

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

08/15

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

View Location Map; G, RO

Progress and Completion Pictures; G, RO

Preconstruction Digital Photographs

Preconstruction Video Recording; G, RO

Work to be Performed by the Contractor; G, RO

Eng Form 93; G, RO

SD-04 Samples

Construction Color Boards; G, RO

SD-05 Design Data

Periodic Construction Video Recordings

Periodic Construction Digital Photographs

Final Completion Construction Video Recordings

SD-07 Certificates

Eng Form 93; G, RO

SD-11 Closeout Submittals

Final Completion Construction Digital Photographs

1.2 CONSTRUCTION COLOR BOARDS

The contractor shall submit two sets of color boards depicting samples of all finish materials and one digital pdf copy for record. The color board (finishes sample submittal package) shall include all visible exterior and interior materials and finishes that are a part of the building (and/or structure) or built-in items provided under this contract. The color

boards shall be delivered to each of the addresses listed below in this section. The Contractor shall furnish color board submittal to each of the addresses within 90 days after receipt of the notice to proceed, but more than 30 days prior to ordering finishing materials. The Contractor should obtain approval of his entire color board submission before beginning any work involving final finishes. The Contractor shall use the following format when assembling the color boards:

- a. Provide the samples on 8 ½" x 11-inch board modules with a maximum spread of 25½" x 33 inches for foldouts. Label the modules with the project titles and design them to fit in a standard loose-leaf, three-post binder. The modules should support and anchor all samples. Anchor large or heavy samples with mechanical fasteners.
- b. Organize the submittals in a logical manner to allow a fast review. Write descriptions and explanations clearly. Drawings and photographs must be clear and concise.
- c. Organize samples by scheme with a separate scheme for each room or for groups of rooms with the same scheme. Coordinate the schemes by room names and numbers shown on the architectural floor plans and room finish and color schedule. Include floor plans and schedules in modules.
- d. Indicate true pattern color and texture for interior material and finish samples. Carpet samples should be large enough to indicate a complete pattern or design, but not less than 3 by 5 inches.
- e. Include color/finish pattern and texture for exterior materials and finishes.
- f. Provide at least a 6 x 6-inch square sample where either interior or exterior special finishes, such as architectural concrete or pre-finished textured metal panels, are required. The Contracting Officer or his representative will obtain concurrence from the BCE prior to approving any exterior finishes submitted by the Contractor.
- g. Contractor to deliver above to address:

US Army Garrison, West Point Directorate of Public Works (USAG DPW)
Building 667B Ruger Road
USACE Resident Engineer - 3rd Floor
West Point, NY 10996
917.790.8477

1.3 VIEW LOCATION MAP

Submit, prior to or with the first digital photograph submittals, a sketch or drawing indicating the required photographic locations. Update as required if the locations are moved.

1.4 PROGRESS AND COMPLETION PICTURES

Photographically document site conditions prior to start of construction operations. Provide monthly, and within one month of the completion of

work, digital photographs, 1600x1200x24 bit true color 12 mega pixels minimum resolution in JPEG file format showing the sequence and progress of work. Take a minimum of 20 digital photographs each week throughout the entire project from a minimum of ten views from points located by the Contracting Officer. Submit with the monthly invoice two sets of digital photographs, each set on a separate compact disc (CD) or data versatile disc (DVD), cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Provide photographs for each month in a separate monthly directory and name each file to indicate its location on the view location sketch. Also provide the view location sketch on the CD or DVD as a digital file. Include a date designator in file names. Cross reference submittals in the appropriate daily report. Photographs provided are for unrestricted use by the Government.

1.4.1 Digital Photographs

Identification: Provide the following information with each image description in file metadata tag or in web-based project software site:

- a. Name of Project.
- b. Name of Architect.
- c. Name of Contractor.
- d. Date photograph was taken.
- e. Description of location, vantage point, and direction.
- f. Unique sequential identifier keyed to accompanying view location map.

1.4.2 Video Recording

Video Recordings: Submit video recordings within seven days of recording.

1. Submit video recordings on CD-ROM, or by uploading to web-based project software site. Include copy of view location map indicating each video's location and direction.
2. Identification: With each submittal, provide the following information in file metadata tag or on web-based project software site:
 - a. Name of Project.
 - b. Name of Architect.
 - c. Name of Contractor.
 - d. Date photograph was taken.
 - e. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

1.4.3 Formats And Media

1.4.3.1 Digital Photographs

As indicated above.

1.4.3.2 Digital Video Recordings

Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full high-definition mode with vibration-reduction technology. Provide supplemental lighting in low light levels or backlit conditions.

1.4.3.3 Digital Images

Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

1.4.3.4 Metadata

Record accurate date and time from camera.

1.4.3.5 File Names

Name media files with date and Project name and sequential numbering suffix.

1.4.4 Construction Photographs

1.4.4.1 General

Take photographs with maximum depth of field and in focus.

1. Maintain view location map with each set of construction photographs that identifies each photographic location.

1.4.4.2 Preconstruction Digital Photographs

Before commencement of preservation and construction activities, take photographs of Project site and surrounding areas, including existing items to remain during construction, from different vantage points, as directed by Architect and Historic Preservation Consultant.

1.4.4.3 Periodic Construction Digital Photographs

Take representative progress photographs once work commences. Select vantage points to show status of construction and progress since last photographs were taken.

1.4.4.4 Final Completion Construction Digital Photographs

Take photographs after date of Substantial Completion for submission as Project Record Documents. Architect and Historic Preservation Consultant will inform photographer of desired vantage points

1.4.5 Construction Video Recordings

1.4.5.1 Narration

Describe scenes on video recording by audio narration by microphone while, or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.

1. Confirm date and time at beginning and end of recording.
2. Begin each video recording with name of Project, Contractor's name, and Project location.

1.4.5.2 Preconstruction Video Recording

Before starting construction, record video recording of Project site and surrounding areas from different vantage points, as directed by Architect.

1. Show existing conditions adjacent to Project site before starting the Work.
2. Show protection efforts by Contractor.

1.4.5.3 Periodic Construction Video Recordings

Record video recordings at vantage points to show status of construction and progress since last video recordings were recorded.

1.4.5.4 Final Completion Construction Video Recordings

Record video recordings at vantage points to show the final construction and completion.

1.5 MINIMUM INSURANCE REQUIREMENTS

Provide the minimum insurance coverage required by FAR 28.307-2 Liability, during the entire period of performance under this contract. Provide other insurance coverage as required by State law.

- a. Procure and maintain during the entire period of project performance under this contract the following insurance policies:

- (1) Commercial General Liability Insurance as required by FAR 28.307-2
- (2) The policies described above must be endorsed ~~(i) to include National Park Service (NPS) and New York State Department of Environmental Conservation (NYSDEC) as additional insured and (ii)~~ to provide that notice of an occurrence to the insurance company from any insured will serve as notice from all insured.
- (3) Comprehensive Automobile Liability Insurance as required by FAR 28.307-2
- (4) Certificates of Insurance evidencing the issuance of all insurance required hereby, and guaranteeing at least thirty (30) days prior notice to the Government of cancellation or non-renewal, must be delivered to the Contracting Officer, NPS and NYSDEC prior to entry of the Government's contractors upon the project area, or, in the case of new or renewal policies replacing any policies expiring during the period, no later than thirty (30) days before the expiration dates of such expiring policies.

- b. Prior to the commencement of work hereunder, provide to the Contracting Officer a certificate or statement of the above required insurance. The policies evidencing required insurance must contain an endorsement to the effect that cancellation or any material change in the policies adversely affecting the interests of the Government in such insurance must not be effective for such a period as may be prescribed by the laws of the State in which this contract is to be performed and in no event less than thirty (30) days after written notice thereof to the Contracting Officer.

- c. The Contractor shall insert the substance of this clause, including

this paragraph (c), in subcontracts under this contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

- d. This insurance will be included at no additional cost to the government.

1.6 CONTRACTOR'S KEY MANAGEMENT PERSONNEL

The following Key Management Personnel shall be employed for the full duration of the contract and meet the minimum requirements described herein and SECTION 01 30 00. All Key Management Personnel Qualifications are to be submitted at the Preconstruction Conference and are subject to Contracting Officer Approval.

a. Contractor's Project Manager:

- (1) Performs all project management duties of the project.
- (2) Serves as the Governments' sole point of contact in all matters relating to work including, but not limited to, contract compliance, progress of work, overall project scheduling, financial matters, and change orders.
- (3) Attends all job meetings.
- (4) On site a minimum of five (5) days per week.
- (5) Minimum of fifteen (15) years of construction experience in similar size project as a project superintendent and/or project manager.
- (6) Authorized to negotiate changes.

b. Contractor's Superintendent: (Overall Field Manager Responsible for Construction)

- (1) Performs all superintendent duties require of the Contractor, except any duties required under "Superintendence of Subcontractors" below.
- (2) Serves as the Governments' sole on site point of contact in all matters relating to the work including, but not limited to, scheduling of work, utility interruptions, and testing.
- (3) Attends all job meetings.
- (4) On site at all time during all construction activities.
- (5) Serves under, and reports directly to, the Contractor's Project Manager.
- (6) Minimum of fifteen (15) years of construction experience in similar size project as a project superintendent and/or project manager.

c. One (1) Assistant Superintendent: (Field Manager Responsible for Construction - Assistant)

- (1) Same duties as Superintendent above but acts as assistant (not the lead).
- (2) Minimum of ten (10) years of construction experience in similar size project.
- (3) Performs all subcontract management/superintendent duties required of the Contractor, and any duties required under contract clause titled SUPERINTENDENCE OF SUBCONTRACTORS.

- (4) Serves as the alternate in the event the Superintendent is absent.
- d. Contractor's Quality Control System Manager: (Manager of Field Quality Control Personnel)
- (1) Performs all quality control management duties required of the Contractor (reference Section 01 45 00.00 10).
 - (2) Serves as the Governments' sole point of contact in all matters relating to the quality of the work including, but not limited to, contract compliance and testing procedures.
 - (3) Has no other duties except Quality Control.
 - (4) Attends all job meetings.
 - (5) On site at all times during construction activities.
 - (6) Reports all deficiencies to the Government and the Contractor's Project Manager for correction.
 - (7) Works directly under, and is responsible to, an officer of the Contractor at least one level higher than the Contractor's Project Manager.
 - (8) Minimum of fifteen (15) years of construction experience in similar size project.
 - (9) Manager of Field Quality Control Personnel indicated in sections e., f., and all additional staff required under the CQC Personnel experience matrix per Section 01 45 00.00 10.
 - (10) The CQC Manager and CQC organization is solely responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.
- e. Contractor's Quality Control System Manager (Mechanical and Electrical Quality Control Personnel)
- (1) Performs all quality control management duties required of the Contractor (reference Section 01 45 00.00 10).
 - (2) Serves as the Governments' sole point of contact in all matters relating to the quality of the work including, but not limited to, contract compliance and testing procedures for MEP.
 - (3) Has no other duties except Quality Control. Acts as assistant to the overall quality control manager.
 - (4) Attends all job meetings.
 - (5) On site at all times during MEP construction activities.
 - (6) Reports all deficiencies to the Government and the Contractor's Project Manager for correction.
 - (7) Works directly under, and is responsible to, an officer of the Contractor at least one level higher than the Contractor's Project Manager.
 - (8) Minimum of ten (10) years of construction experience in similar size project. Follow requirements in specification Section 01 45 00.00 10 Paragraph 3.4.3 Experience Matrix.
- f. Contractor's Assistant Quality Control System Manager: (Manager of Field Quality Control Personnel)
- (1) Performs all quality control management duties required of the Contractor (reference Section 01 45 00.00 10).
 - (2) Serves as the Governments' sole point of contact in all matters relating to the quality of the work including, but not limited to, contract compliance and testing procedures.
 - (3) Has no other duties except Quality Control. Acts as assistant to the overall quality control manager.
 - (4) Attends all job meetings.

- (5) On site at all times during construction activities.
 - (6) Reports all deficiencies to the Government and the Contractor's Project Manager for correction.
 - (7) Works directly under, and is responsible to, an officer of the Contractor at least one level higher than the Contractor's Project Manager.
 - (8) Minimum of seven (7) years of construction experience.
- g. Site Safety and Health Officer: (Principal in Charge of Enforcing Safety Codes)
- (1) Performs all safety management duties required of the Contractor including duties of the Site Safety and Health Officer (SSHO)(reference Specification Section 01 35 26, SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS).
 - (2) Serves as the Governments' sole point of contact for all matters relating to safety.
 - (3) Continually enforces and implements the safety requirements of the contract including the Accident Prevention Plan.
 - (4) On site at all times during construction activities.
 - (5) Has no other duties other than safety. Performs all duties as per EM-385-1-1.
 - (6) Works under and reports to the Contractor's Project Manager.
 - (7) Minimum of ten (10) years construction experience on similar projects in a similar role.
- h. Assistant Site Safety and Health Officer: (Principal in Charge of Enforcing Safety Codes)
- (1) Performs all safety management duties required of the Contractor including duties of the Site Safety and Health Officer (SSHO)(reference Specification Section 01525, SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS).
 - (2) Serves as the Governments' sole point of contact for all matters relating to safety.
 - (3) Continually enforces and implements the safety requirements of the contract including the Accident Prevention Plan.
 - (4) On site at all times during construction activities.
 - (5) Has no other duties other than safety. Performs all duties as per EM-385-1-1.
 - (6) Works under and reports to the Site Safety Health Officer.
 - (7) Minimum of seven (7) years construction experience on similar projects in a similar role.
- i. Cybersecurity Representative:
- (1) Key person to implement and manage the cybersecurity of all related control systems of the project.
 - (2) Submit Cybersecurity Representative's certification of qualifications per DoDD 8570/DoDD 8140 no later than 30 calendar days after Notice to Proceed and at least 30 days prior to the Cybersecurity Kickoff Meeting for review and approval. Submit one hard copy and an electronic copy.
 - (3) The Cybersecurity Representative must lead and oversee the cybersecurity control systems work specified herein and be the primary point of contact for the Government regarding the cybersecurity work.

1.7 FIRST TIER CONTRACTOR REQUIREMENTS FOR ASBESTOS CONTAINING MATERIALS

Accomplish all contract requirements of Section 02 82 00 ASBESTOS REMEDIATION, 02 83 00 LEAD REMEDIATION, 02 85 00 MOLD REMEDIATION assigned to the Designated Competent Person, directly with a first tier subcontractor.

1.8 PLANT

Maintain sufficient plant on the job to meet the requirements of the work. The plant must be in satisfactory operating condition, capable of safely and efficiently performing the work as set forth in the specifications and be subject to the inspection of the Contracting Officer at all times. No reduction in the capacity of the plant employed on the work may be made except by written permission of the Contracting Officer. The measure of the capacity of the plant shall be its performance on the work to which these specifications apply.

1.9 SUPERVISION

The following Key Management Personnel, shall be employed for the full duration of the contract and meet the minimum requirements described herein and SECTION 01 30 00. All Key Management Personnel Qualifications are to be submitted at the Preconstruction Conference and are subject to Contracting Officer Approval.

1.9.1 Minimum Communication Requirements

Have at least one qualified superintendent, or competent alternate, capable of reading, writing, and conversing fluently in the English language, on the job-site at all times during the performance of contract work. In addition, if a Quality Control (QC) representative is required on the contract, then that individual must also have fluent English communication skills.

1.9.2 Contractor's Superintendent Qualifications (Overall Field Manager Responsible for Construction)

The project superintendent must have a minimum of 20 years experience in construction in similar size project as a project superintendent and/or project manager. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance. The individual must be capable of interpreting a critical path schedule and construction drawings.

1.9.2.1 Duties

The project superintendent is primarily responsible for managing and coordinating day-to-day production and schedule adherence on the project. Serves under and reports directly to the Contractor's Project Manager. The superintendent is required to attend all job meeting, USACE partnering meetings, and quality control meetings. The superintendent or qualified alternative must be on-site at all times during the performance of this contract until the work is completed and accepted. Serves as the Governments' sole on site point of contact in all matters relating to the work including, but not limited to, scheduling of work, utility interruptions, and testing. And performs all superintendent duties require of the Contractor, except any duties required under "Superintendence of Subcontractors" below.

1.9.3 Assistant Superintendent

One assistant superintendents shall be assigned to the project.

1.9.4 Qualifications

Minimum of ten (10) years of construction experience in similar size project.

1.9.4.1 Duties

Same duties as Superintendent above but acts as assistant (not the lead). Performs all subcontract management/superintendent duties required of the Contractor, and any duties required under contract clause titled SUPERINTENDENCE OF SUBCONTRACTORS. Serves as the alternate in the event the Superintendent is absent.

1.9.5 Contractor's Project Manager: (Manager of Field Quality Control Personnel)

Assign a Project Manager with the responsibility for the overall management of the project.

1.9.5.1 Duties

Performs all project management duties of the project. Serves as the Governments' sole point of contact in all matters relating to work including, but not limited to, contract compliance, progress of work, overall project scheduling, financial matters, and change orders. Attends all job meetings. On site a minimum of five (5) days per week. Project manager is authorized to negotiate changes.

1.9.5.2 Qualification

The Project Manager must have a minimum 20 years experience as a Project Manager or Superintendent on projects of similar size and complexity

1.9.6 Contractor's Quality Control Systems Manager

Performs all quality control management duties required of the Contractor
01 45 00.00 10 QUALITY CONTROL

1.9.6.1 Qualifications

Minimum of fifteen (15) years of construction experience in similar size project.

1.9.6.2 Duties

Serves as the Governments' sole point of contact in all matters relating to the quality of the work including, but not limited to, contract compliance and testing procedures. Has no other duties except Quality Control. Attends all job meetings. On site at all times during construction activities. Reports all deficiencies to the Government and the Contractor's Project Manager for correction. Works directly under, and is responsible to, an officer of the Contractor at least one level higher than the Contractor's Project Manager. Manager of Field Quality Control Personnel indicated in sections e., f., and all additional staff

required under the CQC Personnel experience matrix per Section 01 45 00.00 10. The CQC Manager and CQC organization is solely responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

1.9.7 Contractor's Assistant Quality Control System Manager: (Manager of Field Quality Control Personnel)

Contractor's Assistant Quality Control System Manager: (Manager of Field Quality Control Personnel)

1.9.7.1 Qualifications

Minimum of seven (7) years of construction experience.

1.9.7.2 Duties

Serves as the Governments' sole point of contact in all matters relating to the quality of the work including, but not limited to, contract compliance and testing procedures for MEP. Has no other duties except Quality Control. Acts as assistant to the overall quality control manager. Attends all job meetings. On site at all times during construction activities. Reports all deficiencies to the Government and the Contractor's Project Manager for correction. Works directly under, and is responsible to, an officer of the Contractor at least one level higher than the Contractor's Project Manager.

1.9.8 Site Safety and Health Officer: (Principle in Charge of Enforcing Safety Code)

Performs all safety management duties required of the Contractor including duties of the Site Safety and Health Officer (SSHO)(reference Specification Section 01 35 26 GOVERNMENT SAFETY REQUIREMENTS. Works under and reports to the Contractor's Project Manager.

1.9.8.1 Qualifications

Minimum of ten (10) years construction experience on similar projects in a similar role.

1.9.8.2 Duties

Serves as the Governments' sole point of contact for all matters relating to safety. Continually enforces and implements the safety requirements of the contract including the Accident Prevention Plan. On site at all times during construction activities. Has no other duties other than safety. Performs all duties as per EM-385-1-1.

1.9.9 Assistant Site Safety and Health Officer: (Principle in Charge of Enforcing Safety Code)

Performs all safety management duties required of the Contractor including duties of the Site Safety and Health Officer (SSHO)(reference Specification Section 01 35 26 GOVERNMENT SAFETY REQUIREMENTS. Works under and reports to the Site Safety Health Officer.

1.9.9.1 Qualifications

Minimum of seven (7) years construction experience on similar projects in

a similar role

1.9.9.2 Duties

Serves as the Governments' sole point of contact for all matters relating to safety. Continually enforces and implements the safety requirements of the contract including the Accident Prevention Plan. On site at all times during construction activities. Has no other duties other than safety. Performs all duties as per EM-385-1-1.

1.9.10 Non-Compliance Actions

The Project Superintendent is subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to insure timely completion. Furthermore, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders is acceptable as the subject of claim for extension of time for excess costs or damages by the Contractor.

1.10 PHYSICAL CONDITIONS

The information and data provided or referred to below are not intended as representations or warranties but are provided for information only. It is expressly understood that the Government will not be responsible for the accuracy thereof or for any deduction, interpretation or conclusion drawn there from by the Contractor.

- a. Weather Conditions: Climatological data determined from records of the U.S. Weather Bureau Station: Newburgh/Stewart, NY

Mean Annual Temperature: 51.9 degrees Fahrenheit
Mean Annual Precipitation: 46.1 inches

Transportation

1. Transportation Facilities:

Highways and Roads: All deliveries shall proceed through the Stony Lonesome Gate Entrance to the United States Military Academy. The contractor will be responsible for coordinating all deliveries with the installation. Roads within the military reservation proposed to be used by the Contractor, shall be subject to prior approval of the post authorities and such roads, if used, shall be maintained throughout construction and shall be restored to as good condition as existed prior to their use. All costs for the use of existing transportation facilities, for the construction of temporary facilities, and for maintenance, repair, removal and restoration shall be borne by the Contractor. The roads system on the installation is inclusive of vehicular bridges. The Contractor is responsible for following all applicable weight restrictions for the vehicular bridges on post. Loading of a vehicular bridge in excess of its rated load requires an oversized load from the asset owner.

2. Railroads: Conrail serves the locality of the proposed work.

Railhead is located approximately 15 miles from the project site. The Contractor shall make all arrangements at his expense for the use of sidings necessary for the delivery of materials, equipment, supplies, and other facilities required for completion of the

work. The Contractor's use of sidings must be arranged so as not to interrupt or delay the operation of the Military reservation.

1.11 SUBMITTAL OF WORK TO BE PERFORMED BY THE CONTRACTOR

Provide the Contracting Officer, within five days after award, items of work to be performed by contractor's employees and the estimated cost of those items. For the purposes of this contract, the percentage of work that must be performed by the Contractor is stated in Section 00 72 00 Contract Clauses, FAR Clause 52.236-01.

1.12 VETERANS EMPLOYMENT EMPHASIS FOR U.S. ARMY CORPS OF ENGINEERS CONTRACTS

In addition to complying with the requirements outlined in FAR Part 22.13, FAR Provision 52.222-38, FAR Clause 52.222-35, FAR Clause 52.222-37, DFARS 222.13 and Department of Labor regulations, U.S. Army Corps of Engineers (USACE) contractors and subcontractors at all tiers are encouraged to promote the training and employment of U.S. veterans while performing under a USACE contract. While no set-aside, evaluation preference, or incentive applies to the solicitation or performance under the resultant contract, USACE contractors are encouraged to seek out highly qualified veterans to perform services under this contract.

The following resources are available to assist USACE contractors in their outreach efforts:

Federal Veteran employment information at
<http://www.fedshirevets.gov/index.aspx>
Department of Labor Veterans Employment Assistance
<https://www.dol.gov/vets/>
Department of Veterans Affairs-VOW to Hire Heroes Act
<http://benefits.va.gov/vow/>
Army Wounded Warrior Program-
<http://wtc.army.mil/modules/employers/index.html>
U.S. Chamber of Commerce Foundation-Hiring Our Heroes
<http://www.hiringourheroes.org/>

1.13 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE SCHEDULE (52.231-5000)

- a. This special contract requirement does not apply to terminations. See USACE Acquisition Instructions (UAI) 52.249-5000, Basis for Settlement of Proposals, and FAR Part 49.
- b. Allowable cost for construction equipment in sound workable condition owned or controlled and provided by a contractor or subcontractor at any tier must be based on actual cost data for each piece of equipment or groups of similar serial and series for which the Government can determine both ownership and operating costs from the contractor's accounting records. When both ownership and operating costs cannot be determined for any piece of equipment or groups of similar serial or series equipment from the contractor's accounting records, costs for that equipment must be based upon the applicable provisions of EP 1110-1-8, Region I. Working conditions must be considered to be average for determining equipment rates using the schedule unless specified otherwise by the contracting officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of

negotiations must apply. For retroactive pricing, the schedule in effect at the time the work was performed must apply.

- c. Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36, Rental Costs. Rates for equipment rented from an organization under common control, lease purchase arrangements, and sale-leaseback arrangements, will be determined using the schedule, except that actual rates will be used for equipment leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees.
- d. When actual equipment costs are proposed and the total amount of the pricing action exceeds the SAT, the contracting officer must request the contractor to submit either certified cost or pricing data, or partial/limited data, as appropriate. The data must be submitted on Standard Form 1411, Contract Pricing Proposal Cover Sheet.

1.14 SUPERINTENDENCE OF SUBCONTRACTORS

- a. Provide the following, in addition to the superintendence required by FAR Clause 52.236-6 - Superintendence by the Contractor.
 - (1) If more than 50 percent and less than 70 percent of the value of the contract work is subcontracted, One superintendent must be provided at the site and on the Contractor's payroll to be responsible for coordinating, directing, inspecting and expediting the subcontract work.
 - (2) If 70 percent or more of the value of the work is subcontracted, the Contractor must be required To provide two such superintendents to be responsible for coordinating, directing, inspecting and expediting the subcontract work.
- b. If the Contracting Officer, at any time after 50 percent of the subcontracted work has been completed, finds that satisfactory progress is being made, he may waive all or part of the above requirement for additional superintendence subject to the right of the Contracting Officer to reinstate such requirement if at any time during the progress of the remaining work he finds that satisfactory progress is not being made.

1.15 PRECONSTRUCTION CONFERENCE

After award of the contract but prior to commencement of any work at the site, meet with the Contracting Officer to discuss and develop a mutual understanding relative to the administration of the value engineering and safety program, preparation of the schedule of prices or earned value report, shop drawings, and other submittals, scheduling programming and prosecution of the work. Major subcontractors who will engage in the work must also attend.

The Contractor must provide at this conference the following items as indicated:

- a. Initial Project Schedule; section 01 32 01.00 10 Project Schedule
- b. Accident Prevention Plan (APP); section 01 35 26 Governmental Safety Requirements

- c. Contractor Quality Control (CQC) Plan; section 01 45 00.00 10 Quality Control
- d. List of Contact Personnel; section 01 14 00 Work Restrictions
- e. Letter appointing Superintendent
- f. Detailed Concept of Operations Plan

1.16 COORDINATION PERIOD

In addition to contract clause titled PRECONSTRUCTION CONFERENCE, the Contractor shall reserve a 2 workday period of time no later than one month following the contract preconstruction conference for coordination. The Contractor's project management team responsible for this project shall participate. During the 2-day coordination period the Contractor and the Government will exchange information related to the government regulations and procedures, points of contact, relevant design information and general discussion about the execution and coordination of the project. The Contractor shall dedicate his management team for this 2-day coordination period.

1.17 CONNECTION WITH WORK OF OTHER CONTRACTS

During the period of this contract, other contracts may be in force for the construction of other features of work on or adjacent to the site of work being accomplished under this contract. The Contractor shall arrange his plant and shall schedule and perform the work as to effectively cooperate with all other contractors and Government agencies. It is the Contractor's responsibility to know the extent of the limits of his contract. No direct or extra compensation will be allowed on account of the cooperation required.

- a. At all points of connection with work of other contracts, the Contractor shall have weekly coordination meetings until all connections have been completed with the adjoining contractor(s) to insure proper and timely connections.
- b. Where the work under this contract is completed before that of the adjoining contractor, the Contractor shall terminate his work in an approved manner ready for future connection by the adjoining contractor. Pipes and conduits shall be closed with suitable caps or plugs that will prevent entry of dirt or debris, but that are readily removable when final connections are made. For underground lines that are back-filled, approved type markers that extend above the ground surface shall be provided to facilitate future location of the lines by the adjoining contract.
- c. Where the work of the adjoining contractor is already in place, the Contractor shall perform all work required to effect the necessary connection, including locations of underground lines, removing of caps, providing necessary adapters or joining pieces, and all related incidental work for necessary for a proper, secure connection.
- d. USAG DPW has privatized water, wastewater, and electrical utility systems and the Contractor is expected to coordinate with the utility system owners and their standard operating procedures. The contractor shall coordinate at the time of award and continuously over the course of the project to ensure the construction schedule properly

encompasses Primary Utility Contractor's schedule. The contractor is to designate an authorized representative to be responsible for the coordination with the utility system owner, preparation of the schedule and all required updating. The project schedule is to demonstrate the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities of the privatized utility provider. Activities associated with the procurement, fabrication, and delivery of long lead materials, equipment, fabricated assemblies, and supplies are to be included in the schedule.

Contractor shall assume that the project construction schedule will shift and shall be able to adjust the schedule's relationship with the utility provider's schedule accordingly. Ongoing coordination with the Privatized Utility Owner, to include working interactive exchange of idea and periodic schedule update meetings are expected.

1.18 COORDINATION OF TRADES

- a. The contract drawings are in part diagrammatic and show the general arrangement of duct, piping and other mechanical and electrical trades. The Contractor must have a competent engineer on the project site to coordinate all fieldwork and shop drawings of the various trades prior to installation and/or submission of field or shop drawings for approval. The Contractor shall allot spaces to the various trades prior to installation of the work. In spaces where all the various installations cannot be accommodated, the Contractor shall notify the Contracting Officer and shall submit alternate solutions as to its solution at no cost to the Government. The decision of the Contracting Officer shall be final.
- b. The Contractor shall be responsible for the coordinated drawings of the various trades showing locations and sizes of all sleeves, electric outlets, inserts, piping, shafts, hangers, lights, ducts, catwalks, pads, chases, sprinklers, smoke detectors, soffits, fascias, steel trusses, blocking, high-density storage components/rails, etc. Composite signed-off coordinated shop drawings shall be developed at 3/8" equals 1'-0 scale showing all mechanical electrical work in hung ceilings and chases.

1.19 CERTIFICATES OF COMPLIANCE

Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be executed in 4 copies. Each certificates shall be signed by an official authorized to certify in behalf of the manufacturing company and shall contain the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certification apply. Copies of laboratory tests reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Contractor from furnishing satisfying material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements

1.20 NO WAIVER BY GOVERNMENT

The failure of the Government, in any one or more instances, to insist upon the strict performance of any of the terms of this Contract or to

exercise any option herein conferred shall not be construed as a waiver or relinquishment to any extent of the right to assert or rely upon such terms or option on any future occasion.

1.21 PROGRESS PAYMENTS

See FAR Clause 52.232-16 PROGRESS PAYMENTS for any item of work in the bid schedule.

1.22 PROCEDURES FOR SUBMISSION AND PAYMENT OF ALL CONTRACT PAYMENTS

In addition to the requirements contained in the Contract Clause entitled "PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS" and to implement the requirements of the Prompt Payment Act Amendments of 1988, P.L. 100-496, the following must apply to all payments made under this contract:

- a. At the time of submission of the progress chart, the contractor must submit for approval by the Contracting Officer or his authorized representative a breakdown of the contract work which must be to the degree of detail required by the Contracting Officer or his representative to effect reasonable progress payments. The Contracting Officer or his representative must review this breakdown within 30 calendar days after receipt and either advise the contractor that it is approved or disapproved, and if disapproved the reasons for disapproval. Only after the breakdown is approved must any payment invoice be accepted from the contractor and any payment made to him. The Contracting Officer can determine if it is in the best interest of the Government to make payment without an approved breakdown, however, in no case could be more than 10 percent of the contract amount be paid unless the breakdown is approved.
- b. The contractor must submit his request for payment by submission of a proper invoice to the office or Person(s) designated in subparagraph (c). For purposes of payment a "proper invoice" is defined as the following:
 - (1) An estimate of the work completed in accordance with the approved breakdown indicating the percentage of work of each item and the associated costs.
 - (2) A properly completed [Eng Form 93](#) and 93a (where required).
 - (3) All contractual submissions indicated elsewhere in this contract to be submitted with payment, such as updated progress schedules, updated submittal registers, etc.
 - (4) The following certification executed by a responsible official of the organization authorized to bind the firm. A "responsible official" would be either a corporate officer, partner, or owner, in the case of a sole proprietorship I hereby certify, to the best of my knowledge and belief, that --
 - (a) The amounts requested are only for performance in accordance with the specifications, terms and conditions of the contract;
 - (b) Payments to subcontractors and suppliers have been made from previous payments received under the contract and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract requirements and the

requirements of chapter 39 of Title 31, United States Code; and

(c) This request for progress payments does not include any amounts, which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract.

(d) All required prime and subcontractor payrolls have been submitted.

(Name)_____

(Title)_____

(Date)_____

- c. The Government will designate the office or person(s) who will first receive the invoice submissions and the Contractor will be so notified at the preconstruction conference.
- d. The Government representative will return any request for payment which is deemed defective within 7 days of receipt and will specify the defects. If the defect concerns a disagreement as to the amount of work performed and/or the amount of the payment being submitted, the Government and the contractor's representative should meet to resolve the differences and reach agreement. Upon agreement, the contractor must submit a new breakdown and [Eng Form 93](#) (and 93a) and any other submissions requiring correction. These will be incorporated with the previous submittal and will then constitute a proper invoice.
- e. If agreement cannot be reached, the Government must determine the proper amount per Contract Clause, PAYMENTS UNDER FIXED-PRICE CONSTRUCTION CONTRACTS and process the payment accordingly. In this event, a "proper invoice" for Prompt Payment Act purposes will not have been submitted to the Government.
- f. The Government must pay the contractor in accordance with the following time frames:
 - (1) Progress Payments - From the date a "proper invoice" is received, in accordance with subparagraphs b and d of this clause, the Government will issue a check within 14 calendar days.
 - (2) Reduction in Retainage Payment. If during the course of the contract, a reduction in retainage payment is required, the Government will issue a check within 30 calendar days after the approval of the release to the contractor by the Contracting Officer or his authorized representative.
 - (3) Final Payment. A final payment request will not be considered valid until the contractor has fulfilled all contract requirements including all administrative items, payrolls, warranties, etc. and has submitted a release of claims. When the contractor has fulfilled all contract requirements and a "proper invoice" has been submitted, the Government will issue a check within 30 days from the date of acceptance of the project by the Contracting Officer.

1.23 SUBMISSION OF CLAIMS

The following must be submitted to the Contracting Officer at the following address: U.S. Army Corps of Engineers, Room 1843, New York District, 26 Federal Plaza, New York, New York 10278-0090:

- a. claims referencing or mentioning the Contracting Disputes Act of 1978
- b. requests for a written decision by the Contracting Officer
- c. claims certified in accordance with the Contract Disputes Act of 1978

No other Government representative is authorized to accept such requests. A copy must also be provided to the Authorized Representative of the Contracting Officer.

Provide the Contracting Officer with a copy of any requests for additional time, money or interpretation of contract requirements which were provided to the Authorized Representative of the Contracting Officer and which have not been resolved after 90 days.

1.24 PRICING OF ADJUSTMENT

When costs are a factor in any determination of a contract price adjustment pursuant to the Changes clause or any other clause of this contract, such costs shall be in accordance with Part 31 of the Federal Acquisition Regulation and DFARS 252.215-7000 (Dec. 1991) as follows:

PRICE ADJUSTMENTS (DEC 2012)

The term "pricing adjustments", as used in paragraph (a) of the clauses entitled "Price Reduction for Defective Certified Cost or Pricing Data-Modifications", "Subcontractor Certified Cost or Pricing Data," and "Subcontractor Certified Cost or Pricing Data- Modifications," means the aggregate increases and/or decreases in cost plus applicable profits.

1.25 PAYMENTS FOR MATERIALS DELIVERED OFF-SITE (52.232-5000)

- (a) Pursuant to FAR 52.232-5, Payments Under Fixed Price Construction Contracts, materials delivered to the Contractor at locations other than the site of the work may be taken into consideration in making payments if included in payment estimates and if all the conditions of the General Provisions are fulfilled. Payment for items delivered to locations other than the work site must be limited to:
 - (1) Materials required by the technical provisions; or
 - (2) Materials that have been fabricated to the point where they are identifiable to an item of work required under this contract; or
 - (3) Items specifically listed below.
- (b) Payment for materials delivered off-site must be made only after receipt of paid invoices listing the value of material and labor incorporated in the items along with a canceled check showing the prime contractor's title to the items delivered off site.

1.26 LABOR-ADDITIONAL REQUIREMENTS

Fringe benefits statement: The method of payment of applicable fringe benefits will be indicated on DD Form 879, Statement of Compliance, and attached to each weekly payroll.

1.27 (S-102) CONTRACTOR SUPPLY and USE OF ELECTRONIC SOFTWARE FOR PROCESSING DAVIS-BACON ACT CERTIFIED LABOR PAYROLLS (April 2011)

The contractor is encouraged to use a commercially-available electronic system to process and submit certified payrolls electronically to the Government. The requirements for preparing, processing and providing certified labor payrolls are established by the Davis-Bacon Act as stated in FAR 52.222-8, PAYROLLS AND BASIC RECORDS and FAR 52.222-13, COMPLIANCE WITH DAVIS-BACON AND RELATED ACT REGULATIONS.

If the contractor elects to use an electronic Davis-Bacon payroll processing system, then the contractor must be responsible for obtaining and providing for all access, licenses, and other services required to provide for receipt, processing, certifying, electronically transmitting to the Government, and storing weekly payrolls and other data required for the contractor to comply with Davis-Bacon and related Act regulations. When the contractor uses an electronic Davis-Bacon payroll system, the electronic payroll service shall be used by the contractor to prepare, process, and maintain the relevant payrolls and basic records during all work under this construction contract and the electronic payroll service must be capable of preserving these payrolls and related basic records for the required three years after contract completion. If the contractor chooses to use an electronic Davis-Bacon payroll system, then the contractor must obtain and provide electronic system access to the Government, as required to comply with the Davis-Bacon and related Act regulations over the duration of this construction contract. The access must include electronic review access by the Government contract administration office to the electronic payroll processing system used by the contractor.

The contractor's provision and use of an electronic payroll processing system must meet the following basic functional criteria: commercially available; compliant with appropriate Davis Bacon Act payroll provisions in the FAR; able to accommodate the required numbers of employees and subcontractors planned to be employed under the contract; capable of producing an Excel spreadsheet-compatible electronic output of weekly payroll records (format at <http://www.rmssupport.com/guides.aspx>) for export in an Excel spreadsheet to be imported into the contractor's Quality Control System (QCS) version of RESIDENT MANAGEMENT SYSTEM CONTRACTOR MODE (RMS CM), that in turn must export payroll data to the Government's RESIDENT MANAGEMENT SYSTEM (RMS); demonstrated security of data and data entry rights; ability to produce contractor-certified electronic versions of weekly payroll data; ability to identify erroneous entries and track the data/time of all versions of the certified Davis Bacon payrolls submitted to the government over the life of the contract; capable of generating a durable record copy, that is, a CD or DVD and PDF file record of data from the system database at end of the contract closeout. This durable record copy of data from the electronic Davis-Bacon payroll processing system must be provided to the Government during contract closeout.

All contractor-incurred costs related to the contractor's provision and use of an electronic payroll processing service must be included in the

contractor's price for the overall work under the contract. The costs for Davis-Bacon Act compliance using electronic payroll processing services must not be a separately bid/proposed or reimbursed item under this contract.

1.28 BID GUARANTEE

See contract clause entitled BID GUARANTEE in Specifications section 00 72 00 CONTRACT CLAUSES.

1.29 DESIGNATION OF PROPERTY ADMINISTRATOR

The Chief, Property and Accounting Section, U.S. Army Engineer District, New York, Federal Building, 26 Federal Plaza, New York, N.Y. 10278-0090 is designated as Property Administrator, in connection with this contract.

1.30 EQUAL OPPORTUNITY PREAWARD CLEARANCE OF SUBCONTRACTORS

Notwithstanding the clause of this contract entitled "Subcontracts", the Contractor shall not enter into a first-tier subcontract for an estimated or actual amount of \$1 million or more without obtaining in writing from the Contracting Officer a clearance that the proposed subcontractor is in compliance with the equal opportunity requirements and therefore is eligible for award.

1.31 DAMAGE TO WORK

The responsibility for damage to any part of the permanent work shall be as set forth in the article of the contract clause entitled "PERMITS AND RESPONSIBILITIES". However, if in the judgment of the Contracting Officer, any part of the permanent work performed by the Contractor is damaged by flood, earthquake, hurricane, severe coastal storm or tornado, which damage is not due to the failure of the Contractor to take reasonable precautions or to exercise sound engineering and construction practices in the conduct of the work, the Contractor will make the repairs as ordered by the Contracting Officer and full compensation for such repairs will be made at the applicable Contract unit or lump-sum prices as fixed and established in the Contract. If, in the opinion of the Contracting Officer, there are no Contract unit or lump sum prices applicable to any part of such work, an equitable adjustment, pursuant to Contract Clause entitled CHANGES, will be made as full compensation for the repairs of that part of the permanent work for which there are not applicable Contract unit or lump-sum prices. Except as herein provided, damage to all work, utilities, materials, equipment, and plant, including temporary construction and utilities, pavements, and other property along the routes used by the Contractor's pipelines and/or land vehicles, shall be repaired to the satisfaction of the Contracting Officer, the State of New York, and the utilities companies, at the Contractor's expense regardless of the cause of such damage.

1.32 VERIFICATION OF SMALL BUSINESS UTILIZATION

- a. This clause is applicable to small business concerns whose contracts exceed \$1,000,000.
- b. In accordance with the clause at FAR 52.219-8, entitled UTILIZATION OF SMALL BUSINESS CONCERNS AND SMALL DISADVANTAGED BUSINESS CONCERNS, in effect on the date of this contract, the Contracting Officer may survey the extent of small and small disadvantaged business

utilization under this contract. The Contractor may be required to report to the Contracting Officer statistical data on the number and dollars amounts of subcontracting awards with small businesses and small disadvantaged businesses.

- c. As appropriate, the Contracting Officer may require one or more follow-up reports to the initial report.
- d. The Contractor agrees to insert this clause in any subcontract that may exceed \$1,000,000, including this subparagraph (d).

1.33 FAR 52.211-12, LIQUIDATED DAMAGES--CONSTRUCTION

a. If a delay to the NTP date is a result of the Contractor, an extension will not be given. If the Contractor fails to complete the work within the time specified in the contract, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of \$5,400 for each day of delay.

b. If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

c. If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted. (FAR 52.212-5)

d. At a time before the project is physically complete but is functionally complete to the satisfaction of the Government, the Government at its sole discretion may agree to accept transfer of the facility or project provided that the remaining work to be done ("punchlist") is completed no later than 30 days from the date of transfer. In this case the contractor shall pay liquidated damages for punchlist items not completed in the daily amount of \$1,350 per day commencing after 30 days of project transfer or after date required for project completion (including all extensions), whichever occurs later.

1.34 PERFORMANCE EVALUATION OF CONTRACTOR

- (a) As a minimum, the Contractor's performance will be evaluated upon final acceptance of the work. However, interim evaluation may be prepared at any time during contract performance when determined to be in the best interest of the Government.
- (b) The format for the evaluation will be SF Form 2626, and the Contractor will be rated, either, outstanding, satisfactory, or unsatisfactory in the areas of Contractor Quality Control, Timely Performance, Effectiveness of Management, Compliance with Labor Standards, and Compliance with Safety Standards. The Contractor will be advised of any unsatisfactory rating, either in an individual element or in the overall rating, prior to completing the evaluation, and all Contractor comments will be made a part of the official record. Performance Evaluation Reports will be available to all DOD Contracting Offices for their future use in determining Contractor responsibility, in compliance with DFARS 236.201.
- (c) A similar evaluation for subcontractors will be prepared if the Government deems it to be appropriate.

1.35 RED ZONE MEETINGS

Towards the end of the construction contract, conduct red zone meetings to discuss known construction issues before beneficial occupancy. Coordinate with the Contracting Officer to schedule these meetings. Attendees must include the Contractor representatives, Contracting Officer, customer, and others as appropriate. The meeting will be scheduled at least 60 days from the scheduled Beneficial Occupancy Date (BOD) or at 80 percent construction completion.

The meeting agenda should include, but not be limited to the following:

- a. Status of progress vs. schedule of the project.
- b. Pending modifications, time extensions, etc.
- c. Submittals -O&M Manuals and as-built drawings.
- d. Warranty information and periods, transfer procedures and responsibilities, and security requirements and key transfer.
- e. Posting equipment instructions, training requirements for maintenance personnel, and pre-final and final inspection procedures.
- f. HVAC Commissioning, Building Commissioning, and Enhanced Commissioning.
- g. Correction of deficiencies (timely).
- h. Status of payroll requirements.
- i. Withholding of payments for outstanding deficiencies.
- j. Liquidated damages.
- k. Fiscal Items - Modifications required for BOD, post BOD modifications, mods funded by MIPRS.
- l. On Military Contracts - DD Form 1354 coding requirements discussed with the Real Property Accountable Officer.
- m. Joint occupancy requirements / fit-out / follow-on contractor coordination issues.
- n. LEED notebook.
- o. Refer to attachment A - INITIAL RED ZONE MEETING CHECKLIST.

1.35.1 General Meeting Requirements

Preparatory and Initial Phase meeting checklists. See Section 01 45 00.00 10 QUALITY CONTROL for Preparatory and Initial Phase meeting checklists. The contractor is responsible for phase and progress meetings to include:

- a. Meeting notification to participants.
- b. Prepare agenda for meetings.

- c. Use phase checklists for Preparatory and Initial Phase meetings
- d. Physical arrangements for meetings.
- e. Preside at meetings.
- f. Record minutes recording proceedings and decisions.
- g. Copy and send minutes to:
 - (1) Meeting participants.
 - (2) Project parties affected by decisions.
 - (3) Contracting Officer (No later than 3 working days).

1.35.2 Weekly Progress Meetings Agenda

See section 01 32 01.00 10 PROJECT SCHEDULE for the weekly progress meeting. Modify the agenda as needed for on-going work.

- a. Review minutes from previous progress meetings.
- b. Review RMS CM Contractor Action Item Report
- c. Review work progress since previous meeting.
- d. Review current definable features of work:
 - Identify phases of current features of work.
 - Identify pending phase changes.
 - Identify features for discussion in next scheduled meeting.
- e. Discuss problem prevention:
 - (1) Field observations.
 - (2) Deficiencies and tracking.
 - (3) Procedures working well.
 - (4) Problems, conflicts.
 - (5) Methods to improve.
- f. Review construction schedule:
 - (1) Identify delays.
 - (2) Discuss proposed corrective actions to regain schedule.
- g. Submittals and Requests for Information (design interpretation):
 - (1) Review submittal register.
 - (2) Identify submittals to expedite as required.
- h. Review off-site activities:
 - (1) Fabrications.
 - (2) Material and equipment delivery schedule.
- i. Review Testing:
 - (1) Type, Schedule.
 - (2) Received Results.

- j. Review changes to construction schedule:
 - (1) Planned progress during succeeding work period.
 - (2) Coordination of various schedules.
 - (3) Effect of changes on construction and completion date.
- k. Review site safety.
- l. Discuss maintaining contract quality for materials and workmanship.
- m. Discuss pending modifications, changes, and substitutions.
- n. Discuss other business, as appropriate.

1.36 PARTNERING

To most effectively accomplish this contract, the Government requires the formation of a cohesive partnership within the Project Team whose members are from the Government, the Contractor and their Subcontractors. Key personnel from the Supported Command, the End User (who will occupy the facility), the Government Design and Construction team and Subject Matter Experts, the Installation, the Contractor and Subcontractors, and the Designer of Record will be invited to participate in the Partnering process. The Partnership will draw on the strength of each organization in an effort to achieve a project that is without any safety mishaps, conforms to the Contract, and stays within budget and on schedule.

The Contracting Officer will provide Information on the Partnering Process and a list of key and optional personnel who should attend the Partnering meeting.

1.36.1 Formal Partnering

Provide and host the Partnering sessions with key personnel of the Project Team, including Contractor personnel and Government personnel. The Contractor should plan for the attendance of approximately 15 to 20 individuals from the Government, local community representatives, NYSDEC in addition to the Contractor's and subcontractor's personnel. Pay all costs associated with the Partnering effort including the Facilitator, the meeting room, and other incidental items. In exception, each participant bears their own costs for meals, lodging, and transportation associated with the Partnering sessions.

Before a Partnering session, coordinate with the Facilitator all requirements for incidental items (such as audio-visual equipment, easels, flipchart paper, colored markers, note paper, pens/pencils, colored flash cards), and have these items available at the Partnering session. Provide copies of documents for distribution to all attendees. Provide a Facilitator experienced in conducting Partnering Workshops, and who is acceptable to both the Government and the Contractor. The Facilitator is responsible for leading the team in a timely manner and making sure that issues are identified and resolved. A list of Partnering Facilitators is available from the Contracting Officer.

- a. Schedule the Initial Partnering Session for a duration of one day minimum. Locate this session at a place off the construction site, as agreed to by the Contracting Officer and the Contractor. It may take place concurrently with the Pre-Construction conference.

- b. Schedule follow-on Partnering Session(s) for a maximum of 4 hours. Schedule them at no more than 3 to six month intervals. Participants are encouraged to utilize electronic means to expedite meetings. Meetings may be held at a location off-Base, at the project site, or in a Government Facility on Base. Follow-on meetings may be held concurrently with other scheduled meetings. Attendees need only be those required to resolve current issues. Recommend using the same Facilitator from the Initial Partnering session to achieve best results and for continuity.
- c. Provide a completed partnering agreement to all participants within 30 days of partnering session.

1.37 GENERAL MEETING REQUIREMENTS

1.37.1 Preparatory and Initial Phase meeting checklists

See Section 01 45 00.00 10 QUALITY CONTROL for Preparatory and Initial Phase meeting checklists. The contractor is responsible for phase and progress meetings to include:

- a. Meeting notification to participants
- b. Prepare agenda for meetings
- c. Use phase checklists for Preparatory and Initial Phase meetings
- d. Physical arrangements for meetings
- e. Preside at meetings
- f. Record minutes recording proceedings and decisions
- g. Copy and send minutes to:
 - (1) Meeting participants
 - (2) Project parties affected by decisions
 - (3) Contracting Officer (No later than 3 working days)

1.37.2 Weekly Progress Meetings Agenda

See section 01 32 01.00 10 PROJECT SCHEDULE for the weekly progress meeting. Modify the agenda as needed for on-going work.

- a. Review minutes from previous progress meetings
- b. Review RMS CM Contractor Action Item Report
- c. Review work progress since previous meeting
- d. Review current definable features of work:
 - Identify phases of current features of work
 - Identify pending phase changes
 - Identify features for discussion in next scheduled meeting

- e. Discuss problem prevention:
 - (1) Field observations
 - (2) Deficiencies and tracking
 - (3) Procedures working well
 - (4) Problems, conflicts
 - (5) Methods to improve
 - f. Review construction schedule:
 - (1) Identify delays
 - (2) Discuss proposed corrective actions to regain schedule
 - g. Submittals and Requests for Information (design interpretation):
 - (1) Review submittal register
 - (2) Identify submittals to expedite as required
 - h. Review off-site activities:
 - (1) Fabrications
 - (2) Material and equipment delivery schedule
 - i. Review Testing:
 - (1) Type, Schedule
 - (2) Received Results
 - j. Review changes to construction schedule:
 - (1) Planned progress during succeeding work period
 - (2) Coordination of various schedules
 - (3) Effect of changes on construction and completion date
 - k. Review site safety
 - l. Discuss maintaining contract quality for materials and workmanship
 - m. Discuss pending modifications, changes, and substitutions
 - n. Discuss other business, as appropriate
- 1.38 SITE AND BUILDING SECURITY AND VEHICLE IDENTIFICATION
- a. The Contractor must be responsible for the security of the areas within the contract limits. When the Government takes possession of certain areas, the Contractor must be responsible for the areas remaining under Contractor control.

- b. The Contract must maintain continual base security with personnel security guard and temporary fences. Wherever there are fence disruptions due to the construction of this project, the Contractor must continually monitor and maintain the fence.
- c. The Contractor must be responsible for furnishing an identification required by West Point Military Academy to each employee in accordance with paragraph titled AT/FP - Identification for Contractor Personnel. The Contractor must provide an updated list of all employees working on the site. This list must be provided on a monthly basis or when requested by the Contracting Office throughout the duration of this contract.
- d. The Contractor must be responsible for requiring each employee engaged on the work to display such identification as may be approved and directed by the Contracting Officer. All prescribed identification must immediately be delivered to the Contracting Officer for cancellation upon release of any employees. When required by the Contracting Officer, the Contractor must obtain and submit fingerprints of all persons employed or to be employed on the project.
- e. The Contractor and subcontractors must register all company and private vehicles that will be used in the execution of this contract with the Installation Provost Marshall's office prior to start of work by the Contractor/subcontractor. Entry to the installation requires the following prior coordination with the Contracting Officer or designated representative; current vehicle registration, proof of insurance, valid driver's license for the vehicle driver, and procure identification for other personnel. Contractors/Subcontractors and their employees requiring access to the installation will be required to comply with the installation access control policy/procedures. The government will not be responsible for damages due to delay/stoppages caused by failure to comply.
- f. All vehicles and personnel are subject to search and seizure of contraband and/or unauthorized government property. Contractor vehicles (Contractor-owned and personal), contractor personnel, and their personal property must be subject to searches upon entering or leaving the installation. The search and seizure provisions of AR 190-22 must apply to contractor personnel entering or leaving West Point Military Academy.

1.39 ELECTRONIC MAIL (E-MAIL) ADDRESS

Establish and maintain electronic mail (e-mail) capability along with the capability to open various electronic attachments as text files, pdf files, and other similar formats. Within 10 days after contract award, provide the Contracting Officer the email addresses required for electronic communications from the Contracting Officer related to this contract including, but not limited to contract documents, invoice information, request for proposals, and other correspondence. The Contracting Officer may also use email to notify the Contractor of base access conditions when emergency conditions warrant, such as hurricanes or terrorist threats. Multiple email addresses are not allowed.

It is the Contractor's responsibility to make timely distribution of all Contracting Officer initiated e-mail with its own organization including field office(s). Promptly notify the Contracting Officer, in writing, of any changes to this email address.

West Point, NY
Cullum Hall

Contract #W912DS-19-C0031

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 05 51 33

METAL LADDERS

02/16

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN LADDER INSTITUTE (ALI)

ALI A14.3 (2008; R 2018) Ladders - Fixed - Safety Requirements

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2020) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM A36/A36M (2019) Standard Specification for Carbon Structural Steel

ASTM A47/A47M (1999; R 2018; E 2018) Standard Specification for Ferritic Malleable Iron Castings

ASTM A53/A53M (2020) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM A123/A123M (2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A153/A153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A500/A500M (2018) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

ASTM A653/A653M (2020) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM A780/A780M (2009; R 2015) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

ASTM A924/A924M (2018) Standard Specification for General

Requirements for Steel Sheet,
Metallic-Coated by the Hot-Dip Process

ASTM D1187/D1187M

(1997; E 2011; R 2011) Asphalt-Base
Emulsions for Use as Protective Coatings
for Metal

MASTER PAINTERS INSTITUTE (MPI)

MPI 79

(2012) Primer, Alkyd, Anti-Corrosive for
Metal

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC SP 6/NACE No.3

(2007) Commercial Blast Cleaning

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.23

(Nov 2016) Ladders

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submittals with an "AE" are for submittal to the Designer of Record. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Ladders, Installation Drawings

Ship's Ladder (With or Without Guards), Installation Drawings

SD-03 Product Data

Ladders

Ship's Ladder (With or Without Guards)

Ladder Safety Devices (Climbing Ladder Fall Arrest Systems)

SD-05 Design Data

Member and Connection Calculations; G, AE

SD-07 Certificates

Fabricator Certification for Ladder Assembly

Fabricator Certification for Ships Ladder Assembly

Certification Letter From Contractor's Professional Engineer; G, AE

1.3 CERTIFICATES

Provide fabricator certification for ladder assembly stating that the ladder and associated components have been fabricated according to the requirements of 29 CFR 1910.23.

Provide fabricator certification for ships ladder assembly stating that the ships ladder and associated components have been fabricated according to the requirements of 29 CFR 1910.23.

1.4 QUALIFICATION OF WELDERS

Qualify welders in accordance with AWS D1.1/D1.1M. Use procedures, materials, and equipment of the type required for the work.

1.5 SHOP DRAWINGS

Include plans, elevations, sections, details, and attachments to other work. Indicate sizes, spacing and locations of structural members. Include details of cuts, connections, splices, attachments, holes, and other pertinent data. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Indicate all AWS weld designations for pre-qualified full and partial penetration welds and detail all joint preparations. Provide erection details of all field welded connections. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Detail material required for the connection of other work. The Professional Structural Engineer's signature and seal shall appear on all structural steel shop drawings (including erection drawings, piece drawings and connection calculations. Cloud, bubble, or otherwise highlight and identify all revisions on the drawings. Submittals which do not identify changes and revisions will be returned as "Not Reviewed". Drawings that have been renumbered will be rejected.

1.5.1 Design Calculations

Design Calculations for Metal Ladders: Design Metal Ladders under direct supervision of the manufacturer employed Professional Engineer. Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations (Member and Connection Calculations). Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers and a coordinated table of contents. Design Calculations submittal shall be signed and sealed by a qualified Professional Engineer licensed in the state or district in which the project is located. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect. Design Calculations submission must be concurrent with the submission of corresponding Fabrication drawings. Fabrication drawings submitted without corresponding Design Calculations will be returned as "Not Reviewed". Design Calculations shall be submitted for information only.

1.5.1.1 Certification Letter from Contractor's Professional Engineer

Prior to the submission of Shop Drawings, Product Data, Design Calculations and other required submittals, submit a Certification Letter

from the Contractor's responsible design Professional Engineer. No shop drawings will be reviewed by the Architect prior to the submission and acceptance of this Certification Letter. Certification Letter shall be submitted for information only. The Certification Letter shall include the following:

- a. Signature and seal of the registered Professional Engineer (registered in the state or district in which the project is located).
- b. Statement that the Professional Engineer is fully experienced in the design of Metal Ladders.
- c. Statement that all calculations and shop drawings are in accordance with the Contract Documents and applicable building codes and have been prepared under the direction of the Professional Engineer.
- d. Statement that the Professional Engineer's signature and seal shall appear on all design calculations and on all shop drawings.
- e. Statement that the design shall be in accordance with the aesthetic design intent of the project with the Architect having final authority in reference to aesthetic matters.
- f. Statement that the Professional Engineer will submit an additional signed and sealed letter at the completion of the work related to this section stating that the fabrication and installation of the Metal Ladders have been performed in accordance with the Professional Engineer's design.

1.6 DELIVERY, STORAGE, AND PROTECTION

Protect from corrosion, deformation, and other types of damage. Store items in an enclosed area free from contact with soil and weather. Remove and replace damaged items with new items.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Structural Carbon Steel

ASTM A36/A36M.

2.1.2 Structural Tubing

ASTM A500/A500M.

2.1.3 Steel Pipe

ASTM A53/A53M, Type E or S, Grade B.

2.1.4 Fittings for Steel Pipe

Standard malleable iron fittings ASTM A47/A47M.

2.2 FABRICATION FINISHES

2.2.1 Galvanizing

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Galvanizing: ASTM A123/A123M, ASTM A153/A153M, ASTM A653/A653M or ASTM A924/A924M, G90, as applicable.

2.2.2 Galvanize

Anchor bolts, washers, and parts or devices necessary for proper installation, unless indicated otherwise.

2.2.3 Repair of Zinc-Coated Surfaces

Repair damaged surfaces with galvanizing repair method and paint conforming to [ASTM A780/A780M](#) or by application of stick or thick paste material specifically designed for repair of galvanizing, as approved by Contracting Officer. Clean areas to be repaired and remove slag from welds. Heat surfaces to which stick or paste material is applied, with a torch to a temperature sufficient to melt the metallics in stick or paste; spread molten material uniformly over surfaces to be coated and wipe off excess material.

2.2.4 Shop Cleaning and Painting

2.2.4.1 Surface Preparation

Blast clean surfaces in accordance with [SSPC SP 6/NACE No.3](#). Wash cleaned surfaces which become contaminated with rust, dirt, oil, grease, or other contaminants with solvents until thoroughly clean.

2.2.4.2 Pretreatment, Priming and Painting

Apply pretreatment, primer, and paint in accordance with manufacturer's printed instructions. On surfaces concealed in the finished construction or not accessible for finish painting, apply an additional prime coat to a minimum dry film thickness of [1.0 mil](#). Tint additional prime coat with a small amount of tinting pigment.

2.2.5 Nonferrous Metal Surfaces

Protect by plating, anodic, or organic coatings.

2.3 [LADDERS](#)

Fabricate vertical ladders conforming to [29 CFR 1910.23](#) and Section 5 of [ALI A14.3](#). Ladders shall be capable of supporting their maximum intended load. Use [2 1/2 by 3/8 inch](#) steel flats for stringers and [3/4 inch](#) diameter steel rods for rungs. Ladder rungs, step and cleats must be spaced not less than [10 inches](#) and not more than [16 inches](#) wide (measured before installation of [ladder safety](#) system), spaced no more than [14 inches](#) apart, plug welded or shouldered and headed into stringers. Install ladders so that the maximum perpendicular distance from the centerline of the steps or rungs, or grab bars, or both, to the nearest permanent object in the back of the ladder or to the finished wall surface will not be less than [7 inches](#), except for the elevator pit ladders, which have a minimum perpendicular distance of [4.5 inches](#). Provide heavy clip angles riveted or bolted to the stringer and drilled for not less than two [1/2 inch](#) diameter expansion bolts as indicated. Provide intermediate clip angles not over [48 inches](#) on centers. The top rung of the ladder must be level with the top of the access level, parapet or landing served by the ladder except for hatches or wells. Extend the side rails of through or side step ladders [42 inches](#) above the access level. Provide ladder access protective swing gates at the top of access/egress level. The drawings must indicate ladder locations and details of critical dimensions and materials.

2.3.1 Ship's Ladder

Fabricate stringers and framing of steel plate or shapes. Bolt, rivet or weld connections and anchor to supporting construction. Provide treads with non-slip surface as specified for safety treads. Design assembly, including tread connections and methods of attachment, to support a live load of 300 pounds per tread. Provide railings as specified for metal handrails.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

Install items at locations indicated, according to manufacturer's instructions. Verify all measurements and take all field measurements necessary before fabrication. Provide Exposed fastenings of compatible materials, generally matching in color and finish, and harmonize with the material to which fastenings are applied. Include materials and parts necessary to complete each item, even though such work is not definitely shown or specified. Poor matching of holes for fasteners will be cause for rejection. Conceal fastenings where practicable. Thickness of metal and details of assembly and supports must provide strength and stiffness. Formed joints exposed to the weather to exclude water. Items listed below require additional procedures.

3.2 WORKMANSHIP

Metalwork must be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching must produce clean true lines and surfaces. Continuously weld along the entire area of contact. Do not tack weld exposed connections of work in place. Grid smooth exposed welds. Provide smooth finish on exposed surfaces of work in place, unless otherwise approved. Where tight fits are required, mill joints. Cope or miter corner joints, well formed, and in true alignment. Install in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

3.3 ANCHORAGE, FASTENINGS, AND CONNECTIONS

Provide anchorage where necessary for fastening metal items securely in place. Include for anchorage not otherwise specified or indicated slotted inserts, expansion anchors, and powder-actuated fasteners, when approved for concrete; toggle bolts and through bolts for masonry; machine bolts, carriage bolts and powder-actuated threaded studs for steel; through bolts, lag bolts, and screws for wood. Do not use wood plugs in any material. Provide non-ferrous attachments for non-ferrous metal. Make exposed fastenings of compatible materials, generally matching in color and finish, to which fastenings are applied. Conceal fastenings where practicable.

3.4 WELDING

Perform welding, welding inspection, and corrective welding, in accordance with AWS D1.1/D1.1M. Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation.

3.5 FINISHES

3.5.1 Dissimilar Materials

Where dissimilar metals are in contact, protect surfaces with a coat conforming to [MPI 79](#) to prevent galvanic or corrosive action. Where aluminum is in contact with concrete, plaster, mortar, masonry, wood, or absorptive materials subject to wetting, protect with [ASTM D1187/D1187M](#), asphalt-base emulsion.

3.5.2 Environmental Conditions

Do not clean or paint surface when damp or exposed to foggy or rainy weather, when metallic surface temperature is less than [5 degrees F](#) above the dew point of the surrounding air, or when surface temperature is below [45 degrees F](#) or over [95 degrees F](#), unless approved by the Contracting Officer.

3.6 LADDERS

Secure to the adjacent construction with the clip angles attached to the stringer. Secure to masonry or concrete with not less than two [1/2 inch](#) diameter expansion bolts. Install intermediate clip angles not over [48 inches](#) on center. Install brackets as required for securing of ladders welded or bolted to structural steel or built into the masonry or concrete.

-- End of Section --

SECTION 05 52 00.01

EXTERIOR METAL RAILINGS

02/18

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2020) Structural Welding Code - Steel

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME B18.2.1 (2012; Errata 2013) Square and Hex Bolts and Screws (Inch Series)

ASME B18.6.1 (2016) Wood Screws (Inch Series)

ASME B18.6.3 (2013; R 2017) Machine Screws, Tapping Screws, and Machine Drive Screws (Inch Series)

ASME B18.21.1 (2009; R 2016) Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers (Inch Series)

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M (2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A153/A153M (2016a) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A167 (2011) Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

ASTM A269/A269M (2015; R 2019) Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service

ASTM A307 (2014; E 2017) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength

ASTM A312/A312M (2019) Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes

ASTM A500/A500M

(2018) Standard Specification for
Cold-Formed Welded and Seamless Carbon
Steel Structural Tubing in Rounds and
Shapes

INTERNATIONAL CODE COUNCIL (ICC)

ICC/ANSI A117.1

(2009) Accessible and Usable Buildings and
Facilities

1.2 SYSTEM DESCRIPTION

- a. Provide complete new exterior railing systems for stairs and ramps as indicated on the drawings and herein
 1. Type I: Decorative steel railing system, custom fabricated
 2. Type II: [Stainless steel railing system with illuminated sections](#).
Electrical distribution and components for illuminated railings are specified in Section [26 56 00](#) EXTERIOR LIGHTING
- b. Remove and reinstall existing steel stair railing at B3 level as indicated on the drawings.
- c. Railing must withstand a minimum concentrated load of 200 pounds applied vertically downward or horizontally in any direction, but not simultaneously, at any point on the top rail or 50 lb per foot applied horizontally to the top of the rail, whichever is more severe.
- d. Installed railing assemblies must fit both existing and new construction. Existing construction may not be cut or altered unless specifically indicated. Field verify all existing dimensions and conditions prior to producing shop drawings.
- e. Work for original iron balustrades on the building is specified in Section [05 72 00](#) DECORATIVE METAL SPECIALITIES.

1.3 ADMINISTRATIVE REQUIREMENTS

1.3.1 Preinstallation Meetings

Within 30 days of contract award, submit [fabrication drawings](#) to the Contracting Officer for the following items:

- a. [Iron and steel hardware](#)
- b. [Steel shapes, plates, bars and strips](#)
- c. Steel/stainless steel railings and handrails, complete drawings with layouts, field verified dimensions, fabrication, field connections, and installation details with adjoining construction
- d. Anchorage and fastening systems

Submit manufacturer's catalog data, including two copies of manufacturers specifications, load tables, dimension diagrams, and anchor details for the following items:

- a. [Structural-steel plates, shapes, and bars](#)

- b. Structural-steel tubing
- c. Cold-finished steel bars
- d. Hot-rolled carbon steel bars
- e. Cold-drawn steel tubing
- f. Concrete inserts
- g. Masonry anchorage devices
- h. Protective coating
- i. Steel and stainless steel railings and handrails
- i. Laminated glass railing system and handrails
- j. Anchorage and fastening systems

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submittals with an "AE" are for submittal to the Designer of Record. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Fabrication Drawings; G, AE

Iron and Steel Hardware; G, AE

Steel Shapes, Plates, Bars and Strips; G, AE

SD-03 Product Data

Structural-Steel Plates, Shapes, and Bars; G, RO

Structural-Steel Tubing; G, AE

Cold-Finished Steel Bars; G, AE

Hot-Rolled Carbon Steel Bars; G, AE

Cold-Drawn Steel Tubing; G, AE

Concrete Inserts; G, AE

Masonry Anchorage Devices; G, AE

Protective Coating; G, AE

Steel Railings and Handrails; G, AE

Stainless Steel Railing System with Illuminated Sections System
and Handrails, including accessory parts; G, AE

Anchorage and Fastening Systems; G, AE

SD-04 Samples

Stainless Steel Railing; G, AE

Steel Railing; G, AE

SD-05 Design Data

Member and Connection Calculations; G, AE

SD-07 Certificates

Welding Procedures; G, AE

Welder Qualification; G, AE

Certification Letter from Contractor's Professional Engineer; G, AE

1.5 QUALITY CONTROL

1.5.1 Welding Procedures

Submit results of [welding procedures](#) testing in accordance with [AWS D1.1/D1.1M](#) made in the presence of the Contracting Officer and by an approved testing laboratory at the Contractor's expense.

1.5.2 Welder Qualification

Submit certified [welder qualification](#) by tests in accordance with [AWS D1.1/D1.1M](#), or under an equivalent approved qualification test. In addition, perform tests on test pieces in positions and with clearances equivalent to those actually encountered. If a test weld fails to meet requirements, conduct an immediate retest of two test welds and ensure that each test weld passes. Failure in the immediate retest will require that the welder be retested after further practice or training and make a complete set of test welds. Submit [certification letter from Contractor's Professional Engineer](#) indicating all qualifications are met.

1.5.3 ADA

New railings: fabrication, components and installation to conform with current ADA and [ICC/ANSI A117.1](#) guidelines

1.5.4 Shop Drawings

Include plans, elevations, sections, details, and attachments to other work. Indicate sizes, spacing and locations of structural members. Include details of cuts, connections, splices, attachments, holes, and other pertinent data. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Indicate all AWS weld designations for pre-qualified full and partial penetration welds and detail all joint preparations. Provide erection details of all field welded connections. Indicate type,

size, and length of bolts, distinguishing between shop and field bolts. Detail material required for the connection of other work. The Professional Structural Engineer's signature and seal shall appear on all structural steel shop drawings (including erection drawings, piece drawings and connection calculations. Cloud, bubble, or otherwise highlight and identify all revisions on the drawings. Submittals which do not identify changes and revisions will be returned as "Not Reviewed". Drawings that have been renumbered will be rejected.

1.5.5 Design Calculations

Design Calculations for Metal Railings: Design Metal Railings under direct supervision of the manufacturer employed Professional Engineer. Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations (Member and Connection Calculations). Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers and a coordinated table of contents. Design Calculations submittal shall be signed and sealed by a qualified Professional Engineer licensed in the state or district in which the project is located. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect. Design Calculations submission must be concurrent with the submission of corresponding Fabrication drawings. Fabrication drawings submitted without corresponding Design Calculations will be returned as "Not Reviewed". Design Calculations shall be submitted for information only.

1.5.5.1 Certification Letter from Contractor's Professional Engineer

Prior to the submission of Shop Drawings, Product Data, Design Calculations and other required submittals, submit a Certification Letter from the Contractor's responsible design Professional Engineer. No shop drawings will be reviewed by the Architect prior to the submission and acceptance of this Certification Letter. Certification Letter shall be submitted for information only. The Certification Letter shall include the following:

- a. Signature and seal of the registered Professional Engineer (registered in the state or district in which the project is located).
- b. Statement that the Professional Engineer is fully experienced in the design of Metal Railings.
- c. Statement that all calculations and shop drawings are in accordance with the Contract Documents and applicable building codes and have been prepared under the direction of the Professional Engineer.
- d. Statement that the Professional Engineer's signature and seal shall appear on all design calculations and on all shop drawings.
- e. Statement that the design shall be in accordance with the aesthetic design intent of the project with the Architect having final authority in reference to aesthetic matters.
- f. Statement that the Professional Engineer will submit an additional signed and sealed letter at the completion of the work related to this section stating that the fabrication and installation of the Metal Railings have been performed in accordance with the Professional Engineer's design.

PART 2 PRODUCTS

2.1 FABRICATION-GENERAL

Configurations, profiles and dimensions of railing systems are indicated on the drawings. Variation from configurations or dimensions is not permitted.

Preassemble items in the shop to the greatest extent possible. Disassemble units only to the extent necessary for shipping and handling. Clearly mark units for reassembly and coordinated installation.

For the fabrication of work exposed to view, use only materials that are smooth and free of surface blemishes, including pitting, seam marks, roller marks, rolled trade names, and roughness. Remove blemishes by grinding, or by welding and grinding, before cleaning, treating, and applying surface finishes, including zinc coatings.

Provide railing and handrail detail plans and elevations at not less than 1 inch to 1 foot. Provide details of sections and connections at not less than 3 inches to 1 foot. Also detail setting drawings, diagrams, templates for installation of anchorages, including concrete inserts, anchor bolts, and miscellaneous metal items having integral anchors.

Use materials of size and thicknesses indicated or, if not indicated, of the size and thickness necessary to produce adequate strength and durability in the finished product for its intended use. Work the materials to the dimensions indicated on approved detail drawings, using proven details of fabrication and support. Use the type of materials indicated or specified for the various components of work.

Form exposed work true to line and level, with accurate angles and surfaces and straight sharp edges. Ensure that all exposed edges are eased to a radius of approximately 1/32 inch. Bend metal corners to the smallest radius possible without causing grain separation or otherwise impairing the work.

Weld corners and seams continuously and in accordance with the recommendations of AWS D1.1/D1.1M. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.

Form the exposed connections with hairline joints that are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of the type indicated or, if not indicated, use countersunk Phillips flathead screws or bolts.

Provide anchorage of the type indicated and coordinated with the supporting structure. Fabricate anchoring devices and space as indicated and as required to provide adequate support for the intended use of the work.

Use hot-rolled steel bars for work fabricated from bar stock unless work is indicated or specified to be fabricated from cold-finished or cold-rolled stock.

Fabricate unattached ends of handrails with a closed and continuously welded half-sphere, finished smooth

2.1.1 New Steel Handrails (Type I)

Fabricate joinery of posts, rail, and corners by one of the following methods:

- a. Flush-type rail fittings of commercial standard, welded and ground smooth, with railing splice locks secured with $3/8$ inch hexagonal-recessed-head setscrews.
- b. Mitered and welded joints made by fitting post to top rail and intermediate rail to post, mitering corners, groove-welding joints, and grinding smooth. Butt railing splices and reinforce them by a tight-fitting interior sleeve not less than 6 inches long.
- c. Railings may be bent at corners in lieu of jointing, provided that bends are made in suitable jigs and the pipe is not crushed.

2.1.2 Steel Railings and Handrails

Provide steel handrails, including inserts in concrete, steel pipe conforming to ASTM A53/A53M or structural tubing conforming to ASTM A500/A500M, Grade A or B of equivalent strength.

Provide steel railings and handrails of nominal sizes indicated on the drawings

Galvanize exterior railings, including pipe, fittings, brackets, fasteners, and other ferrous metal components.

2.1.3 Sample

Submit sample section of custom steel railing prior to fabricating complete railings. Sample must be minimum one quarter of a complete panel including each type of typical member and each type of connection in the railing. Sample must have finish powder coating in the selected color.

2.2 EXISTING STEEL RAILINGS

Provide repairs and modifications to existing steel railings as indicated on the drawings. Cleanly cut away sections of material indicated to be removed or replaced as well as corroded material that compromises structural integrity of the railings. Fully weld replacement steel to existing members, unless otherwise indicated on the drawings.

Steel plates, shapes and bars, for the repair, replacement or modification of existing steel railings must match existing in material, forms and dimensions

2.3 COATINGS FOR STEEL RAILINGS

Thoroughly blast clean all steel surfaces of existing railings to bare Metal in the shop.

Hot-dip galvanize all cleaned and new steel used in steel railing systems, in accordance with ASTM A123/A123M. Touch up abraded surfaces and cut ends of galvanized members with zinc-dust, zinc-oxide primer, or an approved galvanizing repair compound.

Shop-prime the steelwork as indicated in accordance with Section 09 91 12

EXTERIOR PAINTS AND COATINGS except the following:

- a. steel surfaces encased in concrete
- b. steel surfaces for welding
- c. high-strength bolt-connected contact surfaces

Finish paint new steel railings in shop with thermosetting powder coat.

- a. Color: Custom.

Finish paint existing steel railings in accordance with Section 09 91 12
EXTERIOR PAINTS AND COATINGS

2.4 STAINLESS STEEL RAILING SYSTEM (TYPE II)

Provide pre-finished stainless steel railing system as indicated on the drawings and herein, including illuminated sections of railing where indicated. Basis of design: Lumenlinear system by Wagner Architectural Systems.

- a. Stainless Steel: Type 304
 1. Bar: ASTM A167
 2. Pipe and Tubing: ASTM A269/A269M, ASTM A312/A312M
 3. Finish Ornamental Grade, AISI No. 4
- b. Posts and rails: nominal 1.90" diameter. Provide matching stainless steel handrail standoff brackets on top of posts (for continuity of handrail grip) and fascia/cover plates around post bases. All exposed components of the system to be stainless in same finish
- c. Provide manufacturer's slotted tube and linear LED fixtures inside rail of illuminated sections of stair railings.

2.4.1 Fabrication

Fabricate railings to configurations, dimensions and post spacing indicated on the drawings. Fabricate and assemble railings in the shop to the greatest extent feasible.

- a. Form rail-to-end post connections and all changes in rail direction by radius elbows.
- b. Cut material square and remove burrs from all exposed edges, with no chamfer.
- c. Make exposed joints butt tight and flush.
- d. Close exposed ends of posts by use of appropriate end cap, and exposed ends of handrail with half-sphere cap
- e. For posts set in concrete, furnish matching sleeves or inserts as indicated, but not less than 5 inches long.
- f. Verify dimensions on site prior to shop fabrication.
- g. All mechanical fasteners used in the assembly of stainless steel railings must be manufactured from stainless steel

2.4.2 Sample

Submit sample(s) of stainless steel railing, including each typical railing member, handrail with finished end, connections between parts, and accessories. Samples must be in the specified finish.

2.4.3 Delivery and Handling

Deliver materials to the job site in good condition and properly protected against damage to finished surfaces. Keep handling on site to a minimum. Exercise particular care to avoid damage to finishes of material.

2.5 MASONRY ANCHORAGE DEVICES

Unless otherwise indicated, provide masonry anchorage devices consisting of expansion shields complying with AASHTO M 314, ASTM E488/E488M and ASTM C514 as follows:

Provide lead expansion shields for machine screws and bolts 1/4 inch and smaller; head-out embedded nut type, single-unit class, Group I, Type 1, Class 1.

Provide lead expansion shields for machine screws and bolts larger than 1/4 inch in size; head-out embedded nut type, multiple-unit class, Group I, Type 1, Class 2.

Provide bolt anchor expansion shields for lag bolts; zinc-alloy, long-shield anchor class, Group II, Type 1, Class 1.

Provide bolt anchor expansion shields for bolts; closed-end bottom-bearing class, Group II, Type 2, Class 1.

2.6 FASTENERS

Unless otherwise indicated, Provide galvanized zinc-coated fasteners in accordance with [ASTM A153/A153M](#) used for exterior applications or where built into exterior walls or floor systems. Select fasteners for the type, grade, and class required for the installation of steel stair items.

Provide standard hexagon-head bolts, conforming to [ASTM A307](#), Grade A.

Provide square-head lag bolts conforming to [ASME B18.2.1](#).

Provide cadmium-plated steel machine screws conforming to [ASME B18.6.3](#).

Provide flat-head carbon steel wood screws conforming to [ASME B18.6.1](#).

Provide plain round, general-assembly-grade, carbon steel washers conforming to [ASME B18.21.1](#).

Provide helical spring, carbon steel lockwashers conforming to [ASME B18.2.1](#).

PART 3 EXECUTION

3.1 REMOVALS

Remove existing steel railings indicated on the drawings for removal, or removal and reinstallation. Take care to not damage stone in, or to, which railings are mounted, or steel stairs to which railings are attached. Railings shown as remove and reinstall are to be reinstalled in their original locations.

Repairs, modifications, cleaning and priming of removed railings to be completed in the shop prior to reinstallation.

3.2 PREPARATION

Adjust stair railings and ramps handrails before securing in place in order to ensure proper matching at butting joints and correct alignment throughout their length. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:

- a. Anchor railing posts and rails into stone as indicated on the drawings
- b. Where not indicated otherwise, anchor posts in concrete and stone by means of pipe sleeves set and anchored into concrete. Provide sleeves of standard-weight, 316 stainless steel pipe, not less than 6 inches long, and having an inside diameter not less than 1/2 inch greater than the outside diameter of the inserted pipe post. Provide steel plate closure secured to the bottom of the sleeve. After posts have been inserted into sleeves, fill the annular space between the post and sleeve with nonshrink grout. Cover anchorage joint with a steel/stainless steel flange welded to the post, shape and size as indicated on the drawings.

Secure posts and handrails to walls where and as indicated in the drawings, with brackets and fittings as shown or designed for that purpose by railing manufacturer.

Secure wall brackets and wall return fittings to building construction as follows:

- a. For concrete and solid masonry anchorage, use bolt anchor expansion shields and lag bolts.

3.2.1 Railing System Preparation

Test fit railing systems in locations and to conditions where they will be installed. Complete railing must fit exactly without field adjustments, shims or fillers. Fabricator must correct any defects in fit at the factory. Do not drill for masonry anchorage of railing systems until field fit is correct.

Install electrical power and control systems for illuminated railing sections prior to installing railing. Power feed locations are limited to the existing post holes in historic granite curbs.

3.3 INSTALLATION

Install exterior railings in accordance with the shop drawings, and in accordance with manufacturer's recommendations for stainless steel railing system.

Erect work horizontal or parallel to rake of steps and ramps, and free from distortion or defects detrimental to appearance or performance.

3.4 FIELD QUALITY CONTROL

3.4.1 Field Welding

Ensure that procedures of manual shielded metal arc welding, appearance

and quality of welds made, and methods used in correcting welding work
comply with AWS D1.1/D1.1M.

3.5 PROTECTION AND CLEANING

Protect railing systems and their finishes from damage during construction

Clean railings at acceptance with clean water and soap to remove soiling
and inspect for damage

Repair defective or damaged components or damaged finish.

-- End of Section --

SECTION 10 28 13

TOILET ACCESSORIES
08/17

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z535.4 (2011) Product Safety Signs and Labels

ASTM INTERNATIONAL (ASTM)

ASTM F2285 (2004; R 2016; E 2016) Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use

ASTM G21 (2015) Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

INTERNATIONAL CODE COUNCIL (ICC)

ICC A117.1 COMM (2017) Standard And Commentary Accessible and Usable Buildings and Facilities

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submittals with an "AE" are for submittal to the Designer of Record. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Finishes; G, AE

Accessory Items; G, AE

Recycled content for stainless steel toilet accessories; S

Tested Sound Power Level by decibels for Electric Hand Dryer; G, AE

SD-04 Samples

Finishes; G, RO

Accessory Items

SD-07 Certificates

Accessory Items

SD-10 Operation and Maintenance Data

Electric Hand Dryer; G, RO

1.3 DELIVERY, STORAGE, AND HANDLING

Wrap toilet accessories for shipment and storage, then deliver to the jobsite in manufacturer's original packaging, and store in a clean, dry area protected from construction damage and vandalism.

1.4 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

Provide toilet accessories where indicated in drawings. Provide each accessory item complete with the necessary mounting plates of sturdy construction with corrosion resistant surface.

Provide stainless steel products listed herein manufactured from materials containing a minimum of 50 percent recycled content. Provide data identifying percentage of [recycled content for stainless steel toilet accessories](#).

2.1.1 Anchors and Fasteners

Provide anchors and fasteners capable of developing a restraining force commensurate with the strength of the accessory to be mounted and suited for use with the supporting construction. Provide tamperproof design exposed fasteners with finish to match the accessory.

2.1.2 [Finishes](#)

Except where noted otherwise, provide the following finishes on metal:

Metal	Finish
Stainless steel	No. 4 satin finish
Carbon steel, copper alloy, and brass	Chromium plated, bright

2.2 [ACCESSORY ITEMS](#)

Conform to the requirements for accessory items specified below. Submit fasteners proposed for use for each type of wall construction, mounting, operation, and cleaning instructions and one sample of each other accessory proposed for use. Incorporate approved samples into the

finished work, provided they are identified and their locations noted. Submit certificate for each type of accessory specified, attesting that the items meet the specified requirements.

2.2.1 Grab Bar (TA-28, TA-29)

Provide an 18 gauge, 1-1/2 inch; Basis of Design: Bobrick G6806 grab bar OD Type 304 stainless steel. Provide form and length for grab bar as indicated. Provide concealed mounting flange. Provide grab with satin finish peened non-slip surface. Furnish installed bars capable of withstanding a 500 pound vertical load without coming loose from the fastenings and without obvious permanent deformation. Allow 1-1/2 inch space between wall and grab bar.

2.2.2 Mirrors, Glass (~~MGT~~TA-20)

Provide mirror and frame; basis of design - Bobrick B-165, size 18" x 36".

Frame - Type-430 stainless steel, 1/2" x 1/2" x 3/8" channel with 1/4-inch return at rear for Snap Lock-ing

Design; 1/2" x 1/2" x 1/2" channel for Lock Tab Design, with bright polished finish. One piece frame with 90 degree mitered corners. Galvanized steel back has integral horizontal hanging brackets near the top for hanging the mirror and near the bottom to prevent the bottom of the mirror from pulling away from the wall. Locking devices secure mirror to concealed wall hanger.

Mirror - No. 1 quality, 1/4-inch select float glass: selected for silvering, electrolytically copper-plated by the galvanic process, and guaranteed for 15 years against silver spoilage. Back is protected by full-size, shock-absorbing, water-resistant, nonabrasive, polyethylene padding.

Concealed Wall Hanger - 16 gauge cold roll steel construction. Incorporates upper and lower support members, which engage backplate louvers to keep mirror against wall.

2.2.3 Paper Towel Dispenser (TA-03)

Basis of Design: Bobrick B-262. Provide paper towel dispenser constructed of a minimum 0.03 inch Type 304 stainless steel, surface mounted. Provide a towel compartment for each dispenser. Furnish tumbler key lock locking mechanism.

2.2.4 Sanitary Napkin and Tampon Dispenser (TA-~~09~~08)

Provide sanitary napkin and tampon dispenser; basis of design-Bobrick ~~B37063; recessed~~B-2706C; surface mounted. Dispenser, including door of Type 304 stainless steel that dispense both napkins and tampons with a minimum capacity of 20 each. Furnish dispensing mechanism for complimentary. Hang doors with a full-length corrosion-resistant steel piano hinge and secure with a tumbler lock. ~~Provide keys for coin box different from the door keys.~~

2.2.5 Sanitary Napkin and Tampon Disposal (TA-10)

Provide sanitary napkin and tampon disposal; basis of design-Bobrick B-270; surface mounted. Surface-mounted sanitary napkin disposal shall be

type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. Cover shall be drawn, one-piece, seamless construction and secured to container with a full-length stainless steel piano-hinge. Container shall have integral finger depression for opening covers.

2.2.6 Soap Dispenser-Wall (TA-13)

Basis of Design: Bobrick B2111. Provide soap dispenser surface mounted, liquid type consisting of a vertical Type 304 stainless steel tank with holding capacity of 40 fluid ounces with a corrosion-resistant all-purpose valve that dispense liquid soaps, lotions, detergents and antiseptic soaps.

~~2.2.7 Soap Dispenser Counter (TA-15)~~

~~Provide automatic, counter mounted liquid soap dispenser which shall dispense adjustable amount of commercially marketed all purpose bulk liquid hand soaps of various viscosities. Spout assembly (6-3/4 inches) shall be bright polished chromeplated ABS plastic with integral shank to accommodate up to 2 inch thick countertops. Unit shall be equipped with oversized funnel shape opening, covered by a 180 degree rotatable lid with concealed locking mechanism to allow for top filling. unit shall have LED indicators to show when unit has been activated. Unit shall have IR sensor located on PC board housing in water resistant ABS plastic housing. Activation lens shall allow for defined activation range to eliminate chance of false activation during hand washing. Portion control knob shall allow field adjustment of design volume of soap dispensed per hand wash. Unit shall be equipped with an automatic system flush button to allow for cleaning and maintenance. Provide 6V A/C adapter.~~

2.2.7 Baby Changing Station

Baby Changing Station BOD to be Koala Kare Products KB-110-SSWM Horizontal Wall Mounted Stainless Steel Finish Baby Changing Station. Baby changing station shall have 18-gauge satin stainless steel exterior finish with high-density polyethylene with Microban antimicrobial interior. Design of unit shall be surface-mounted. Unit shall be equipped with a pneumatic cylinder for controlled opening and closing of bed. Bed shall be secured to back plate with a concealed, full-length steel-on-steel hinge. Unit shall have Microban® antimicrobial embedded into plastic material. No hinge structure shall be exposed on interior or exterior surfaces. Unit shall have 11-gauge steel mounting plates with mounting hardware included. Unit shall conform to ICC A117.1 COMM, ASTM F2285, ANSI Z535.4, and ASTM G21or local code if more stringent installation requirements are applicable for barrier free accessibility. Unit shall comply with ADA regulations when properly installed. Bed shall have smooth concave changing area with a nylon safety strap and two hooks for bags or purses. Unit shall have a built-in Liner Dispenser for use with 3-ply chemical free biodegradable sanitary liners, universal instruction graphics and safety messages in 6 languages. Unit shall be backed by manufacturer's 5-year limited warranty on materials and workmanship and include a provision for replacement caused by vandalism. Unit shall be manufactured in the U.S.A.

~~2.2.8 Shelf, Metal, Heavy Duty (TA-04)~~

~~Furnish a 0.04 inch Type 304 stainless steel; basis of design Bobrick B-295; heavy duty metal shelf with hemmed edges. Provide shelves over 30 inch with intermediate supports. Provide 0.06 inch Type 304 stainless~~

~~steel supports, welded to the shelf, and spaced no more than 30 inch apart.~~

2.2.8 Toilet Tissue Dispenser, Jumbo (TA-01)

Provide surface mounted toilet tissue dispenser; basis of design-Bobrick B-2892 with 2 rolls of jumbo tissue. Fabricate cabinet of Type 304, 18 gauge stainless steel with Type 304, 20 gauge stainless steel door. Furnish tumbler key lock locking mechanism.

2.2.9 Toilet Seat Cover Dispenser (TA-~~1716~~)

Provide Type 304 stainless steel with basis of design-Bobrick B-~~3013~~4221; ~~recessed~~surface--mounted toilet seat cover dispensers. Provide dispenser with a minimum capacity of ~~500~~250 seat covers. Furnish tumbler key lock locking mechanism.

2.2.10 Electric Hand Dryer (TA-06)

Submit Tested Sound Power Level by decibels for Electric Hand Dryers in dBA. Tested sound power level not to exceed 80 dBA.

Basis of design-Bobrick B-7128. Provide wall mount and electric hand dryer designed to operate at 110/125 volts, 60 cycle, single phase alternating current with a heating element core rating of a maximum 2100 watts and a maximum decibel tested sound power level by decibels for Electric Hand Dryer of 80dBA. Provide Type 304 stainless steel exposed surface. Submit 4 complete copies of maintenance instructions listing routine maintenance procedures and possible breakdowns. Include repair instructions for simplified wiring and control diagrams and other information necessary for unit maintenance.

2.2.11 Mop and Broom Holder (TA-19)

Provide 0.03 inc Type 304 stainless steel with grip jaw cam mechanism; basis of design-Bobrick B-223; securing 3 mop or broom handles. Provide 0.03 inch Type 304 stainless steel. Mop and broom holder to be located at every mop sink.

PART 3 EXECUTION

3.1 INSTALLATION

Do not install items that show visual evidence of biological growth. Provide the same finish for the surfaces of fastening devices exposed after installation as the attached accessory. Provide oval exposed screw heads. Install accessories at the location and height indicated. Protect exposed surfaces of accessories with strippable plastic or by other means until the installation is accepted. After acceptance of accessories, remove and dispose of strippable plastic protection. Coordinate accessory manufacturer's mounting details with other trades as their work progresses. After installation, thoroughly clean exposed surfaces and restore damaged work to its original condition or replace with new work.

~~3.1.1 Recessed Accessories~~

~~Fasten accessories with wood screws to studs, blocking or rough frame in wood construction. Set anchors in mortar in masonry construction. Fasten to metal studs or framing with sheet metal screws in metal construction.~~

3.1.1 Surface Mounted Accessories

Mount on concealed backplates, unless specified otherwise. Conceal fasteners on accessories without backplates. Install accessories with sheet metal screws or wood screws in lead-lined braided jute, PTFE or neoprene sleeves, or lead expansion shields, or with toggle bolts or other approved fasteners as required by the construction. Install backplates in the same manner, or provide with lugs or anchors set in mortar, as required by the construction. Fasten accessories mounted on gypsum board and plaster walls without solid backing into the metal or wood studs or to solid wood blocking secured between wood studs, or to metal backplates secured to metal studs.

3.2 CLEANING

Clean material in accordance with manufacturer's recommendations. Do not use alkaline or abrasive agents. Take precautions to avoid scratching or marring exposed surfaces.

-- End of Section --

SECTION 10 56 13

STEEL SHELVING
04/06

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM A536 (1984; R 2019; E 2019) Standard
Specification for Ductile Iron Castings

ASTM D522/D522M (2017) Mandrel Bend Test of Attached
Organic Coatings

ASTM D2794 (1993; R 2019) Standard Test Method for
Resistance of Organic Coatings to the
Effects of Rapid Deformation (Impact)

ASTM D3359 (2017) Standard Test Methods for Rating
Adhesion by Tape Test

MATERIAL HANDLING INDUSTRY OF AMERICA (MHI)

MHI MH28.1 (1997) Specification: Industrial Steel
Grade Shelving

1.2 DEFINITIONS

For the purposes of this specification the shelf category, "medium weight," "heavy weight," will be as follows. Load is given per shelf in pounds for evenly distributed load. This does not limit the shelf size, only the shelving category.

Minimum Evenly Distributed Load Per Shelf in Pounds		
Shelf Size	Type Medium Duty	Type Heavy Duty
18 by 36 in.	700	1300
18 by 48 in.	500	900

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook,

in conformance to Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Shelving Units; G, AE

SD-02 Shop Drawings

Dimensioned Rail Layouts with Field Dimensions; G, AE

Dimensioned Carriage Layouts; G, AE

Details of Shelving Units; G, AE

Installation Sequencing and Scheduling; G, AE

SD-03 Product Data

Shelving Units; G, RO

Accessories; G, RO

Installation instructions; G, RO

SD-04 Samples

Finishes; G, AE

SD-06 Test Reports

Shelving Units; G, RO

Finish; G, RO

1.4 SHOP DRAWINGS

Show fabrication, assembly, and installation details including descriptions of procedures and diagrams. Show complete extent of installation layout including clearances, spacing, and relation to adjacent construction in plan, elevation, and sections. Indicate clear exit and access aisle widths; access to concealed components; assemblies, connections, attachments, reinforcement, and anchorage; and deck details, edge conditions, and extent of finish flooring within area where units are to be installed.

- a. Show installation details at non-standard conditions. Furnish floor layouts, technical and installation manuals for every unit shipment with necessary dimensions for rail layout and system configuration at the project site. Include installed weight, load criteria, furnished specialties, and accessories.
- b. Provide layout, dimensions, and identification of each unit corresponding to sequence of installation and erection procedures. Specifically include the following:
 1. Dimensioned Rail Layouts with Field Dimensions: Location, position and configuration of tracks on all floors.
 2. Dimensioned Carriage Layouts: Plan layouts of positions of

carriages, including all required clearances.

3. **Details of Shelving Units:** Indicating method and configuration of installation in carriages.

- c. Provide location and details of anchorage devices to be embedded in or fastened to other construction.
- d. Provide installation schedule and complete erection procedures to ensure proper installation.

1.5 PROJECT CONDITIONS

- a. **Field Measurements:** Verify mobile storage unit location by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- b. **Established Dimensions:** Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating mobile storage units. Coordinate construction to ensure actual dimensions correspond to established dimensions.

1.6 INSTALLATION SEQUENCING AND SCHEDULING

- a. **Sequencing:** Coordinate storage shelving system installation with other work to minimize possibility of damage and soiling during remainder of construction period.
- b. **Scheduling:** Plan installation to commence after finishing operations, including painting have been completed.
- c. **Built-In Items:** Provide components which must be built in at a time which causes no delays general progress of the Work.
- d. **Pre-installation Conference:** Schedule and conduct conference on project site to review methods and procedures for installing mobile storage units including, but not limited to, the following:
 1. Review project conditions and levelness of flooring and other preparatory work performed under other contracts.
 2. Review and verify structural loading limitations.

1.7 DELIVERY, STORAGE, AND HANDLING

Deliver materials in original packages, containers or bundles bearing the brand name and identification of the manufacturer. Store inside under cover. Protect surfaces from damage.

PART 2 PRODUCTS

2.1 MANUFACTURED UNITS

MHI MH28.1. Provide shelving units indicated. Motorized High-Density Storage Shelving systems must be coordinated with Electrical for motorized carriages and field verified constraints of building. Provide shelving units designed for structural floor system capable of supporting live and dead loads required by prevailing building codes, including loads of storage units to be installed. Provide a maximum allowable sub floor deflection of L/360 with Automatic Brake under specified mobile storage

loads.. Provide units with base plates for floor anchorage when required. Provide wall connections for units over 8 feet 3 inches to top shelf. Minimum high-density shelving aisle width shall be no less than 36 inches between carriages.

2.2 FINISHES

Provide the shelving units in the manufacturer's standard colors. Clean metal by multiple stage phosphatizing and sealing process, for rust resistance and paint adhesion. Finish is to be archive quality, non-reactive, solvent-free, baked polyester powder coating and will have no potential off-gassing. Solvent based wet-spray paint finishes on any components in the entire installation are unacceptable.

Finishes for Metal Storage items as selected from Basis of Design manufacturers standards, are to be as follows or Equivalent;

- a. Museum Conservation Cabinets coded as XH6 in the Furniture Location Plans. Powder-Coat paint finish: Spacesaver - FW-Furniture White (15).
- b. Motorized High Density Storage coded as XH1.1, XH1.2, XH1.3, XH1.4, XH2.1, XH2.2 and XH2.3 in the Furniture Location Plans. Powder-Coat paint finish: Spacesaver - FW-Furniture White (15). Provide Laminate Face Panels: Spacesaver - AF232 Natural Linen, Suede finish for all systems with exception of the High Density Storage system XH1.1 located in the Environmental Room (Cold Storage) to receive only closed face panels with powder coated finish. All systems must include a powder coated finish on closed end panels at walls..

2.3 SOURCE QUALITY CONTROL

- a. MHI MH28.1, for tests of shelf capacity, lateral stability and shelf connections.
- b. Finish flexibility, ASTM D522/D522M, Method A, 1/8 inch diameter, 180 degree bend, no evidence of fracturing to the naked eye.
- c. Finish adhesion, ASTM D3359, Method B. There shall be no film removed by tape applied to 11 parallel cuts space 1/8 inch apart plus 11 similar cuts at right angles.
- d. Impact resistant finish, ASTM D2794, no loss of adhesion after direct and reverse impact equal to 1.5 times metal thickness in mm, expressed in inch pounds.

2.4 MUSEUM CONSERVATION CABINET (XH6)

Basis of Design Manufacturer or Equivalent: Spacesaver - Viking Metal Cabinets Model 395 - 94.5"W x 50"D x 79"H (181 cubic feet of storage).

- a. Extra large sealed heavy gauge steel conservation cabinet with reinforced four-way pallet welded base with removable front access cover and levelers. Hinged lift-off reinforced bi-fold doors for full open. Lockable doors with lever pull. Interior to include 4 - Adjustable Heavy-Duty multichannel full width shelves above, 4 - 5"H full width Flat File drawers with safety stops below. Provide cabinets with optional vents with sliding closures.
- b. NOTICE: Unit requires tight coordination with project renovation work

to time installation of large components. Contractor to coordinate install with other work requiring larger openings with Storage Supplier. Unit typically fully welded, customized to be installed in pieces on site.

2.5 ~~M~~otorized High-Density Storage System for Cold Storage Room
(Stainless Rail/Wheels) - (XH1.1)

Basis of Design Manufacturer or Equivalent: Spacesaver - ActivRac 7P. Motorized Carriages for Cold Storage with recessed stainless steel rails and wheels in thermal insulated flooring troughs. Refer to drawings for configurations and sizes. Units require tight coordination with installation of the Cold Storage room insulation, Electrical provisions and finished floor. Contractor to coordinate installation of rails in recessed troughs by Storage Supplier. Refer to project drawings for details on recessed rails.

2.5.1 System Description

- a. General: The system consists of manufacturer's storage units mounted on manufacturer's track-guided carriages to form a compact storage system. System design permits access to any single aisle by moving units until the desired aisle is opened. The manufacturer's standard unit interlock system prevents units from being moved while the open aisle is occupied. The carriage/rail system provides uniform carriage movement along the total length of travel, even with unbalanced loads.
- b. Operating environment: Design options shall allow the carriage system to operate in the following environmental conditions.
 1. System controls shall operate at room temperatures between 32 F and 122 F.
 2. System controls shall operate at room temperature between 32 F and -20 F.
- c. Carriage System Design and Features: The carriage system consists of a formed structural steel frame with stainless steel wheels riding on stainless steel rails recessed and mounted to the floor, receiving silicon at anchor penetration points. Rails shall be types selected by the manufacturer to ensure smooth operation and self-centering of mobile storage units during travel without end play or binding. Rail types, quantities and spacing shall be selected by the manufacturer to suit installation conditions and requirements. All bearings used in the drive mechanism shall be permanently shielded and lubricated.
- d. Movement Controls: Provide a carriage control panel on the accessible (open) end of each movable carriage, located approx. 39 inches above the base, centered on the control panel. Minimum controls shall include directional control buttons, STOP/RESET push-button and a red reset light.
 1. System controls shall start motors on each movable carriage "sequentially" to minimize power demands and shall provide dynamic braking to provide smooth operation. No additional hardware shall be required to change between "sequential" and "block" movement. Maximum running speed shall be limited to 3.3 inches per second.
 2. Provide solid state controls and indicator lights for a visual indication of safety system operation. Provide each aisle with a programmable distance sensor to ensure proper timing for

- start/stop operation.
3. Pushing the directional control button on any mmovablecarriage adjacent to the desired aisle location in the direction away from the desired aisle location opens the system at the desired aisle. The selected aisle shall open automatically regardless of the position of the carriages. Manual Reset: The carriage control head will display a flashing red reset light at the newly opened aisle indicating that the aisle is locked open and requires resetting before another aisle can be opened. Provide for automatic lockout and manual reset of controls if selected aisle is not moved within a preset period of time.
 4. Controls shall feature back lit message indicating which aisle is in use (i.e. "Right Aisle in use" or "Left Aisle in use").
 5. Each control head shall be protected (shielded) by a 12 gauge cover guard.
- e. Drive System: The system shall be designed with a positive type motorized drive which minimizes end play and that carriages will stop without drifting. All system components shall be selected to ensure a smooth, even movement along the entire carriage length.
1. Each electric carriage shall be provided with a current limited fractional horsepower gear motor, connected to drive wheel assembly with a roller chain.
 2. System shall include a chain sprocket drive system to ensure that carriages move uniformly along the total length of travel, even with unbalanced loads.
 3. A tensioning device shall be provided on each chain drive (when applicable).
 4. All bearings used in the drive mechanism shall be permanently shielded and lubricated.
 5. System shall operate on 115 V.A.C. 50/60 hertz, 20 amp dedicated circuit provided by others, one per module.
 6. Rear or front mounted overhead mounted power pantograph distribution system to conceal all interconnecting wiring shall be available. (note: power distribution systems are dependent on type of shelving/storage equipment contact manufacturer for details).
- f. Safety Features:
1. Visual indicators shall provide verification that carriages are in the locked or unlocked mode.
 2. Two safety sweeps shall be provided in each aisle. A full-length infrared photoelectric safety sweep shall be provided to stop carriage movement if the sweep contacts an obstruction while in motion. Sweep must be equipped with OSHA approved safety demarcation tape.
 3. Infrared photoelectric aisle entry sensor system shall be provided to stop carriage movement if the system detects persons entering a closing aisle.
 4. Entire system shall be C-UL US system listed.
 5. A handheld rechargeable power pack shall be provided for emergency operations in case of primary power failure.
 6. Stop pushbutton shall be provided at each aisle control. A warning horn shall be provided whereupon activation of an aisle movement pushbutton it will sound for the first 3 seconds of carriage movement. A flashing yellow warning light is provided on the carriage ends that will flash during system movement.

2.5.2 System Operation

- a. Open an aisle with one-touch, user-friendly, directional operation (at the carriage mounted control or via optional infrared or RF remote control aboard a fork truck).
- b. Press a safety "Stop/Reset" button to immediately stop any moving carriage(s).
- c. Easily distinguish a systems operational status via the lighted indicators on each carriage.
- d. Be protected by in-aisle safety devices that stop carriage movement when a person or object (i.e., box, ladder, or fork truck) is detected.
- e. When carriages are in motion, any safety activation (photo sweeps and aisle entry sensors) will stop the aisle from closing on that aisle and the mobile carriage LED indicators will illuminate flashing red on both sides of the aisle where the safety was activated.
- f. Depressing any "Stop/Reset" button during carriage movement will bring all carriages to a stop.
- g. After carriages complete their movement the open aisle will be locked out and the control head indicator on either side of the open aisle will illuminate "Aisle in Use" its now safe to enter the aisle.

2.5.3 Manufactured Components

- a. Rails:
 1. RECESSED MOUNT: Rail shall be 17-4PH Stainless Steel bar 4.00" wide x 3/8" high with smooth finish. Rail shall disperse the wheel point loads to structural slab. Rail shall have two permanently mounted floor anchors maximum 15" on center. Rail shall be installed recessed into concrete slab, flush to top of concrete slab, and laid in a manor such that rail joints are staggered across all adjacent rail runs. Rail and carriage design allows concrete slab to be unlevel at the following maximum variation of 3/16" over any 2 (0.6m) rail run and 1/4" maximum variation over any 10 ail run.
- b. Mobile Carriages:
 1. Assembled structural steel carriage base will have a minimum capacity of 7,000 lbs. Each wheel assembly shall be equipped with two wheels, minimum 5" diameter steel wheels. Wheels are equipped with two permanently lubricated and shielded radial ball bearings. Wheel capacity 3,500 lbs each. Wheels have solid steel axles of 1 inch in diameter. Wheels shall be dual flange, all wheel guided. All carriage sections between wheel assemblies have integral cross bracing to maintain accepted tolerances for function of systems. Side profiles shall provide and maintain wheel assembly alignment and squareness. These profiles shall be pre-drilled at the factory but are bolted, and assembled on the job site as integral carriage members.
 2. Structural steel side profiles shall be minimum 5.084" high, 10 gauge.
 3. Wheels: Provide precision machined and balanced units with

permanently shielded and lubricated bearings.

4. Provide manufacturer's design movable carriages fabricated or bolted steel construction. Galvanized structural components and/or riveted carriages are unacceptable.

c. Drive / Guide System:

1. Design: Provide drive system which prevents carriage whipping, binding and excessive wheel/rail wear under normal operation.
2. Drive: Line shaft driven carriages, all wheels on one side of carriage shall drive.
3. Shafts: Solid steel tube.
4. Shaft Connections: Secured couplings.
5. Bearing Surfaces: Provide rotating load bearing members with ball or roller bearings. Provide shafts with pillow block or flanged self-aligning type bearings.

d. Power and Controls:

1. System power requirements - 120 VAC single phase input. Powered carriages shall be equipped with 1/8 HP; 90-volt DC gear motors.
2. Multiple carriages shall be moved with a single activation of a carriage control and/or via an infrared or RF remote. Each carriage shall be equipped with one or more 1/8 HP, 90-volt DC gear motors, depending on load rating. Each independent drive shall be synchronous and current limiting to maintain proper alignment through closed loop motor feedback and control on all individual motors within the carriage regardless of length or weight load and eliminate racking and binding. Motor and motor controllers shall provide for soft-start/soft-stop movement, current limiting, and automatic time-out. Carriage movement to be selectable between sequential to minimize power demands on start-up, or block movement for faster access. Motors and power train shall provide for maximum carriage travel speed of 3 inches per second. All power transfer to wheels to be done by chain drive. Power to mobile units provided by an overhead buss bar system. Communication between carriages is provided by overhead cable festoon. Power supply to be provided by others.

2.6 Motorized High-Density Storage System - (XH1.2, XH1.3, XH1.4, XH2.1, XH2.2 and XH2.3)

Basis of Design Manufacturer or Equivalent: Spacesaver - Eclipse Powered Mobile System. Refer to drawings for configurations and sizes. Contractor to coordinate installation of recessed rails by Storage Supplier with Structural work and concrete topping. Refer to project drawings for details on recessed rails and configurations of shelving..

2.6.1 System Description

- a. General: The system consists of Spacesaver manufactured storage units mounted on manufacturer's track-guided carriages to form a compact storage system. System design permits access to any single aisle by moving units until the desired aisle is opened. The manufacturer's standard unit interlock system prevents units from being moved while the open aisle is occupied. The carriage/rail system provides uniform carriage movement along the total length of travel with the "Syncro-Guide" drive system, even with unbalanced loads. Therefore, Line Shaft Driven carriages are not permitted.

- b. Carriage System Design and Features: The carriage system consists of a formed structural steel frame with hardened steel wheels riding on steel rails surface mounted to the floor. Rails shall be types selected by the manufacturer to ensure smooth operation and self-centering of mobile storage units during travel without end play or binding. Rail types, quantities and spacing shall be selected by the manufacturer to suit installation conditions and requirements. All bearings used in the drive mechanism shall be permanently shielded and lubricated.
- c. Movement Controls: Provide a carriage control panel on the accessible (open) end of each moveable carriage, located 44 inches (1118 MM) above the base, centered on the face panel. Minimum controls shall include directional control buttons/icons, STOP/RESET push-button/icon and a red reset light/icon.
 - 1. System controls shall start motors on each movable carriage sequentially" to minimize power demands and shall provide dynamic braking to provide smooth operation. No additional hardware shall be required to change between "sequential" and "block" movement. Maximum running speed shall be limited to 3.3 inches per second.
 - 2. Provide solid state controls and indicator lights/icons for a visual indication of safety system operation. Provide each aisle with a programmable distance sensor to ensure proper timing for start/stop operation.
 - 3. Pushing the directional control button/icon on any moveable carriage adjacent to the desired aisle location in the direction away from the desired aisle location opens the system at the desired aisle. The selected aisle shall open automatically regardless of the position of the carriages. Manual Reset: The carriage control head will display a flashing red reset light/icon at the newly opened aisle indicating that the aisle is locked open and requires resetting before another aisle can be opened. Provide for automatic lockout and manual reset of controls if selected aisle is not moved within a preset period of time. Automatic Reset: The carriage control heads will display a constant green light, or green arrow icon, at all carriages indicating that the system is ready for the next aisle access.
 - 4. Controls shall feature safety activated message and direction indicator designating which aisle safety was activated or back lit message indicating which aisle is in use (i.e. "Right Aisle in use" or "Left Aisle in use").
- d. Drive System: The system shall be designed with a positive type motorized drive which minimizes end play and that carriages will stop without drifting. All system components shall be selected to ensure a smooth, even movement along the entire carriage length.
 - 1. Each electric carriage shall be provided with a current limited fractional horsepower gear motor, connected to drive wheel assembly with a roller chain.
 - 2. System shall include a chain sprocket drive system to ensure that carriages move uniformly along the total length of travel, even with unbalanced loads.
 - 3. A tensioning device shall be provided on each chain drive (when applicable).
 - 4. All bearings used in the drive mechanism shall be permanently shielded and lubricated.

5. System shall operate on 115 V.A.C. 50/60 hertz, 20 amp dedicated circuit provided by others, one per module.
6. Overhead mounted power pantograph distribution system shall conceal all interconnecting wiring.

e. Safety Features:

1. Visual indicators/icons shall provide verification that carriages are in the locked or unlocked mode.
2. Two Infra Red Safety sweeps shall be provided in each aisle. Full-length infrared photoelectric safety sweeps shall be provided to stop carriage movement if the sweep contacts an obstruction while in motion. Sweep must be equipped with OSHA approved safety demarcation tape.
3. Entire system shall be C-UL US system listed.
4. Infrared photoelectric aisle entry sensor system shall be provided to stop carriage movement if the system detects persons entering a closing aisle.
5. A handheld rechargeable power pack shall be provided for emergency operations in case of primary power failure.

2.6.2 Grout

- a. General: Provide non-shrink, non-staining hydraulic cement compound conforming to the following requirements, based on the performance of the test specimens at room temperature and in laboratory air, as stated by the grout manufacturer.

1. Linear Movement: No shrinkage while setting; maximum expansion limited to .002 inches per linear inch.
2. Compressive Strength: Based on two inch cubes made following ASTM standards, tested on a Balding-Southward machine of 60,000 pounds capacity, meet or exceed the following:

- a) Age: 1 hour - 4,500 psi
7 days - 8,000 psi

2.6.3 Manufactured Components

- a. Rails: General: Provide manufacturer's standard design units with the following properties:

1. Material: ASTM/AISI Type 1035 or 1045 steel, manufacturers selection.
2. Capacity: 1,000 pounds per lineal foot of carriage.
3. Minimum Contact Surface: 5/8 inch wide.
4. Provide rail sections in minimum 6 foot lengths.
5. Rail configuration shall permit attachment to top of structural floor system with provision for leveling rails to compensate for variations in floor surface level.
6. Provide rail connections designed to provide horizontal and vertical continuity between rail sections, to gradually transfer the concentrated wheel point load to and from adjoining rail sections. Butt joints without connections are not permitted.
7. Once rails are leveled, they shall be supported the full length with the specified grout.

- b. Carriages:

1. Provide manufacturer's design movable carriages fabricated of welded steel construction. Galvanized structural components and/or riveted carriages are unacceptable. 1,000 pound per foot minimum capacity.
2. Provide fixed carriages of same construction and height as the movable carriages, anchored to rails. Setting fixed shelving directly on floors is not permitted.
3. When required, provide bolted carriage splices designed to maintain proper unit alignment and weight load distribution.
4. Design carriages to allow the shelving uprights to recess and interlock into the carriages a minimum of 3/4 inch. Top mount carriages are unacceptable.
5. Provide each carriage with two wheels per rail.

c. Drive / Guide System:

1. Design: Provide drive system which prevents carriage whipping, binding and excessive wheel/rail wear under normal operation.
 - a. Synchronized drives are required - a minimum of one wheel assembly driving both sides of carriage at center location required. Drive shaft shall exhibit no play or looseness over the entire length of that assembly.
2. Shafts: Solid steel rod or tube.
3. Shaft Connections: Secured couplings.
4. Bearing Surfaces: Provide rotating load bearing members with ball or roller bearings. Provide shafts with pillow block or flanged self-aligning type bearings.

d. Wheels:

1. Materials: Type 1045 solid steel **ASTM A536** specification 65/45/12 machined ductile iron. Minimum load capacity per wheel: 3200 lbs.
2. Size: Minimum 5 inches outside diameter drive wheels.
3. Guides: Determined by manufacturer; minimum 2 locations.

e. Motors:

1. Type: 90VDC

f. Face Panels:

1. Materials: Steel with factory applied laminate panels.
2. Finishes: Selected from manufacturers standard available colors and patterns.
3. End panels must cover the full height and width of shelving.
4. Edgings: Provide preformed edging, color-matched to unit colors selected.

PART 3 EXECUTION

3.1 EXAMINATION

- a. Examine floor surfaces, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of mobile storage units.

- b. Verify that building structural system is adequate for installing mobile storage units at locations indicated on approved shop drawings, ensure that recesses for rails in floor are at proper spacing and depths.
- c. Verify that intended installation locations of mobile storage units will not interfere with nor block established required exit paths or similar means of egress once units are installed.
- d. Verify that adequate capacity permanent power sources have been installed at locations indicated on approved shop drawings.
- e. Prepare written report, endorsed by Installer, listing conditions detrimental to proper performance of mobile storage units, once installed.
- f. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

a. Rails:

- 1. Lay out rails using full-length units to the maximum extent possible. Use cut lengths only at ends to attain total length required. Locate and position properly, following dimensions indicated on approved shop drawings. Verify thickness of finished floor materials to be installed and install level 1/16 inch above finished floor surfaces.
- 2. Verify level, allowing for a minimum 1/4 inch of grout under high points. Position and support rails so that no movement occurs during grouting.
- 3. Set rails in full grout bed, completely filling any voids entire length of all rails including rail connectors. Trim up sides flush with rails to ensure proper load transfer from rail to supporting floor. Using shims in lieu of full grouting is not permitted.
- 4. Installation Tolerances: Do not exceed levelness of installed rails listed below:
 - a. Maximum Variation From True Level Within Any Module: 3/32 inch.
 - b. Maximum Variation Between Adjacent (Parallel) Rails: 1/16 inch, perpendicular to rail direction.
 - c. Maximum Variation In Height: 1/32 inch, measured along any 10 foot rail length.
- 5. Verify rail position and level; anchor to structural floor system with anchor type and spacings indicated on approved shop drawings.

b. Shelving Units Installation:

- 1. General: Follow layout and details shown on approved shop drawings and manufacturer's printed [installation instructions](#). Position units level, plumb; at proper location relative to adjoining units and related work.
- 2. Carriages:
 - a. Place movable carriages on rails. Ensure that all wheels track properly and centering wheels are properly seated on centering rails. Fasten multiple carriage units together to form single

movable base where required.

b. Position fixed carriage units to align with movable units; make final leveling adjustments with leveling screws.

3. Shelving Units:

a. Permanently fasten shelving units to fixed and movable carriages with vibration-proof fasteners.

b. Stabilize shelving units following manufacturer's written instructions. Reinforce shelving units to withstand the stress of movement where required and specified.

4. Wiring:

a. Make final control wiring connections between modules under single control.

b. Test wiring for continuity and proper connections with regulated field power supply before making final power connections. Final connection to units shall be provided by electrician.

c. Test system operation by cycling all units through complete operations sequences.

3.3 FIELD QUALITY CONTROL

a. Verify shelving/racking unit alignment and plumb after installation. Correct if required following manufacturers instructions.

b. Remove components which are chipped, scratched, or otherwise damaged and which do not match adjoining work. Replace with new matching units, installed as specified and in manner to eliminate evidence of replacement.

3.4 ADJUSTING

Adjust components and accessories to provide smoothly operating, visually acceptable installation.

3.5 CLEANING

Immediately upon completion of installation, clear components and surfaces. Remove surplus materials, rubbish and debris resulting from installation upon completion of work and leave areas of installation in neat, clean condition.

3.6 DEMONSTRATION AND TRAINING

a. Schedule and conduct demonstration of installed equipment and features with User's personnel.

b. Schedule and conduct maintenance training with User's maintenance personnel. Training session should include lecture and demonstration of all maintenance and repair procedures that end user personnel would normally perform.

3.7 PROTECTION

Protect system against damage during remainder of construction period. Provide additional protection needed to ensure that system will be without

damage or deterioration at time of substantial completion.

-- End of Section --

SECTION 14 24 23

HYDRAULIC PASSENGER ELEVATORS

05/16

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M (2020) Structural Welding Code - Steel

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME A17.1/CSA B44 (2016) Safety Code for Elevators and Escalators

ASME A17.2 (2017) Guide for Inspection of Elevators, Escalators, and Moving Walks Includes Inspection Procedures for Electric Traction and Winding Drum Elevators, Hydraulic Elevators, and Escalators and Moving Walks

ASME A17.5/CSA B44.1 (2019) Elevator And Escalator Electrical Equipment

ASME A18.1 (2020) Safety Standard For Platform Lifts And Stairway Chairlifts

ASME B16.11 (2016) Forged Fittings, Socket-Welding and Threaded

ASME B16.9 (2018) Factory-Made Wrought Buttwelding Fittings

ASTM INTERNATIONAL (ASTM)

ASTM A106/A106M (2019a) Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service

ASTM A53/A53M (2020) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41 (1991; R 1995) Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits

INTERNATIONAL CODE COUNCIL (ICC)

ICC IBC (2018) International Building Code

NATIONAL ELEVATOR INDUSTRY, INC. (NEII)

NEII-1 (2000; R thru 2017) Building
Transportation Standards and Guidelines,
including the Performance Standards Matrix
for New Elevator Installation

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 101 (2018; TIA 18-1; TIA 18-2; TIA 18-3) Life
Safety Code

NFPA 70 (2020; ERTA 20-1 2020; ERTA 20-2 2020; TIA
20-1; TIA 20-2; TIA 20-3; TIA 20-4)
National Electrical Code

NFPA 70E (2018; TIA 18-1; TIA 18-2) Standard for
Electrical Safety in the Workplace

NFPA 72 (2019; TIA 19-1; ERTA 1 2019) National
Fire Alarm and Signaling Code

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-560-01 (2017, with Change 2, 2019) Operations and
Maintenance: Electrical Safety

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191 Americans with Disabilities Act (ADA)
Accessibility Guidelines for Buildings and
Facilities; Architectural Barriers Act
(ABA) Accessibility Guidelines

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submittals with an "AE" are for submittal to the Designer of Record. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Elevator System; G, RO

Elevator Components; G, RO

Elevator Machine; G, RO

Elevator Controller; G, RO

Wiring Diagrams; G, RO

Interior Cab Finishes Detail Drawings; G, AE

Commercial Wheelchair Lift System & Components; G, RO

SD-04 Samples

SST Finish Samples for Pre-Engineered Interior Finish System (4x4);
G, AE

SD-03 Product Data

Elevator and Accessories; G, RO

Elevator Components; G, RO

Data Sheets; G, RO

Elevator Microprocessor Controller; G, RO

Commercial Wheelchair Lift; G, RO

SD-05 Design Data

Emergency Power, Systems, and Operations

Heat Loads

Reaction Loads

SD-07 Certificates

Elevator Parts and Components Price Lists; G, RO

Warranty

Endorsement Letter

Welders' Qualifications

Elevator Controller Certification; G, RO

SD-10 Operation and Maintenance Data

Elevator, Data Package 4; G, RO

Maintenance Control Program (MCP); G, RO

Software and Documentation; G, RO

Submit in accordance with Section 01 78 23 OPERATION AND
MAINTENANCE DATA and 01 78 24.05 20 FACILITY OPERATION AND
MAINTENANCE SUPPORT INFORMATION.

Commercial Wheelchair Lift, Data Package 4; G, RO

1.2.1 Shop Drawing Requirements

Provide assembly and arrangement of elevators, accessories, elevator components, and [Commercial Wheelchair Lift](#). Show location of [elevator machine](#) in elevator machine room (MR) or machinery space (MS). Show location of [elevator controller](#) in elevator machine room or elevator control room (CR). Provide details for materials and equipment, including but not limited to operating and signal fixtures, doors, door and car frames, car enclosure, controllers, motors, guide rails and brackets, layout of hoistway in plan and elevation, the Commercial Wheelchair Lift, and other layout information and clearance dimensions and other layout information and clearance dimensions.

Provide assembly and arrangement of commercial wheelchair lifts, accessories, and [commercial wheelchair lift system & components](#). Show location of all remote components in the surrounding rooms. Provide details for materials and equipment, including but not limited to operating and signal fixtures, doors, door and lift frames, lift enclosure, controllers, motors, guide rails and brackets, layout of lift in plan and elevation, and other layout information and clearance dimensions.

Provide [interior cab finishes detail drawings](#) in elevation and plan to include but not be limited to: ceiling layout, wall panel seaming/reveals, handrails, bumper rails and wall base.

1.2.2 Delivery, Storage and Handling of Interior Finishes

Deliver materials to install on site in manufacturer's original packaging. Store in dry, secure location, protected against direct sunlight and excessive heat. Protect finished surfaces with strippable film.

1.2.3 Warranty

Provide manufacturer standard warranty for pre-engineered interior finish system. Terms: One year against defects in material and workmanship.

1.2.4 Product Data Requirements

Provide manufacturers' product data for all elevator and commercial wheelchair lift components, including but not limited to the following: elevator controller, hydraulic pump unit, hydraulic pump and motor, hydraulic cylinder, hydraulic piping and fittings, car and hall fixture buttons and switches, cab and machine room or control room communication devices, door operator, door protection system, car roller guides, and buffers. For [data sheets](#), provide document identification number or bulletin number, published or copyrighted prior to the date of contract bid opening. Provide controller manufacturer's published procedures for performance of each and all testing required by [ASME A17.1/CSA B44](#).

1.2.5 Design Data

1.2.5.1 [Reaction Loads](#)

Provide calculations by registered professional engineer for reaction loads imposed on building by elevator system. Demonstrate calculations complying with [ASME A17.1/CSA B44](#)

1.2.5.2 Heat Loads

Provide calculations from elevator manufacturer, or by registered professional engineer, for total anticipated heat loads generated by all of the elevator equipment.

1.2.6 Welders' Requirements

Comply with AWS D1.1/D1.1M, Section 5. Include certified copies of field welders' qualifications. List welders' names with corresponding code marks to identify each welder's welding work

1.2.7 Maintenance Control Program (MCP)

For each elevator, prepare and provide a written Maintenance Control Program (MCP) that complies with ASME A17.1/CSA B44 Section 8.6, including written documentation that details the test procedures for each and every test that is required to be performed by ASME A17.1/CSA B44. Assemble all MCP documentation, and supporting technical attachments, in a single MCP package and provide in both electronic and hard copy. Assemble entire hard copy MCP in 3-ring binders. For each elevator provided, the MCP must include only documentation and instruction that apply to the elevator specified.

For each elevator, provide an additional, separate binder that includes all maintenance, repair, replacement, call back, and other records required by ASME A17.1/CSA B44. The records binder must be kept in the elevator mechanical room, maintained by elevator maintenance and service personnel, and be available at all times to authorized personnel.

Provide detailed information regarding emergency service procedures and elevator installation company personnel contact information. Provide a listing of all tools to be provided to the Contracting Officer as components of the elevator system.

1.2.8 Emergency Power, Systems, and Operations

Include full description of emergency power, systems, and operations.

1.3 QUALITY ASSURANCE

1.3.1 Qualification

Provide a designed and engineered elevator system by an elevator contractor regularly engaged in the installation of elevator systems. Provide elevator components manufactured by companies regularly engaged in the manufacture of elevator components. Utilize only licensed and certified elevator personnel for the installation, adjusting, testing, and servicing of the elevators.

1.3.1.1 Elevator Contractor's Elevator Technicians

For elevator installations in the United States, including United States territories, perform all elevator related work under the direct guidance of a state certified elevator technician with a minimum of three years of experience in the installation of elevator systems of the type and complexity specified in the contract documents. Provide an endorsement letter from the elevator manufacturer, certifying that the elevator specialist is qualified. All elevator technicians must carry a current

certification issued by one of the following organizations:

- a. National Association of Elevator Contractors (NAEC)
- b. National Elevator Industry Education Program (NEIEP)

1.3.2 Manufacturers' Technical Support

Provide elevator components from manufacturers that provide factory training and online and live telephone elevator technical support to any elevator installation, service, and maintenance contractor. Provide elevator components from manufacturers that guarantee accessibility to all replacement and repair parts and components to any elevator installation, service, and maintenance contractor. Use only elevator component manufacturers that provide current published [price lists](#) for all elevator parts and components.

1.3.3 Operation and Maintenance Data

Assemble all shop drawing and product data material into O&M Data Packages in accordance with Article SUBMITTALS. Provide two complete O&M Data Packages in hard copy and two complete electronic O&M data packages on separate CDs, in PDF format. Provide all O&M Data Packages to Contracting Officer. Include controller diagnostic documentation and software as required under Article CONTROL EQUIPMENT.

1.3.4 Wiring Diagrams

Provide complete [wiring diagrams](#) and sequence of operations, which show electrical connections and functions of elevator systems. Provide one set (11 inch by 17 inch minimum size) of wiring diagrams, with individual sheets laminated in plastic and assembled in binder, to be stored in the machine room or control room cabinet. Provide one additional hard copy set and two complete electronic sets on separate CDs, in PDF format. Provide all wiring diagram sets to the Contracting Officer. Coded diagrams are not acceptable unless fully identified.

1.3.5 Machine Room/Control Room Cabinet

For storage of O&M Data Packages and Wiring Diagrams, provide locking metal cabinet with a minimum size of 20 inch W by 12 inch D by 30 inch H. Cabinet must be sized large enough to accommodate all O&M Data and hardware required in paragraphs OPERATION AND MAINTENANCE DATA and WIRING DIAGRAMS. Secure cabinet to machine room or control room wall.

1.4 NEW INSTALLATION SERVICE

Provide elevator [warranty](#) service in accordance with the manufacturer's maintenance plan, warranty requirements and applicable safety codes, for a period of 12 months after the date of acceptance by Contracting Officer. Perform this work during regular working hours. Provide supplies and parts to keep elevator system in operation. Perform service only by factory trained personnel. Provide Monthly services to include repairs, adjustments, greasing, oiling, and cleaning. Provide service log in elevator machine room or control room and update Monthly, throughout the one-year warranty period.

Provide 24-hour emergency service, with one hour on-site response time, during this period without additional cost to the Government.

1.4.1 Periodic Elevator Certification Inspection and Testing

Provide elevator mechanic to support QEI Certified Elevator Inspector in the periodic six-month and the annual Category 1 elevator certification inspection and testing. Perform Category 1 inspection and testing no greater than 30 days prior to the end of the warranty period. Perform all elevator certification testing in the presence of QEI Certified Elevator Inspector.

In conjunction with the testing noted above, test systems for Emergency Power Operation, Earthquake Emergency Operation, and Hospital Emergency Commandeering Service Operation, as applicable. Schedule so that testing does not interfere with building operations.

1.5 FIRE PROTECTION SYSTEM

Coordinate interface between building fire protection system and elevator controls.

Additional fire protection requirements are located in: Section 28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM; Section 21 13 13.00 10 WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION; and Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM.

1.5.1 Fire Alarm Initiating Devices

Fire alarm initiating devices are specified in 28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, including conduit and wiring from each detector to fire protection addressable modules in elevator machine room or control room.

1.5.2 Fire Sprinklers

Provide fire sprinklers in accordance with all applicable safety codes and with Section 21 13 13.00 10 WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION. Provide shutoff valve, check valve, and non-adjustable, zero time-delay flow switch, in each sprinkler line immediately outside of each machine room, control room, and hoistway, as applicable. Provide inspectors' test valve for periodic testing of flow switch and shunt trip disconnect.

Pipe sprinkler piping serving these spaces in a series manner with no laterals. Locate inspectors' test connection at the end of pipe runs such that operation of the test connection will purge air from system piping.

1.5.3 Shunt Trip Disconnect

Provide flow switches specified in paragraph FIRE SPRINKLERS to comply with ASME A17.1/CSA B44 and NFPA 72 for shunt trip of the main line power supply. For each elevator, provide control wiring connecting the flow switch to a shunt trip equipped circuit breaker located in the elevator machine room or control room. Upon flow of water, flow switch will instantaneously cause opening of the shunt-trip circuit breaker and remove power from the elevator. Flow switch must also send a signal to fire alarm control panel to indicate water flow condition.

PART 2 PRODUCTS

2.1 ELEVATOR DESCRIPTION

Provide elevator system that complies with ASME A17.1/CSA B44 in its entirety, ASME A17.2 in its entirety, and additional requirements specified herein. Provide elevator system that meets or exceeds the NEII-1 Ride Quality Performance Standards Matrix (RQPSM). Comply with the RQPSM "Intermediate Performance" criteria.

Provide and install elevators in accordance with 36 CFR 1191 - ABAAS, ICC IBC, IEEE C62.41, NFPA 70 and NFPA 101 requirements.

2.1.1 Elevator Design Parameters

2.1.1.1 Elevator No. 1 - Emergency Medical Service Accessibility (EMSA)

Provide elevator(s) with minimum size and arrangement to accommodate an ambulance stretcher 24-inch by 84-inch with not less than 5-inch radius corners, in the open, horizontal position.

- a. Type: In-Ground Direct Plunger
- b. Rated load: 3500 lb.
- c. Rated Speed: 150 fpm
- d. Car Door Type: Single-speed side slide.
- e. Car Door Opening Width: 3 ft.-6 in. minimum.

2.1.2 Cab Enclosure and Hoistway Entrance Assemblies

2.1.2.1 Cab Enclosures and Door Finishes

Provide all interior finishes as indicated on Finish Location Plan Drawings and as specified in this section.

- a. Floor: Rubber sheet flooring as indicated on Finish Plans shall be flush with cab sill.
- b. Interior Rear and Side Wall Panels: Pre-engineered elevator interior system including stainless steel clad panels over fire-rated MDF backer with .020-inch aluminum sealer sheet and z-clip mounting system. Panel configuration to match layout identified in Drawings. Stainless steel finish shall be textured to be "smudge-proof" with SST reveals in finish identified on Drawings. All fasteners shall be concealed. Interior face of doors to match wall panels. Provide 4-inch high SST wall base in finish to match wall panels.
- c. Provide SST handrails on rear and side walls at 34 inches above finished floor on center. Handrail to stop short of perpendicular walls by 6 inches. Style of rail shall be 1.25 inches in diameter with radius bend at ends in SST stippled finish. SST Finish Samples for Pre-Engineered Interior Finish System (4x4).
- d. Ceiling System: Canopy mounted six equal SST panels with painted reveals mounted on fire-rated particleboard substrate with aluminum backer and integral lighting system. Ceiling to have continuous 2-inch

clearance at perimeter of suspended ceiling for ventilation. Paint exposed surfaces above wall panels with fire-rated intumescent paint. Provide removable exit hatch per ASME A17.1/CSA B44 for emergency egress. (Location to be verified in field.) Stainless steel finish as indicated on Ddrawings.

- e. Lighting: Provide six recessed LED downlights centered in panels with continuous LED perimeter lighting in pre-installed aluminum housing. Provide emergency lighting system with additional system with additional power supply and a battery with automatic charger.
- f. Hoistway Doors and Frame Finishes - Provide finishes on exterior of hoistway as follows:
 - 1. Frame: Prefinished steel to match door finish.
 - 2. Exterior Face of Door Stainless steel to match interior face.
 - 3. Protect elevator finishes, fixtures and equipment from damage caused by work per this section. Install in accordance with elevator interior system instructions. Do not make structural changes to elevator car or install work in a manner that interferes with the safe operation of the elevator.

2.2 ELEVATOR OPERATION

ASME A17.1/CSA B44, Introduction, Section 3, Definitions.

2.2.1 Selective Collective Automatic Operation

Provide Selective Collective Automatic Operation.

2.3 SPECIAL OPERATION AND CONTROL

Provide the following special operations and control systems.

2.3.1 Keys for Elevator Key Switches

Provide a minimum of twelve keys per unique cylinder used on all key switches for a single elevator. If there is more than one elevator, additional keys will not be required unless there are additional unique lock cylinders. Provide keys with brass or fiberglass tags marked "PROPERTY OF THE U.S. GOVERNMENT" on one side with function of key or approved code number on the other side.

2.3.2 Firefighters' Emergency Operation (FEO)

Provide FEO equipment and signaling devices. The designated level for the FEO Phase I key operated switch is the ground floor. In the FEO Phase I fixture, provide FEO Operating Instructions.

2.3.2.1 Firefighters' Emergency Operation (FEO) Key Box

Provide flush mounted, locking, FEO Key Box of a minimum size of 5 inch W by 9 inch H by 1.5 inch D. Install at a height of 6 feet above floor level and directly above the FEO Phase I key switch. Provide box equipped with lock that uses the FEO K1 key.

2.3.3 Hoistway Access Operation

Provide hoistway access operation with switches at top and bottom terminal landings. Locate switch 6 feet above floor level, within 12 inches of elevator hoistway entrance frame or with the ferrule exposed when located in the elevator entrance frame.

2.3.4 In-Car Inspection Operation

Provide In-Car Inspection Operation.

2.3.5 Independent Service

Provide exposed key-operated switch in car operating panel to enable independent service and simultaneously disable in-car signals and landing-call responses. Provide indicator lights that automatically illuminate during independent service. For duplex or group operation, if one car is removed from group another car will respond to its hall calls.

2.3.6 Elevator Auxiliary Power Operating System

Provide elevator auxiliary power operating system for Elevator No. 1.

2.4 ELEVATOR DRIVE SYSTEM

Provide hydraulic elevator drive system, including pump unit, piping, cylinder/plunger assembly, and associated equipment, which will operate at a maximum working pressure of 500 psi or less. Provide complete elevator system that meets or exceeds the NEII-1 Ride Quality Standard, including elevator ride quality and noise levels in car and in elevator machine room and machinery space.

2.4.1 Hydraulic Pump Unit

Provide self-contained pump unit, including oil-hydraulic elevator pump, electric motor, suction-line oil strainer, and structural steel outer base with tank supports and isolation pads. Provide oil tank capacity for full plunger displacement plus at least 10 gallons. Provide means to maintain oil temperature between 100 and 130 degrees F regardless of ambient temperature. Limit acoustic output in elevator machine room and machinery space to 80 dbA.

2.4.1.1 Pump Motor

Provide intermittent-duty pump motor rated at 120 starts/hour. Provide motor that is sized so that the motor amperage does not exceed the motor data tag amperage in any operating condition, exclusive of acceleration and deceleration. Provide minimum of one mega ohm insulation resistance between conductors and motor frame. Provide motor and pump nameplate and data tags permanently mounted on the outside of the pump unit frame, with all data viewable without the use of mirrors or other tools.

2.4.2 Hydraulic Controls and Equipment

Provide control valve, overspeed safety valve, blowout-proof muffler, and hydraulic pump discharge strainer in the hydraulic oil supply line. Provide two 1/4 turn, ball valve type manual shutoff valves. Provide one in the elevator hoistway pit and one in the elevator machine room or machinery space.

2.4.2.1 Hydraulic Control Valve

Provide constant-velocity, down-speed regulated, control valve. Down-speed regulated control valve allows the car to travel at the same speed in the down direction, regardless of the load on the elevator. In addition, the hydraulic control valve must have built-in adjustment capability to operate the elevator at 140 percent of rated speed to facilitate periodic testing of the overspeed safety valve.

2.4.2.2 Hydraulic Overspeed Safety Valve

Provide overspeed safety valve in hydraulic oil supply line, directly adjacent to the hydraulic cylinder. Provide threaded pipe connections between the hydraulic cylinder and the overspeed valve. Provide valve equipped with manufacturer's manual shutoff feature. Overspeed valve must not be equipped with a manual or automatic lowering feature. Provide adjustable valve with means to seal adjustment after inspection and testing by certified elevator inspector.

2.4.3 Hydraulic Piping and Accessories

Provide [ASTM A53/A53M](#) or [ASTM A106/A106M](#), Schedule 80, black steel piping with [ASME B16.9](#) or [ASME B16.11](#) fittings for supply piping. Extend schedule 80 piping from the pump control valve body, inside the pump unit, to the hydraulic cylinder in the hoistway. Provide welded or threaded forged pipe fittings for all fittings and components of the hydraulic oil supply line. For in-ground direct plunger cylinders, provide dielectric union or isolation couplings at each end of the hydraulic oil supply line. Provide hangers or supports for all piping and components.

2.4.3.1 Containment of Hydraulic Oil Supply Line

Protect all portions of hydraulic oil supply line that are installed below ground, including portions encapsulated in concrete or covered by construction, with continuous, Schedule 80, PVC. Inside diameter of PVC must be [3 inches](#) larger than the outside diameter of the hydraulic oil supply line pipe and couplings.

2.4.4 Hydraulic Elevator Type

Provide a in-ground direct plunger direct plunger type hydraulic elevator. Elevators with telescopic or inverted cylinder-plungers are not acceptable and may not be used. Rope hydraulic elevator design is not acceptable and may not be used.

2.4.4.1 Cylinder-Plunger (Jack) Unit

Provide a single-stage plunger of seamless steel construction. Provide cylinder with self-stabilizing mount that will support and hold cylinder plumb without the need for stabilization means at the bottom of the cylinder. Provide a threaded, [1/4 inch](#) bleeder valve at the top of the cylinder, just below packing gland.

2.4.5 Cylinder Well System

For direct plunger, in-ground type hydraulic elevator, provide a dry, sealed cylinder well system.

2.4.5.1 Well Casing

Locate and drill well for the cylinder well system. Line well with steel casing, minimum 1/4 inch wall with welded 1/2 inch steel bottom. Set casing plumb.

2.4.5.2 PVC or HDPE Liner

Provide Schedule 80 PVC or HDPE liner with bottom cap and couplings; joints sealed watertight using pipe manufacturer's recommended adhesive or heat welding methods. Provide liner inside diameter not less than 3 inches larger than elevator cylinder maximum outside diameter. Liner may be provided as a cylinder manufacture's applied liner or as a separate component. For separate liner, set liner plumb in well casing, located for cylinder installation. Provide dry, salt-free sand below and around liner to top of well casing.

2.4.5.3 Cylinder Installation

Remove all moisture from inside of liner. Install cylinder plumb, inside liner. Provide a 1/4 inch copper evacuation tube inside the liner. The bottom of the evacuation tube must be within 6 inch of the bottom of the liner. Top of evacuation tube must extend at least 6 inch above pit floor. Provide top of test tube with removable cap to exclude foreign matter. Provide air inlet pressure fitting in top of liner and accessible in pit, for performance of air pressure test. Secure Liner/Cylinder Assembly as recommended by cylinder manufacturer.

2.4.5.4 Cylinder Liner Moisture Sensor System

Provide moisture and oil sensors inside the cylinder liner for detection of oil and water at the bottom of the cylinder liner. Provide sensor monitoring system that will actuate audible and visual alarms and identify the presence of water and identify the presence of oil inside the liner.

2.4.5.5 Seal Top of Well Casing

Upon successful test and certification of Liner/Cylinder assembly, seal gap between steel well casing and liner with foam insert strong enough to retain and support final grouting. Provide 3000 psi grout to a minimum of 4 inch thickness and level top of final grouting with pit floor.

2.5 CONTROL EQUIPMENT

Enclose all elevator control equipment in factory-primed and baked-enamel coated sheet-metal cabinets with ventilation louvers and removable or hinged doors. Mount cabinets at a height of 10 inches above machine room or control room finish floor.

2.5.1 Motor Control Equipment

Provide elevator motor control with electronic, soft-start motor starter.

2.5.2 Elevator Microprocessor Controller

For each individual elevator controller, and for each group controller, provide a microprocessor controller that complies with the following paragraphs. Provide controller(s) package that includes all hardware and software required for the installation, maintenance, and service of the

elevator, in its' entirety. Provide verification of technical support service that the controller manufacturer provides to any licensed elevator installation, service, and maintenance company.

Provide an elevator controller from a manufacturer that provides comprehensive factory training to include controller installation, adjustment, service, and maintenance. The training must be identified as available to any licensed elevator contractor. Provide verification of an established and documented training schedule, with pricing, for factory training classes that manufacturer has provided for a minimum period of one year prior to contract award date.

The elevator controller must be identified as available for purchase and installation by any licensed elevator contractor. All components, parts, diagnostic tools, and software must be available for purchase and installation and use by any licensed elevator contractor; "exchange-only" provisions for the purchase of spare parts are not acceptable. The elevator controller manufacturer must publish an industry competitive price listing for all controller parts, diagnostic tools, and software.

Provide verification of telephone and internet based technical support service that the elevator controller manufacturer provides to any licensed elevator installation, service, and maintenance company at an industry competitive price. The service must include live telephone based technical support for installation, adjustment, maintenance, and troubleshooting of the elevator controller and related elevator components. The service must be available during standard working hours.

Provide an elevator controller that is designed to automatically reestablish normal elevator operation following any temporary loss of power, regardless of duration.

2.5.2.1 Elevator Controller Interface Cabinet

For each individual elevator microprocessor controller, provide a separate elevator control cabinet with an integrated human interface system. For group elevator installations, a single cabinet and interface system with full access to each elevator controller may be utilized. The separate controller interface cabinet must be supplied by the elevator controller manufacturer and include a minimum 12 inch wide keyboard and a minimum 10 inch monitor. The elevator controller interface cabinet must comply with arc-flash protection requirements of NFPA 70E and UFC 3-560-01.

2.5.2.1.1 Elevator Microprocessor Human Interface

The interface system must provide complete elevator controller interface capability and must include the elevator controller manufacturer's comprehensive package of installation and diagnostic software. The microprocessor interface system must provide unrestricted access to all parameters, all levels of adjustment, and all flags necessary for installation, adjustment, maintenance, and troubleshooting of each elevator and for the elevator group. All software programming must be stored in non-volatile memory. The elevator controller fault log must provide non-volatile memory fault log storage of all faults, trouble calls, and fault history for a minimum of one year and the ability to download or print the fault log. The controller interface must also provide the capability to display and diagnose trouble calls, faults, and shutdowns. Expiring software, degrading operation, and "key" access controls are not acceptable.

2.5.2.2 Software and Documentation

Provide three copies of the manufacturer's maintenance and service diagnostic software, with complete software documentation, that will enable the same level of unrestricted access to all controllers of the same make and model, regardless of the installation date or location. Provide signed certification, from the manufacturer's corporate headquarters, that guarantees that the microprocessor software and access system will not terminate the unlimited and unrestricted access at any future date.

2.5.2.3 Elevator Controller Certification

For elevator installations in the United States, including United States territories, provide an elevator microprocessor controller that has a current certificate of safety code compliance issued by the Technical Standards and Safety Authority (TSSA), Toronto, Canada.

2.6 OPERATING PANELS, SIGNAL FIXTURES, AND COMMUNICATIONS CABINETS

For all panels and fixtures, provide identical and uniform panel and fixture design, material, finish, and components for all elevators. For all panels and fixtures, legibly and indelibly identify all buttons, devices, and all operating positions for each device. Use engraving and backfilling, or photo etching, for button and device designations. Do not use attached signs. Provide elevator manufacturers' standard grade for all key switches unless otherwise specified. All illuminating panels and fixture components must utilize LED lighting for energy efficiency.

2.6.1 Car and Hall Buttons

For all cab and landing fixture buttons, provide industry-standard, vandal resistant push buttons with positive-stop assembly design. Buttons must be minimum 3/4 inch diameter, satin-finish stainless steel, with illuminating LED halo.

2.6.2 Passenger Car-Operating Panel

Provide each car with one car operating panels that contains operation controls and communication devices. Provide exposed, flush mounted buttons for the controls identified in subparagraph PASSENGER CONTROLS. Provide a lockable service cabinet for the controls listed in subparagraph SERVICE CONTROLS. Use engraving and backfilling or photo etching for button and switch designations. Do not use attached signs.

2.6.2.1 Passenger Controls

In addition to ASME A17.1/CSA B44 requirements, provide the following operating controls, identified as indicated:

- a. Illuminating car-call buttons identified to correspond to landings served by the elevator.
- b. "DOOR OPEN" and "DOOR CLOSE" buttons. For front and rear openings at the same floor, include the identification "F" and "R" for each opening.
- c. Red, illuminating "ALARM" button.

- d. Key-operated "Independent Service" switch.
- e. "Help" communication device to include communication between elevator cab and elevator machine room or control room.

2.6.2.2 Service Controls

In addition to ASME A17.1/CSA B44 requirements, provide the following operating controls, identified as indicated:

- a. Provide a key-operated, three-position switch for "In car Inspection Operation" and "Hoistway Access". The center switch position will provide normal, automatic operation.
- b. "Car Light" switch.
- c. "Car Fan" switch with two speed settings identified.
- d. 120-volt ac 60 Hz single-phase duplex electrical outlet of ground-fault-circuit-interrupt (GFCI) design.

2.6.2.3 Certificate Window

Provide a minimum 4 inch wide by 6 inch high certificate window for elevator inspection certificate. Locate window in the Service Controls door of the Car Operating Panel.

2.6.2.4 Emergency Signaling Devices

Provide an audible signaling device, operable from the Car Operating Panel button marked "ALARM". The audible signaling device must have a sound pressure rating between 80 and 90 dBA at 10 ft. Provide battery backup power capable of operating the audible signaling device for at least one hour.

2.6.3 Elevator In-Car Position Indicators

For all elevators, provide illuminating position indicator in the Car Operating Panel.

2.6.4 Elevator In-Car Direction Indicators

Provide visual direction indicators and audible car arrival signal in the elevator car door jamb, in accordance with ABA Standards. Visual indicators must be visible from the hall call fixture.

2.6.5 Hall Call Landing Fixtures

Provide a hall call fixture adjacent to each elevator. Provide a single push-button for terminal landings and dual push-buttons, up and down, at intermediate landings.

2.6.5.1 Designated Landing Hall Call Fixture

2.6.5.1.1 Location of COMMUNICATION MEANS FAILURE (CMF) Visual Signal

When required by ASME A17.1/CSA B44, provide an elevator CMF audible and illuminating signal, and reset switch, in the FEO Designated Landing hall

call fixture. Mount the signal and reset switch at a minimum of 7 inches above the "UP" hall call button.

2.6.5.1.2 COMMUNICATION MEANS FAILURE (CMF) Visual and Audible Signal Operation

Provide a CMF visual and audible signal system that conforms to ASME A17.1/CSA B44. Provide continuous verification of operability of the telephone line and immediate activation of audible and visual signals when verification means determines that the telephone line is not functioning. Provide illumination of visual signal at one second intervals. Provide a minimum of 65 dBA audible signal at 30 second intervals.

2.6.5.1.3 Firefighters' Emergency Operation Phase I Switch and Visual Signal

When required by ASME A17.1/CSA B44, provide an elevator Firefighters' Emergency Operation Phase I switch and illuminating visual signal in the FEO Designated Landing hall call fixture. Provide FEO Phase I visual signal that is designed with intermittent, flashing, illumination when actuated by the machine room, control room, or hoistway fire alarm initiating device. Locate FEO Phase I key switch above the CMF visual signal with a minimum of 6 inches vertical between the centerlines of the CMF signal and the FEO Phase I key switch. Locate FEO Phase I visual signal directly above the Phase I switch. In addition, locate Elevator Corridor Call Station Pictograph at top of hall call fixture.

2.6.6 Elevator Car Position and Direction Indicators and Car Arrival Signal

For elevator installations with three or more stops, provide a separate hall landing fixture that includes the visual elevator position indicator, visual direction indicators, and audible car arrival signal, in accordance with ABA Standards.

2.6.7 Emergency or Standby Power

When emergency or standby power is provided for elevator operation, provide an elevator emergency power visual indicator that conforms to ASME A17.1/CSA B44. Locate the visual signal in the Firefighters Emergency Operation fixture for each simplex elevator and for each elevator group. When an emergency power selector switch is required, provide switch in a separate, flush mounted fixture located at the designated level, in view of all elevator entrances.

2.7 CAR DOOR EQUIPMENT

2.7.1 Car Door Operator

Provide elevator door operator equipment and circuitry that is designed and installed as discreet communication. Serial communication must not be used for this system.

2.7.2 Infra-red Curtain Unit

Provide Infra-red Curtain Unit (ICU) with multiple infra-red beams that protect to the full height and width of the door opening. Provide door nudging operation.

2.8 PASSENGER ELEVATOR GUIDES, PLATFORM, AND ENCLOSURE

2.8.1 Roller Guides

Provide coil-spring loaded roller guide assemblies in adjustable mountings on each side of car and counterweight frames in accurate alignment at top and bottom of frames.

2.8.2 Car Enclosure Wall Panels, Return Panels, Doors, Entrance Columns, and Transom

Provide 14 Gauge minimum stainless steel cab wall panels and entrance components. Use same material and finish for all hoistway and car entrance assemblies. Apply sound-deadening material on exterior of all cab wall panels.

2.8.3 Car Enclosure Top

Provide reinforced, 12 gauge minimum steel car enclosure top. Provide hinged emergency exit with lock that complies with the seismic risk zone 2 or greater design requirements of [ASME A17.1/CSA B44](#). Locate emergency exit hinge towards the rear of the elevator cab. Design and configure the elevator cab interior ceiling to provide convenient and unobstructed access to, and use of, emergency exit from inside the elevator cab.

2.8.4 Car Door

Provide 16 gauge minimum stainless steel car doors of sandwich construction with flush surfaces on car and landing sides. Provide a minimum of 2 door guide assemblies per door panel, one guide at leading and one at trailing door edge with guides in the sill groove their entire length of travel.

2.8.5 Car Entrance Sill

Provide one piece cast nickel silver entrance sill(s). Set sills level and flush with floor finish. Use same material for hoistway and car entrance sills.

2.8.6 Cab Finish Floor

Provide cab finish floor with top of finish floor flush with the cab sill.

2.8.7 Car Fan

Provide 2-speed fan for car enclosure forced ventilation. Fan must be mounted in the car enclosure top.

2.8.8 Car Lighting

Utilize LED lighting for elevator car interior illumination. Provide a minimum of 10 foot-candles, measured at all areas of the car enclosure floor. Provide automatic car lighting operation that will turn off car lights after 3 minutes of inactivity. Car lights must automatically turn on upon actuation of an elevator car or hall call.

2.8.9 Car Protection Pads and Hooks

Provide fire retardant, hanging car protection pads that provide

protection for all car interior wall panels. Provide permanently installed studs in car that are designed for hanging the car protection pads in the car.

2.9 PASSENGER ELEVATOR HOISTWAY DOORS AND ENTRANCES

Provide hoistway entrance assemblies with a minimum 1-1/2 hour fire rating. Use same material and finish for all hoistway and car entrance assemblies.

2.9.1 Hoistway Entrance Frames

Provide 14 gage minimum stainless steel hoistway entrance frames. Solidly grout uprights of entrance ways to height of 5 feet.

2.9.2 Hoistway Entrance Sills

Provide one-piece cast nickel silver, stainless steel, or white bronze entrance sills. Set top of landing sill flush with top of finish floor. Solidly grout under full length of sill. Use same material for all hoistway and car entrance sills.

2.9.3 Hoistway Entrance Doors

Provide stainless steel non-vision construction hoistway entrance doors with flush surfaces on car and landing sides. Provide a minimum of 2 door guide assemblies per door panel, one guide at leading edge and one at trailing edge with guides in the sill groove the entire length of door travel. Use same material and finish for all hoistway and car entrance assemblies.

2.9.4 Hoistway Entrance Door Track Dust Covers

Provide sheet metal hoistway door track dust covers at each landing. Dust covers must cover top and hoistway side of door locks and door roller tracks, and extend the full width of the door track and associated hardware. Dust cover sections will not exceed 3 feet in length.

2.10 HOISTWAY EQUIPMENT

2.10.1 Car Guide Rails and Fastenings

Provide T-section type guide rails for car. Paint rail shanks with one coat of black enamel.

2.10.2 Pit Equipment and Support Channels

Provide rail-to-rail pit channels to serve as mounting surface for main guide rails, hydraulic cylinder and car buffers. Method of installation of channels, brackets and buffer mounts must be such that pit waterproofing is not punctured.

2.10.3 Pit "STOP" Switch

Provide push-to-stop/pull-to-run type pit "STOP" switch.

2.10.4 Traveling Cables

Suspend traveling cables by means of self-tightening webbed devices or

internal suspension members.

2.10.5 Hoistway Pit Ladder

Provide continuous horizontal rungs for the full height of the pit ladder.

2.11 COMMERCIAL WHEELCHAIR LIFT

Provide exterior grade, non-skid 36"x54" straight-through platform wheelchair lift with the following criteria:

- a. Rated Load: 750 lbs.
- b. Drive: Belt driven Ball screw/90 VDC hp motor with brake and 24 VDC battery powered.
- c. Power: 120 VAC 15A ground circuit or 240 VAC.
- d. Speed: Estimated Average 10 fpm.
- e. Controls: Constant pressure paddle switch with emergency stop and key switch.
- f. Manual Lowering
- g. Safety Design: [ASME A18.1](#), Section 2 - Vertical Platform Lifts.
- h. Standards: [ASME A17.5/CSA B44.1](#) - elevator and Escalator Equipment ETL Listed 3148125.
- i. Safety Features: Safety pan, final limit, ball nut safety backup, belt monitor and non skid surface.
- j. Warranty: 2-year parts.
- k. Auto-folding ramp.
- l. Solid 42: high guard panels and grab bar.
- m. Platform and upper landing gate.
- n. Standard manufacturer's white color finish.
- o. 53" lifting height.
- p. [Commercial Wheelchair Lift, Data Package 4](#)

2.11.1 [Commercial Wheelchair Lift](#) Codes

Commercial wheelchair lift and lift installation to comply with all applicable national and local codes including:

- 2010 ADA Standards for accessible design
- 2004 ADAAG (ADA Accessibility Guidelines)
- 2015 Architectural Barriers Act (ABA) Standards
- ICC A117.1 "Accessible and Usable Buildings and Facilities Code"
- ASME A18.1 "Safety Standard for Platform Lifts and Stairway Lifts"

2.11.2 Commercial Wheelchair Lift Basis of Design

Basis of Design to be Graventa Lift or equal,
<https://www.garaventlift.com/en.html>

Model: Genesis Opal.

Rated Load: Rated Load of 750 lbs

Platform size: Mid-Size Platform: 36" x 54 7/8"

Configuration: Straight through entry/exit

Controls Up/Down continuous pressure directional controls

Warranty Standard: 2 years

Accessories:

- Keyless operation.
- Grab rail on platform side wall.
- Audible Illuminated Emergency Stop/Alarm Switch
- Illuminated and tactile directional buttons.
- Platform mounted automatic folding ramp for installations without a pit.

~~2.12 Sub Title~~

PART 3 EXECUTION

3.1 INSTALLATION

Install in accordance with DOD design criteria, contract specifications, manufacturer's instructions, **NEII-1** Building Transportation Standards and Guidelines, and all applicable building and safety code requirements.

3.1.1 Structural Members and Finish Materials

Do not cut or alter structural members. Do not alter finish materials from manufacturer's original design. Restore any damaged or defaced work to original condition.

3.1.2 Miscellaneous Requirements

Provide recesses, cutouts, slots, holes, patching, grouting, and refinishing to accommodate elevator installation. Use core drilling to drill all new holes in concrete. Finish work to be straight, level, and plumb. During installation, protect machinery and equipment from dirt, water, or mechanical damage. At completion, clean all work and spot paint.

3.2 FIELD QUALITY CONTROL

The Contractor will provide and utilize a third-party licensed and certified Qualified Elevator Inspector (QEI) to conduct elevator pre-acceptance inspection and testing. The QEI must perform inspections and witness tests to ensure that the installation conforms to all applicable safety codes and contract requirements. The QEI will be directly employed by the Contractor and independent of the elevator contractor.

Upon completion, the QEI must provide written test data for all ASME A17.1/CSA B44 Acceptance Tests and written certification that the elevator is complete and ready for final Acceptance Inspection, Testing, and Commissioning.

3.3 ACCEPTANCE INSPECTION, TESTING AND COMMISSIONING

When elevator system installation is complete and ready for final inspection, notify Contracting Officer that elevator system is ready for Acceptance Inspection, Testing, and Commissioning. Provide QEI certification specified in Article FIELD QUALITY CONTROL.

Contracting Officer will obtain the services of a third-party QEI Certified Elevator Inspector. The QEI must utilize an Elevator Acceptance Inspection Form to record the results of inspection and all testing and to identify safety code and contract deficiencies. Specific values must be provided for all tests required by ASME A17.1/CSA B44, ASME A17.2, and contract documents. Upon completion of inspection and testing, the QEI must sign a copy of the completed forms and provide to the Contracting Officer. Within 2 weeks of the inspection, the QEI must also prepare a formal inspection report, including all test results and deficiencies. Upon successful completion of inspection and testing, the QEI will complete, sign, and provide a certificate of compliance with ASME A17.1/CSA B44.

3.3.1 Acceptance Inspection Support

Prime and Elevator Contractors must provide inspection support and perform all required tests, in order to demonstrate proper operation of each elevator system and to prove that each system complies with contract requirements and all applicable building and safety codes. Inspection procedures in ASME A17.2 form a part of this inspection and acceptance testing. All inspection and testing must be conducted in the presence of the Qualified Elevator Inspector (QEI).

If the elevator does not comply with all contract and safety code requirements on the initial Acceptance Inspection and Test, the Contractor is responsible for all costs involved with re-inspection and re-testing required as a result of contractor delays and discrepancies discovered during inspection and testing.

3.3.2 Testing Materials and Instruments

Furnish all testing materials and instruments necessary for Acceptance Inspection, Testing and Commissioning. At a minimum, include calibrated test weights, tachometer, accelerometer, hydraulic pressure gauge, 600-volt mega ohm meter, volt meter and ammeter, infrared temperature gauge, door pressure gage, dynamometer, and 20 foot tape measure.

3.3.3 Field Tests

3.3.3.1 Endurance Tests

Test each elevator for a period of one hour continuous, automatic operation, with specified rated load in the elevator cab. During the one hour test, stop car at each floor, in both directions of travel, and allow automatic door open and close operation. The requirements for Automatic Operation, Rated Speed, Leveling, Temperature Rise and Motor Amperes must be met throughout the duration of the Endurance Test. Restart the one

hour test period from the beginning, following any shutdown or failure.

3.3.3.2 Speed Tests

Determine actual speed of each elevator, in both directions of travel, with rated load and with no load in elevator car. Make Speed tests at the beginning and at the end of the Endurance test. Determine speed by tachometer reading or accelerometer, excluding accelerating and slow-down zones. Under all conditions, minimum acceptable elevator speed is the Rated speed specified. Maximum acceptable elevator speed is 110 percent of Rated speed.

3.3.3.3 Leveling Tests

Test elevator car leveling operation and provide a leveling accuracy equal to or less than $1/8$ inch at each floor with no load in car, and with rated load in car, in both directions of travel. Determine leveling accuracy at the beginning and at the end of the endurance tests.

3.3.3.4 Temperature Rise Tests

Determine temperature rise of elevator pump motor and hydraulic fluid during one-hour full-load test run. Under these conditions, maximum temperature rise must not exceed acceptable temperature rise indicated on manufacturer's data plate. Start test only when equipment is within 5 degrees C of ambient temperature.

3.3.3.5 Motor Ampere Tests

At beginning and end of Endurance test, measure and record motor amperage in both directions of travel and in both no-load and rated load conditions.

3.3.3.6 Elevator Performance and Ride Quality Testing

Evaluate elevator performance to ensure compliance with specification requirements related to the NEII-1 Performance Standards Matrix for New Elevator Installations.

3.3.3.7 Hydraulic Safety Valve (Automatic Shutoff Valve) Tests

In order to ensure consistent performance, regardless of hydraulic oil temperature, test the Hydraulic Safety Valve twice. Test once before the one-hour endurance test and once immediately after the one-hour test. For elevator certification, safety valve must perform to code in both tests.

3.3.3.8 Hydraulic Pressure Tests

Check the hydraulic static pressure and rated-speed operating pressure at the hydraulic control valve, under both no load and rated load conditions.

3.3.3.9 Pressure Test of Liner/Cylinder Assembly

Perform 20 psig pressure test of the completed and installed liner/cylinder assembly. Test liner/cylinder assembly as a sealed unit. Provide safety relief valve set to relieve at 20 psig; 4.5 inch diameter dial pressure gage scaled for 0 to 50 psig and calibrated to 0.5 percent

accuracy; and an air pressure admission throttle and shutoff valve. For safety, pressure test must only be performed when liner and cylinder are fully inserted and assembled in the well casing. Perform the test from remote location outside of the elevator pit. Perform test in the presence of, and witnessed by, a Certified Elevator Inspector.

3.4 Cleaning and Protection

Remove strippable film. Clean exposed surfaces in accordance with manufacturer's instructions. Protect exposed surfaces from damage by subsequent construction.

-- End of Section --

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APPENDIX 3 - HAZMAT SURVEY

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- FUNGAL INVESTIGATION REPORT
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- RADON
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Asbestos Containing Materials Survey Report

Cullum Hall

USMA West Point NY

Prepared for: Mr. Terry Allen
Mason and Hanger

Prepared by: **the oak group, inc.** 622 Cooper Street Camden, NJ 08102 (856) 377-0060 www.oakgroup.net

Mailing address: PO Box 2041 Voorhees, NJ 08043

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1.0 NARRATIVES

1.0 NARRATIVES

1.1 Purpose:

The OAK Group, Inc. (OAK) was contracted by Mason and Hanger to perform an asbestos survey of the Cullum Hall located at the United States Military Academy located in West Point, NY.

The purpose of the survey was to identify and document asbestos-containing materials (ACM) for remediation prior to planned renovations. The EPA's National Emission Standard for Hazardous Air Pollutants (NESHAP) regulation requires that buildings scheduled for renovations/demolition have an inspection identifying asbestos materials. OSHA's Construction Standard for Asbestos (29 CFR 1926.1101) requires that building materials installed prior to 1981 be inspected for asbestos or they must be classified as presumed asbestos-containing materials (PACM).

1.2 Personnel:

Mr. Andrew Ward, performed the building inspection on October 22, 2018 with the assistance of Mr. Isa Haj. Mr. Ward is an EPA-accredited, New York State-licensed building inspector. Mr. Haj is an EPA-accredited building inspector.

1.3 Discussion and Survey Results:

A total of twenty-six (26) samples were collected from the building. One (1) sample, collected of White 2'x2' Lay-In Ceiling Tile, sample #182365-005, was misplaced resulting in only twenty-five (25) samples being analyzed. This material was sampled elsewhere in the building.

All samples were analyzed by Polarized Light Microscopy (PLM), which classifies a material as asbestos-containing if it contains greater than one percent (>1%) asbestos. Asbestos (>1%) was identified in the following materials:

- ❖ Gray 12"x 12" Floor Tile
- ❖ Black 12"x 12" Floor Tile

As per the New York State Department of Labor Division of Safety & Health regulations governing asbestos, all non-friable organically bound (NOB) materials (i.e. floor tiles, mastics, roofing materials and caulking) must be analyzed by both PLM and TEM (Transmission Electron Microscopy) in order to classify a material as a non asbestos-containing material. Asbestos (>1%) was identified in the following materials:

- ❖ Black Tar Paper Under Black 12"x12" Floor Tile

Additionally, the following materials were found, during PLM or TEM analysis to contain asbestos in quantities less than 1%:

- Black Mastic Associated With Gray 12"x12" Floor Tile
- Black Mastic Associated With Black 12"x12" Floor Tile

Although these materials are not regulated by the EPA as "asbestos-containing materials", any contractor that will be disturbing these materials should be made aware that they contains trace amounts of asbestos and should follow regulations set forth by OSHA in 29 CFR 1910.1001 and 29 CFR 1910.1101.

The following materials were observed and suspected to be asbestos-containing, but were unable to be sampled either because sampling the material would void a fire-rating associated with the material, there was no access to the location of the sample, or at the request of the United States Military Academy personnel escorts:

❖ Metal Fire Doors

Criterion was unable to gain access to the following rooms/areas:

- Room W-G1046
- Room W-G1047
- Room W-G1048
- Room W-G1045
- Room W-G1036 (Room 9)
- Room W-G1022 (Room 14)
- Room W-G1056
- Room W-G1057
- Room W-G1058
- Room W-G1052
- Room W-G2033
- Room W-G2026
- Room W-G2027
- Room W-G2019 (Room 7B)
- Room W-G2008
- Room W-G2006
- Room W-G2005
- Room W-G2004
- Room W-G2003
- Room W-G2001

Certificates of analysis for PLM & TEM analysis can be found in Section 2.0.

Those materials that were observed, sampled, submitted for analysis and found not to be asbestos-containing materials are identified in Section 3.0 of this report.

1.4 Disclaimer:

Information contained herein was obtained by means of onsite observations, a detailed materials survey, and analytical data. Conclusions will be based upon the data obtained. This is not to imply that the data gathered is all the information that exists which may be pertinent to the site. Any areas inaccessible to the survey team due to reasons beyond the control of OAK (i.e., hidden pipe chases, secured spaces, etc.) will not be included in this survey.

1.5 Conclusions and Recommendations:

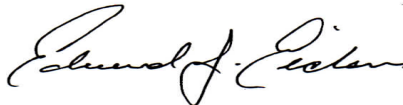
All identified ACM should be removed by a New York-licensed asbestos abatement contractor if they will be impacted by renovation/demolition activity.

Section 2.0, Laboratory Results, contains certificates of analyses for all bulk samples collected and analyzed. Section 3.0, Asbestos Inventory, lists specific locations and quantities of asbestos-containing materials associated with the structures to be demolished.

Section 6.0, Certifications, lists asbestos accreditations for all Criterion employees who worked on this project.

This report is intended to strictly comply with EPA, OSHA and State of New York regulations governing asbestos. This report should be referenced prior to disturbing any materials that may contain asbestos.

OAK appreciates the opportunity to provide you with an asbestos-containing materials survey. Should you have any questions, please do not hesitate to call me at (856) 377-0060 or eje@oakgroup.net



Eduard J. Eichen, CIH
Project Manager

2.0 LABORATORY RESULTS

**EMSL Analytical, Inc.**

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EMSL Order: 041832699

CustomerID: CRIT52

CustomerPO:

ProjectID:

Attn: **S. Vena**
Criterion Laboratories, Inc.
400 Street Road
Bensalem, PA 19020

Phone: (215) 244-1300
 Fax: (215) 244-4349
 Received: 10/31/18 4:25 PM
 Analysis Date: 11/6/2018
 Collected: 10/22/2018

Project: 182365 / Cullum Hall of United States Military Academy of West Point, NY

Test Report:Asbestos Analysis of Bulk Material

Test		Analyzed Date	Color	Non Asbestos		Asbestos
				Fibrous	Non-Fibrous	
Sample ID	01-Skim Coat 041832699-0001		Description Homogeneity	Floor 03 Lounge - Plaster Wall Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	White			100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed
Sample ID	01-Base Coat 041832699-0001A		Description Homogeneity	Floor 03 Lounge - Plaster Wall Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	Brown			100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed
Sample ID	02-Skim Coat 041832699-0002		Description Homogeneity	Floor 03 Stage Control Area - Plaster Wall Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	White			100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed
Sample ID	02-Base Coat 041832699-0002A		Description Homogeneity	Floor 03 Stage Control Area - Plaster Wall Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	Gray			100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed
Sample ID	03-Skim Coat 041832699-0003		Description Homogeneity	Stage - Plaster Wall Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	White			100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed

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Test Report:Asbestos Analysis of Bulk Material

Test	Color	Non Asbestos		Asbestos
		Fibrous	Non-Fibrous	
Sample ID 03-Base Coat 041832699-0003A	Description Stage - Plaster Wall Homogeneity Homogeneous			
PLM NYS 198.1 Friable	11/6/2018 Gray		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM				Not Analyzed
PLM NYS 198.6 NOB				Not Analyzed
TEM NYS 198.4 NOB				Not Analyzed
Sample ID 04 041832699-0004	Description Stage - Plaster Wall - Decorative Homogeneity Homogeneous			
PLM NYS 198.1 Friable	11/6/2018 White		100.00% Non-fibrous (other)	None Detected
No base coat present				
PLM NYS 198.6 VCM				Not Analyzed
PLM NYS 198.6 NOB				Not Analyzed
TEM NYS 198.4 NOB				Not Analyzed
Sample ID 27 041832699-0005	Description Lobby Outside Auditorium - Plaster Ceiling - Decorative Homogeneity Homogeneous			
PLM NYS 198.1 Friable	11/6/2018 White		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM				Not Analyzed
PLM NYS 198.6 NOB				Not Analyzed
TEM NYS 198.4 NOB				Not Analyzed
Sample ID 06-Skim Coat 041832699-0007	Description Copy / Storage Room in Cadet Hostess Office - Plaster Wall Homogeneity Homogeneous			
PLM NYS 198.1 Friable	11/6/2018 White		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM				Not Analyzed
PLM NYS 198.6 NOB				Not Analyzed
TEM NYS 198.4 NOB				Not Analyzed
Sample ID 06-Base Coat 041832699-0007A	Description Copy / Storage Room in Cadet Hostess Office - Plaster Wall Homogeneity Homogeneous			
PLM NYS 198.1 Friable	11/6/2018 Gray		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM				Not Analyzed
PLM NYS 198.6 NOB				Not Analyzed
TEM NYS 198.4 NOB				Not Analyzed
Sample ID 07-Floor Tile 041832699-0008	Description W-G1051 Foyer - Gray 12"x12" Floor Tile Homogeneity Homogeneous			
PLM NYS 198.1 Friable				Not Analyzed
PLM NYS 198.6 VCM				Not Analyzed
PLM NYS 198.6 NOB	11/6/2018 Gray			2.9% Chrysotile 2.9% Total
TEM NYS 198.4 NOB				Not Analyzed

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Test Report:Asbestos Analysis of Bulk Material

Test		Non Asbestos		Asbestos
		Color	Fibrous Non-Fibrous	
Sample ID	07-Mastic	Description	W-G1051 Foyer - Black Mastic	
	041832699-0008A	Homogeneity	Homogeneous	
PLM NYS 198.1 Friable				Not Analyzed
PLM NYS 198.6 VCM				Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Black		Inconclusive: None Detected
TEM NYS 198.4 NOB	11/7/2018	Black		None Detected
Sample ID	08-Floor Tile	Description	W-G1051 Foyer - Gray 12"x12" Floor Tile	
	041832699-0009	Homogeneity	Homogeneous	
PLM NYS 198.1 Friable				Not Analyzed
PLM NYS 198.6 VCM				Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Gray		1.3% Chrysotile 1.3% Total
TEM NYS 198.4 NOB				Not Analyzed
Sample ID	08-Mastic	Description	W-G1051 Foyer - Black Mastic	
	041832699-0009A	Homogeneity	Homogeneous	
PLM NYS 198.1 Friable				Not Analyzed
PLM NYS 198.6 VCM				Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Black		Inconclusive: None Detected
TEM NYS 198.4 NOB	11/7/2018	Black		<1% Chrysotile <1% Total
Inseparable from backing.				
Sample ID	09-Floor Tile	Description	W-G1051 Foyer - Black 12"x12" Floor Tile	
	041832699-0010	Homogeneity	Homogeneous	
PLM NYS 198.1 Friable				Not Analyzed
PLM NYS 198.6 VCM				Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Black		1.2% Chrysotile 1.2% Total
TEM NYS 198.4 NOB				Not Analyzed
Sample ID	09-Mastic	Description	W-G1051 Foyer - Black Mastic	
	041832699-0010A	Homogeneity	Homogeneous	
PLM NYS 198.1 Friable				Not Analyzed
PLM NYS 198.6 VCM				Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Black		Inconclusive: None Detected
TEM NYS 198.4 NOB	11/7/2018	Black		<1% Chrysotile <1% Total
Inseparable from backing.				

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Test Report:Asbestos Analysis of Bulk Material

Test		Color	Fibrous	Non Asbestos	Asbestos
Sample ID	10 041832699-0011	Description Homogeneity	W-G1051 Foyer under Floor Tile - Black Tar Paper Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Black	Inconclusive: None Detected		
TEM NYS 198.4 NOB					Not Analyzed
Sample ID	11 041832699-0012	Description Homogeneity	W-G1051 Foyer under Floor Tile - Black Tar Paper Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Black	Inconclusive : <1%Chrysotile Inconclusive - <1% Total		
TEM NYS 198.4 NOB	11/7/2018	Black	1.3% Chrysotile 1.3% Total		
Sample ID	12-Floor Tile 041832699-0013	Description Homogeneity	W-G1024 Hallway - Light Gray 12"x12" Floor Tile Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Gray	Inconclusive: None Detected		
TEM NYS 198.4 NOB	11/7/2018	Gray	None Detected		
Sample ID	12-Mastic 041832699-0013A	Description Homogeneity	W-G1024 Hallway - Black Mastic Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Black	Inconclusive: None Detected		
TEM NYS 198.4 NOB	11/7/2018	Black	None Detected		
Sample ID	13-Floor Tile 041832699-0014	Description Homogeneity	W-G1024 Hallway - Light Gray 12"x12" Floor Tile Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Gray	Inconclusive: None Detected		
TEM NYS 198.4 NOB	11/7/2018	Gray	None Detected		
Sample ID	13-Mastic 041832699-0014A	Description Homogeneity	W-G1024 Hallway - Black Mastic Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Black	Inconclusive: None Detected		
TEM NYS 198.4 NOB	11/7/2018	Black	None Detected		

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Test Report:Asbestos Analysis of Bulk Material

		Non Asbestos			Asbestos
Test		Color	Fibrous	Non-Fibrous	
Sample ID 14 041832699-0015		Description Homogeneity	W-G1024 Hallway - White 2'x2' Large Ceiling Tile Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Gray/White	20.3% Min. Wool		Inconclusive: None Detected
TEM NYS 198.4 NOB	11/7/2018	Gray/White			None Detected
Sample ID 15-Skim Coat 041832699-0016		Description Homogeneity	Room W-G1039 - Room 6 - Plaster Wall Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	White		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 15-Base Coat 041832699-0016A		Description Homogeneity	Room W-G1039 - Room 6 - Plaster Wall Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	Gray		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 16-Skim Coat 041832699-0017		Description Homogeneity	Room W-G1039 - Room 6 - Plaster Ceiling Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	White		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 16-Base Coat 041832699-0017A		Description Homogeneity	Room W-G1039 - Room 6 - Plaster Ceiling Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	Gray		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID 17-Drywall 041832699-0018		Description Homogeneity	Room W-G1039 - Room 6 - Drywall Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	Brown/White	15.00% Cellulose	85.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed

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Test Report:Asbestos Analysis of Bulk Material

Test		Color	Fibrous	Non-Fibrous	Asbestos
Sample ID	17-Joint Compound 041832699-0018A	Description Homogeneity	Room W-G1039 - Room 6 - Joint Compound Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	White	100.00% Non-fibrous (other)		None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID	18 041832699-0019	Description Homogeneity	Room W-G1039 - Room 6 - Tan Linoleum Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Tan	4.5% Glass		Inconclusive: None Detected
Contains inseparable paper backing and mastic.					
TEM NYS 198.4 NOB	11/7/2018	Tan			None Detected
Sample ID	19 041832699-0020	Description Homogeneity	Room W-G1039 - Room 6 - Tan Linoleum Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Tan	4.8% Glass		Inconclusive: None Detected
TEM NYS 198.4 NOB	11/7/2018	Tan			None Detected
Sample ID	20-Floor Tile 041832699-0021	Description Homogeneity	East Stair Landing - Black 12"x12" Floor Tile Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/7/2018	Black			1.5% Chrysotile 1.5% Total
TEM NYS 198.4 NOB					Not Analyzed
Sample ID	20-Mastic 041832699-0021A	Description Homogeneity	East Stair Landing - Black Mastic Homogeneous		
PLM NYS 198.1 Friable					Not Analyzed
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Black			Inconclusive: None Detected
TEM NYS 198.4 NOB	11/7/2018	Black			<1% Chrysotile <1% Total
Contains inseparable debris.					

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Test Report:Asbestos Analysis of Bulk Material

Test		Non Asbestos				Asbestos
Sample ID	Color	Description	Fibrous	Non-Fibrous		
21-Linoleum 041832699-0022		Description Homogeneity	W-G1031 - Room 16 - Grey Linoleum Homogeneous			
PLM NYS 198.1 Friable						Not Analyzed
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Gray	1.0% Glass			Inconclusive: None Detected
Insuficient mastic.						
TEM NYS 198.4 NOB	11/7/2018	Gray				None Detected
Sample ID	21-Paper Backing 041832699-0022A	Description Homogeneity	W-G1031 - Room 16 - Grey Paper Backing Homogeneous			
PLM NYS 198.1 Friable	11/6/2018	Gray	50.00% Cellulose 40.00% Glass	10.00% Non-fibrous (other)		None Detected
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed
Sample ID	22-Linoleum 041832699-0023	Description Homogeneity	W-G1030 - Room 16 Bathroom - Grey Linoleum Homogeneous			
PLM NYS 198.1 Friable						Not Analyzed
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB	11/6/2018	Gray	1.2% Glass			Inconclusive: None Detected
Insuficient mastic.						
TEM NYS 198.4 NOB	11/7/2018	Gray				None Detected
Sample ID	22-Paper Backing 041832699-0023A	Description Homogeneity	W-G1030 - Room 16 Bathroom - Grey Paper Backing Homogeneous			
PLM NYS 198.1 Friable	11/6/2018	Gray	50.00% Cellulose 45.00% Glass	5.00% Non-fibrous (other)		None Detected
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed
Sample ID	24-Skim Coat 041832699-0024	Description Homogeneity	Throughout Floor - G1 above Ceiling Tile - Plaster Ceiling Homogeneous			
PLM NYS 198.1 Friable	11/6/2018	White		100.00% Non-fibrous (other)		None Detected
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed
Sample ID	24-Base Coat 041832699-0024A	Description Homogeneity	Throughout Floor - G1 above Ceiling Tile - Plaster Ceiling Homogeneous			
PLM NYS 198.1 Friable	11/6/2018	Gray	2.00% Cellulose	98.00% Non-fibrous (other)		None Detected
PLM NYS 198.6 VCM						Not Analyzed
PLM NYS 198.6 NOB						Not Analyzed
TEM NYS 198.4 NOB						Not Analyzed

Initial Report From 11/07/2018 13:47:51

Test Report 198VCM-7.30.0 Printed: 11/7/2018 3:00:25 PM

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ProjectID:

Test Report:Asbestos Analysis of Bulk Material

Test		Non Asbestos			Asbestos
		Color	Fibrous	Non-Fibrous	
Sample ID	25-Drywall 041832699-0025	Description Homogeneity	Throughout Floor - G1 above Ceiling Tile - Drywall Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	Brown/White	12.00% Cellulose 3.00% Glass	85.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID	25-Joint Compound 041832699-0025A	Description Homogeneity	Throughout Floor - G1 above Ceiling Tile - Joint Compound Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	White		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID	23-Skim Coat 041832699-0026	Description Homogeneity	W-G2007 Foyer - Plaster Wall Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	White		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID	23-Base Coat 041832699-0026A	Description Homogeneity	W-G2007 Foyer - Plaster Wall Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	Gray		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID	26-Skim Coat 041832699-0027	Description Homogeneity	Throughout Floor G2 above Ceiling Tile - Plaster ceiling Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	White		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed
Sample ID	26-Base Coat 041832699-0027A	Description Homogeneity	Throughout Floor G2 above Ceiling Tile - Plaster ceiling Homogeneous		
PLM NYS 198.1 Friable	11/6/2018	Gray		100.00% Non-fibrous (other)	None Detected
PLM NYS 198.6 VCM					Not Analyzed
PLM NYS 198.6 NOB					Not Analyzed
TEM NYS 198.4 NOB					Not Analyzed



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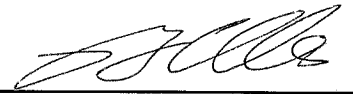
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CustomerPO:

ProjectID:

Test Report:Asbestos Analysis of Bulk Material

Test	Color	Non Asbestos		Asbestos
		Fibrous	Non-Fibrous	
Analyst(s)				
<i>Ebony Miller</i>	<i>Natalia Dispensa</i>			
<i>Jonathan Blanford</i>	<i>Sandy Burany, Ph.D</i>			
<i>Juli Patel</i>				


Benjamin Ellis, Laboratory Manager
or other approved signatory

NOB = Non Friable Organically Bound N/A = Not Applicable VCM = Vermiculite Containing Material

-In New York State, TEM is currently the only method that can be used to determine if NOB materials can be considered or treated as non-asbestos containing.

All samples examined for the presence of vermiculite when analyzed via NYS 198.1.

-NYS Guidelines for Vermiculite containing samples are available at http://www.wadsworth.org/labcert/elapcert/forms/VermiculiteInterimGuidance_Rev070913.pdf

EMSL maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples were received in good condition unless otherwise noted.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. This report may contain data that is not covered by the NVLAP accreditation.

Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ NYS ELAP 10872, PA ID# 68-00367

CRITERION LABORATORIES, INC.
ASBESTOS BULK SAMPLE LOG

PROJECT #: 182365

Client: <i>The Oak Group Inc.</i>	Site Address: <i>Cullum Hall at United States Military Academy at West Point, NY</i>	
Analysis: <i>PLM</i>	TEM	Other _____
Turnaround Time		Method of Submittal
24 Hrs	48 Hrs	Walk-in US Mail
72 Hrs	Other _____	<i>Field</i> Fedex Other _____
FS Name-#/Work Area: <i>Floor 03</i>		Inspector: <i>A. Ward Jr</i>
Project Manager: <i>S. Vena</i>		Comments: <i>Handwritten #1000-</i>
Sample Date: <i>10/22/18</i>		

[illegible]


CHAIN OF CUSTODY		LAB INFORMATION			
Relinquished By (Print/Sign)	Date/Time	Received By (Print/Sign)	Date/Time	Analyzed By (Print/Sign)	Date/Time
Richard J. [Signature]	10-22-18				

PROJECT #: 182365



Client: <u>The Dot Group, Inc</u>		Site Address: <u>Callow Hall at United States Military Academy at West Point, NY</u>	
Analysis:	<u>PLM</u>	TEM	Other _____
Turnaround Time		Method of Submittal	
24 Hrs	48 Hrs	<u>Field</u>	Walk-in US Mail
72 Hrs	Other _____	Fedex	Other _____
FS Name-#/Work Area: <u>Floor D2</u>		Sample Date: <u>10/22/18</u>	
Inspector: <u>A. Ward Jr</u>		Comments: <u>Hickwood Floor, Bare F.pcs</u>	
Project Manager: <u>S. Vena</u>			

[illegible]

CHAIN OF CUSTODY		LAB INFORMATION			
Relinquished By (Print/Sign)	Date/Time	Received By (Print/Sign)	Date/Time	Analyzed By (Print/Sign)	Date/Time
A. Ward Jr. 	10-22-18				



CRITERION LABORATORIES, INC.
ASBESTOS BULK SAMPLE LOG

PROJECT #: 182365

Client: The Oak Group, Inc		Site Address: Callum Hall at United States Military Academy at West Point, NY	
Analysis: PLM	TEM	Other	FS Name#/Work Area: Floor 01
Turnaround Time		Method of Submittal	
24 Hrs	48 Hrs	Field	Walk-in US Mail
72 Hrs	Other	Fedex	Other
Inspector: A. Ward Jr		Project Manager: S. Vena	
Sample Date: 10/22/18		Comments:	

Sample #	HID #	Material Description (Including Color)	Sample Location	Qty (SF/CF)	Friable (Y/N)	Damaged (S/D/N)	For Laboratory Analysis	
							Asbestos Type (s)	%
NS	1900	Plaster Wall	Stairs by Lobby	700 SF	Y	N		
NS	1900	Plaster Ceiling	Stairs by Lobby	641 SF	Y	N		
NS	1900	Plaster Wall	Janitor's Closet and Little Hallway	120 SF	Y	N		
NS	1900	Plaster Ceiling	Janitor's Closet and Little Hallway	65 SF	Y	D		
NS	1900	Plaster Wall	Bathroom	110 SF	Y	N		
NS	1900	Plaster Ceiling	Bathroom	55 SF	Y	N		
NS	1900	Plaster Wall	Main Hallway	1700 SF	Y	N		
NS	1900	Plaster Ceiling	Main Hallway	1304 SF	Y	N		
NS	1900	Plaster Wall	Memorial Room	2400 SF	Y	N		
NS	1900	Plaster Ceiling	Memorial Room	2235 SF	Y	N		
NS	1900	Plaster Wall	Men's Restroom	220 SF	Y	N		
NS	1900	Plaster Ceiling	Men's Restroom	135 SF	Y	N		
-05	1700	White 2X2 Lay-in Ceiling Tile	Men's Restroom	135 SF	Y	N		
NS	1900	Plaster Wall	Women's Restroom	300 SF	Y	N		

CHAIN OF CUSTODY

Relinquished By (Print/Sign)	Date/Time
A. Ward Jr	10-22-18

LAB INFORMATION

Received By (Print/Sign)	Date/Time	Analyzed By (Print/Sign)	Date/Time



CRITERION LABORATORIES, INC.
ASBESTOS BULK SAMPLE LOG

PROJECT #: 182365

Client: The Oak Grove Inc.		Site Address: Cullum Hall at United States Military Academy at West Point, NY	
Analysis: PLM		FS Name-/Work Area: Floor 01	
Turnaround Time		Method of Submittal	
24 Hrs	48 Hrs	Field	Walk-in US Mail
72 Hrs	Other	Fedex	Other
Inspector: A. Ward		Project Manager: S. Vena	
Sample Date: 10/22/18		Comments:	

Sample #	HID #	Material Description (Including Color)	Sample Location	Qty (SF/LF)	Friable (Y/N)	Damaged (S/D/N)	For Laboratory Analysis	
							Asbestos Type (s)	%
NS	1900	Plaster Ceiling	Women's Restroom	234 SF	Y	N		
NS	1700	White 2x2 lay-in Ceiling Tile	Women's Restroom	234 SF	Y	N		
NS	1900	Plaster Ceiling	Toyer	177 SF	Y	N		
NS	1900	Plaster Wall	East Side Storage Room	700 SF	Y	N		
NS	1900	Plaster Ceiling	East Side Storage Room	464 SF	Y	N		
NS	1900	Plaster Wall	Cadet Hostess Office (North)	650 SF	Y	N		
NS	1900	Plaster Ceiling	Cadet Hostess Office (North)	384 SF	Y	N		
NS	1900	Plaster Wall	Cadet Hostess Office (South)	620 SF	Y	N		
NS	1900	Plaster Ceiling	Cadet Hostess Office (South)	371 SF	Y	N		
-06	1900	Plaster Wall	Cop/Storage Rm in Cadet Hostess Office	180 SF	Y	N		
NS	1900	Plaster Ceiling	Cop/Storage Rm in Cadet Hostess Office	70 SF	Y	N		
NS	2600	Fire Door	Lobby by Stairs	1 EA	N	N		

CHAIN OF CUSTODY

Relinquished By (Print/Sign)	Date/Time
A. Ward	10-22-18

LAB INFORMATION

Received By (Print/Sign)	Date/Time	Analyzed By (Print/Sign)	Date/Time



CRITERION LABORATORIES, INC.
ASBESTOS BULK SAMPLE LOG

PROJECT #: 182345

Client: The Oak Group Inc.

Site Address: Cullum Hall at United States Military Academy at West Point, NY

Analysis: PLM

TEM

Other

FS Name#/Work Area: Floor 6A

Sample Date: 10/22/13

Turnaround Time

Method of Submittal

Comments:

24 Hrs

48 Hrs

72 Hrs

Other

Field

Walk-in

US Mail

Fedex

Other

Inspector: A Ward Jr

Project Manager: S Upna

Sample #	HID #	Material Description (Including Color)	Sample Location	Qty (SF/LF)	Friable (Y/N)	Damaged (S/D/N)	For Laboratory Analysis	
							Asbestos Type (s)	%
-07	2500	Grey 12"x12" Floor Tile w/ Black Marble	W-61051 Foyer	25 SF	N	N		
-08	2500	Grey 12"x12" Floor Tile w/ Black Marble	W-61051 Foyer	—	N	N		
-09	2501	Black 12"x12" Floor Tile w/ Black Marble	W-61051 Foyer	40 SF	N	N		
-10	2601	Black Tar Paper	W-61051 Foyer Under Floor Tile	65 SF	N	N		
-11	2601	Black Tar Paper	W-61051 Foyer Under Floor Tile	—	N	N		
NS	1900	Plaster Wall	W-61051 Foyer	120 SF	Y	N		
NS	1700	White 2'x2' Lay-in Ceiling Tile	LS-61051 Foyer	65 SF	Y	N		
NS	1900	Plaster Wall	W-61024 Hallway	1800 SF	Y	N		
B	2502	Light Grey 12"x12" Floor Tile w/ Black Marble		450 SF	N	N		
-13	2502	Light Grey 12"x12" Floor Tile w/ Black Marble		—	N	N		
-14	1700	White 2'x2' Lay-in Ceiling Tile		948 SF	Y	N		
-15	1900	Plaster Wall	Room W-61039 (Rm 6)	200 SF	Y	D		
-16	1900	Plaster Ceiling		30 SF	Y	D		
NS	1700	White 2'x2' Lay-in Ceiling Tile		30 SF	Y	D		

CHAIN OF CUSTODY

Relinquished By (Print/Sign)	Date/Time
A Ward Jr	10-22-13

LAB INFORMATION

Received By (Print/Sign)	Date/Time	Analyzed By (Print/Sign)	Date/Time

Client: The Deck Group, Inc

Call

Client: The Deck Group, Inc.

Analysis:

TEM

Other

5

FS Name-#/Work Area:
- Hall of United States Military A

Academy of West Point, NY

Sample Date: 10/22/13

Turnaround Time		Method of Submittal	
24 Hrs	48 Hrs	Field	Walk-in
72 Hrs	Other _____	Fedex	Other
			US Mail

Inspector: A. Ward Jr.

Project Manager: S. Vena

[illegible]

LAB INFORMATION

Relinquished By (Print/Sign)	Date/Time
A. Ward Jr. / <i>[Signature]</i>	10-27-18

LAB INFORMATION			
Received By (Print/Sign)	Date/Time	Analyzed By (Print/Sign)	Date/Time



CRITERION LABORATORIES, INC.
ASBESTOS BULK SAMPLE LOG

PROJECT #: 182375

Client: The Oak Group Inc.		Site Address: Callum Hall at United States Military Academy at West Point, NY	
Analysis: PLM	TEM	FS Name-#Work Area: Floor 61	
Turnaround Time		Method of Submittal	
24 Hrs	48 Hrs	Field	Walk-in
72 Hrs	Other	Fedex	Other
Inspector: A. Ward Jr		Sample Date: 10/22/18	
Project Manager: S. Vena		Comments:	

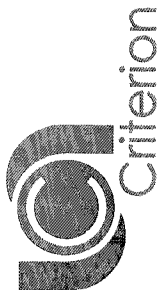
Sample #	HID #	Material Description (Including Color)	Sample Location	Qty (SF/LF)	Friable (Y/N)	Damaged (S/D/N)	For Laboratory Analysis	
							Asbestos Type (s)	%
NS	1700	White 2x2 Lay-in Ceiling Tile	Room W-G1044 & W-G1043	293SF	Y	N		
NS			W-G1040 (Men's Bathroom)	115SF	Y	N		
			W-G1038 (Room 7)	85SF	Y	N		
			W-G1037 (Room 8)	60SF	Y	N		
			W-G1035 (Room 10)	124SF	Y	N		
			W-G1034 (Room 11)	124SF	Y	N		
			W-G1033 (Room 12)	150SF	Y	N		
			W-G1032 (Room 13)	125SF	Y	N		
			Hallway W-G1023	118SF	Y	N		
			W-G1025 & W-G1024 (Room 15)	270SF	Y	N		
			W-G1031 & 13x16s (Room 16)	74SF	Y	N		
			W-G1030 (Bathroom)	44SF	Y	N		
			Hallway - G1026	111SF	Y	N		
			W-G1055 & W-G1054 (Bike Room)	282SF	Y	N		

CHAIN OF CUSTODY

Relinquished By (Print/Sign)	Date/Time
Award, C. [Signature]	10-22-18

LAB INFORMATION

Received By (Print/Sign)	Date/Time	Analyzed By (Print/Sign)	Date/Time



CRITERION LABORATORIES, INC.
ASBESTOS BULK SAMPLE LOG

PROJECT #: 182375

Client: The Oak Group Inc.		Site Address: Cullum Hill at United States Military Academy at West Point, NY	
Analysis: PLM	TEM	FS Name-/Work Area: Floor 61	
Turnaround Time		Sample Date: 10/22/18	
24 Hrs	48 Hrs	Comments:	
72 Hrs	Other		
Method of Submittal		Inspector: A. Ward Jr	
Field	Walk-in	Project Manager: S. Vena	
Fedex	US Mail		
Other	Other		

Sample #	HID #	Material Description (Including Color)	Sample Location	Qty (SF/LF)	Friable (Y/N)	Damaged (S/D/N)	For Laboratory Analysis	
							Asbestos Type (s)	%
NS	1900	Plaster Wall	Room W-G1044 & W-G1043	450 SF	Y	N		
			W-G1040 (Mechanical)	240 SF	Y	N		
			W-G1038 (Room 7)	160 SF	Y	N		
			W-G1037 (Room 8)	150 SF	Y	N		
			W-G1035 (Room 10)	240 SF	Y	N		
			W-G1034 (Room 11)	270 SF	Y	N		
			W-G1033 (Room 12)	250 SF	Y	N		
			W-G1032 (Room 13)	250 SF	Y	N		
			Hallway W-G1023	230 SF	Y	N		
			W-G1025 & W-G1024 (Room 15)	320 SF	Y	N		
			W-G1031 & Closets (Room 16)	130 SF	Y	N		
			W-G1030 (Bathroom)	100 SF	Y	N		
			Hallway - G1026	220 SF	Y	N		
			W-G1055 & W-G1054 (Bike Room)	500 SF	Y	N		

CHAIN OF CUSTODY

Relinquished By (Print/Sign)	Date/Time
A. Ward Jr / [Signature]	10-22-18

LAB INFORMATION

Received By (Print/Sign)	Date/Time	Analyzed By (Print/Sign)	Date/Time

CRITERION LABORATORIES, INC.
ASBESTOS BULK SAMPLE LOG

PROJECT #: 182365

Client: The Oak Group, Inc.

Site Address:

in Hall of Joints

Cullum Hall of United States Military

Academy of West Point, NY

Analysis: PLM

TEM

Other

Turnaround Time

24 Hrs 48 Hrs

Field **Walk-in** **US Mail**

72 Hrs Other

Fedex

Inspector: A. Ward Jr


Project Manager: S. Venka

Sample Date: 10/22/18

Comments:

[illegible]

CHAIN OF CUSTODY

Relinquished By (Print/Sign)	Date/Time
A. Ward Jr. / 	10-22-18

LAB INFORMATION

LAB INFORMATION			
Received By (Print/Sign)	Date/Time	Analyzed By (Print/Sign)	Date/Time

3.0 ASBESTOS INVENTORY

SECTION 3.0
ASBESTOS INVENTORY

**United States Military Academy
Cullum Hall
West Point, NY**

<u>Location</u>	<u>Material</u>	<u>Quantity</u>
Floor 3		
Lounge	Fire Doors (Assumed)	1 Each (Ea)
Floor 2		
Next to Stage	Fire Doors (Assumed)	2 Ea
Floor 1		
Lobby by Stairs	Fire Doors (Assumed)	1 Ea
Floor G1		
W-G1051 – Foyer	Gray 12”x12” Floor Tile	25 Square Feet (SF)
W-G1051 – Foyer	Black 12”x12” Floor Tile	40 SF
W-G1051 – Foyer	Black Tar Paper Under Gray 12”x12” Floor Tile	65 SF
W-G1051 – East Stair Landing	Black 12”x12” Floor Tile	145 SF
W-G1051 – East Stair Landing	Black Tar Paper Under Gray 12”x12” Floor Tile	145 SF
Floor G2		
East Stair Landing	Gray 12”x12” Floor Tile	48 SF

4.0 SUSPECT MATERIALS TESTING NEGATIVE FOR ASBESTOS CONTENT

4.0 Suspect Materials Testing Negative for Asbestos Content

The following materials were observed, sampled, submitted for analysis and found not to be asbestos-containing materials:

- ❖ Plaster Walls & Ceilings
- ❖ Plaster Walls & Ceilings (Decorative)
- ❖ White 2'x2' Lay-In Ceiling Tile
- ❖ Light Gray 12"x12" Floor Tile with Black Mastic
- ❖ Tan Linoleum with Gray Paper Backing
- ❖ Gray Linoleum with Gray Paper Backing

5.0 SAMPLING METHODOLOGY

5.0 Sampling Methodology

Bulk samples of suspected asbestos-containing material (ACM) were collected in accordance with guidelines set forth by the Environmental Protection Agency (EPA) and the National Institute for Occupational Safety and Health (NIOSH). The procedures for obtaining a bulk sample of suspected ACM are:

1. "Functional Spaces" in the Property were identified. A Functional Space is a spatially distinct unit within a building, which contains identifiable populations of building occupants (i.e. corridor, office space, mechanical area, etc.).
2. The total amount and location of each type of suspected ACM was tabulated.
3. The types of suspected ACM were then grouped as homogeneous materials. Each homogeneous material is defined as being uniform in texture and appearance. Based on these parameters, each homogeneous material was assigned a specific identification number as listed below.

Homogeneous Material I.D. #Reference List

Surfacing

0100 to 0199 - Sprayed-On
0200 to 0299 - Troweled-On
0300 to 0399 - Blown-In
0400 to 0499 - Other Surfacing
1900 to 1999 - Plaster Walls and Ceilings

Thermal

0500 to 0599 - Lagging
0600 to 0699 - Breeching
0700 to 0799 - Duct Insulation
0800 to 0899 - Tank Insulation
0900 to 0999 - Block Pipe Insulation
1000 to 1099 - Joints associated with Block Pipe Insulation
1100 to 1199 - Corrugated/Air Cell Pipe Insulation
1200 to 1299 - Joints associated with Corrugated Pipe Insulation
1300 to 1399 - Compressed Pipe Insulation
1400 to 1499 - Joints associated with Compressed Pipe Insulation
1500 to 1599 - Joints associated with Fibrous Glass Pipe Insulation
1600 to 1699 - Other Thermal

5.0 Sampling Methodology (Continued)

Miscellaneous

1700 to 1799 - Lay-In Ceiling Tiles
1800 to 1899 - Spline Ceiling Tiles
2000 to 2099 - Floor Tiles
2100 to 2199 - Drywall
2200 to 2299 - Linoleum
2300 to 2399 - Transite
2400 to 2499 - Expansion Joints
2500 to 2599 - Mastic Floor Tiles
2600 to 2699 - Other Miscellaneous
2700 to 2799 - Mastic Linoleum

4. A sampling scheme was devised based upon the amounts and locations of the different homogeneous materials in order to obtain representative samples.
5. Trained personnel using an appropriate sampling tool and a leak-tight, labeled sample container took the actual bulk samples. The sampling was conducted in areas of the building that are not readily visible to the building occupants. These areas included above lay-in ceiling tiles and beneath cabinets and desks, etc.
6. The personnel employed proper decontamination procedures to prevent contamination of the building environment and possible exposure to themselves and others.
7. Each location of suspicious asbestos-containing material (ACM) was documented on the Asbestos Bulk Sample Log. This documentation included the location of suspicious materials, type of material located and square footage of suspicious ACM. All bulk samples taken were documented on the Sample Log form and a Chain of Custody form. Each was completed for all samples taken by the inspector and handler.
8. The samples were then taken to the laboratory for analysis. The Certificates of Analysis and Chain of Custody relative to each sample are included in this report.
9. The inspector assessed the condition of the suspicious ACM using the eight EPA factors.

6.0 CERTIFICATIONS

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



ANDREW O WARD JR

CLASS(EXPIRES)

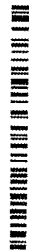
C ATEC(06/19) D INSP(06/19)

H PM (06/19)

CERT# 99-13720
DMV# 623146812

MUST BE CARRIED ON ASBESTOS PROJECTS

01213 004637019 36



01213 004637019 36

EYES BLU

HAIR BRO

HGT 5' 11"

IF FOUND RETURN TO:

NYSOL - L&C UNIT

ROOM 161A BUILDING 12

STATE OFFICE CAMPUS

ALBANY NY 12240

Number 747340

Expiration Date:
11/06/2019

Certificate of Training

CRITERION LABORATORIES, INC.

HEREBY CERTIFIES THAT

Isa Haj

HAS SUCCESSFULLY COMPLETED A 4 HOUR COURSE ENTITLED

Asbestos Building Inspector Refresher

INCLUDING CLASSROOM INSTRUCTION

on this 6th day of November 2018

Exam passed on this 6th day of November 2018 - Score - 92

Approved for AHERA Accreditation Under TSCA Title II

400 Street Road
Bensalem, PA 19020
(215) 244-1300 - Phone
(215) 244-4349 - Fax
www.criterionlabs.com

Rev. 20170501

Course is conducted in English

DIRECTOR:

James A. Weltz

James A. Weltz, CIH, President



Fungal Investigation Report

Cullum Hall

USMA West Point NY

Prepared for: Mr. Terry Allen
Mason and Hanger

Prepared by: **the oak group, inc.** 622 Cooper Street Camden, NJ 08102 (856) 377-0060 www.oakgroup.net

Mailing address: PO Box 2041 Voorhees, NJ 08043

PURPOSE

The OAK Group, Inc. (OAK) was tasked by Mason and Hanger to perform fungal investigations within Cullum Hall of the United States Military Academy located in West Point, NY. The investigation was performed on October 26, 2018.

PERSONNEL

The fungal investigation was performed by, Ms. Melissa Billingsley, Industrial Hygienist. The report was reviewed by Mr. Eduard J. Eichen, CIH.

CONCLUSIONS

Evidence of prior water intrusions was observed in the 1st Floor Cadet Host Office Closet/Copy Room. Steam issues were observed, prior to OAK's site visit, on the B2 Level.

Analysis of most of the indoor airborne fungal spore samples collected from throughout Cullum Hall revealed levels of airborne fungal spores lower than or comparable to those found outdoors on the day of the site visit. Analysis of the indoor airborne fungal samples collected in the B2 Level – Room 3B and the 1st Floor Cadet Host Office Copy Room revealed elevated levels of indoor airborne fungal spores. Additionally, a high concentration of *Penicillium/Aspergillus sp.* spores were found on the sample collected in the B2 Level – Room 3B.

RECOMMENDATIONS

Any water-intrusions or leaks causing water-damage should be repaired as soon as possible.

In the absence of visible fungal growth, a thorough cleaning of the B2 Level – Room 3B and the 1st Floor Cadet Host Office Copy Rooms should be performed to remove excess fungal spores.

If fungal affected materials are observed, the following recommendations should be followed:

Porous building materials (ceiling tile, carpet, drywall, fiberglass insulation) exhibiting fungal growth or that have been, or potentially will stay, wet for greater than 48 hours or that exhibit fungal growth or staining should be removed.

Non and semi-porous (plaster, concrete, floor tiles, wood, metal) fungal-affected building materials should be thoroughly cleaned with an anti-microbial detergent solution, consisting of a biocide, or a 10% bleach solution. Materials should be treated with the solution, scrubbed, treated a second time with the solution, and then wiped clean. Any building materials that cannot be cleaned, to the satisfaction of an Industrial Hygienist, or that are too damaged to be cleaned, should be removed.

In the absence of visible fungal growth, a thorough wet-wiping and HEPA-vacuuming of horizontal surfaces in the areas of concern should remove excess spores from the area.

Please do not hesitate to contact me at (856) 377-0060 or eje@oakgroup.net, if you have any questions or concerns.

Reviewed By:



The OAK Group, Inc.

PROCEDURES

A thorough visual inspection of the area of concern, for visible fungal growth and water damage, was conducted prior to sampling for fungal spores.

Airborne fungal spore samples were collected for fifteen minute intervals using Air-O-Cell® spore cassettes attached to a high volume sampling pump calibrated at approximately 15 liters per minute (lpm).

All samples were quantitatively analyzed for fungal spores at our American Industrial Hygiene Association (AIHA), EMLAP Lab ID #100424 laboratory in Bensalem, PA. Airborne fungal spore samples were quantitatively analyzed for fungal spores using a Kohler illuminated light microscope at 1,000 time magnification (oil immersion). Results are given to the genus level of the spores found. All sampling equipment was calibrated in the field prior to the air sampling.

RESULTS

Sample #	Location	Results – (spores per cubic meter)
162365-01-192-01-001	B2 Level – Room 3B	20,640
162365-01-192-01-002	B1 Level – Room 17	5,800
162365-01-192-01-003	1 st Floor Cadet Host Office Copy Room	7,307
162365-01-192-01-004	2 nd Floor Ballroom Stage	6,840
162365-01-192-01-005	3 rd Floor Balcony	4,573
162365-01-192-01-006	Outdoor	6,200

Laboratory results are included at the end of this report.

DISCUSSION

Airborne fungal spore samples were collected both indoors and outdoors to establish an Indoor/Outdoor (I/O) ratio that was compared to the indoor site of concern. The ratio is determined by dividing the total number of spores found in the indoor sample by the total number of spores in the outdoor sample. If the I/O ratio is greater than 2.0, the indoor site is considered to be an amplification site, i.e., the spores are believed to be originating from inside the building.

By this parameter, most areas of Cullum Hall are not considered fungal amplification sites, meaning the spores that are present are believed to be originating from the outdoor air. However, the high concentrations of indoor airborne fungal spores found in the B2 Level – Room 3B and the 1st Floor Cadet Host Office Copy Room indicates the need for corrective actions.

CRITERION LABORATORIES, INC.
400 Street Road, Suite 100, Bensalem, PA 19020

Total Spore Count / ID Test Results (Method CLI 345)

Client:
The Oak Group, Inc.
Cullum Hall at U. S. Military Academy
West

Project #:
182365

Analyst:
B. Colsher / A. Schwab

Date Sampled: October 26, 2018
Date Received: October 29, 2018
Date Analyzed: November 2, 2018

Sample Type:	25mm Cassette			25mm Cassette			25mm Cassette		
Sample Number:	182365-01-192-01-01			182365-01-192-01-02			182365-01-192-01-03		
Sample Location:	B2 Level - Room 3B			B1 Level - Room 17			1st Floor - Cadet Hostest Office Copy Room		
Volume (L):	75			75			75		
Total Spores/m ³ .*	20640			5800			7307		
	Raw Ct.**	Spores/m ³	%	Raw Ct.**	Spores/m ³	%	Raw Ct.**	Spores/m ³	%
Common Dominant Spores:									
Ascospores	89	1187	5.7	71	947	16.3	59	787	10.8
Basidiospores	1160	15467	74.9	302	4027	69.4	438	5840	79.9
Cladosporium sp.	19	253	1.2	11	147	2.5	8	107	1.5
Penicillium/Aspergillus Types#	257	3427	16.6	45	600	10.3	38	507	6.9
Indoor Hydrophilic Fungi:***									
Chaetomium sp.									
Memmoniella sp.									
Scopulariopsis sp.									
Stachybotrys sp.									
Trichoderma sp.									
Ulocladium sp.									
Others:									
Alternaria sp.									
Bipolaris/Drechslera Group									
Botryis sp.									
Cercospora sp.	1	13	0.1						
Curvularia sp.									
Epicoccum sp.									
Fusarium sp.									
Ganoderma sp.							1	13	0.2
Myxomycetes,Smuts,Periconia sp.	1	13	0.1	6	80	1.4			
Non-specified									
Pestotlia sp.							1	13	0.2
Pithomyces sp.									
Polythrincium sp.									
Nigrospora sp.									
Oidium sp.									
Rusts	21	280	1.4				3	40	0.5
Speggazinia sp.									
Stemphylium sp.									
Torula sp.									
Hyphal Fragments	11	-	-	7	-	-	7	-	-
Background Debris: #	3			4			2		
Comments:									

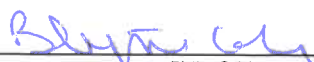
Detection Limit = 7 Spores/m³ (Based on ~ 150 L)

100% of trace analyzed by 400X Phase Contrast using Lactophenol Cotton Blue

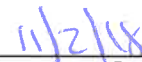
Guidelines for Interpretation:

From the amount of particulate matter present a debris rating on a scale from 0 to 5 is assigned. A rating of 0 indicates no particulate matter detected in impaction area. High levels of background particulate can obscure spores and other particulates leading to underestimation. A rating of 5 indicates an overloading of background particulates, prohibiting the accurate detection and quantification of spores that may be present. A rating of 1-4 indicates low to extremely high. Due to method stopping rules, raw counts in excess of 500 are extrapolated based on the percentage analyzed. Criterion maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by Criterion. Criterion bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. Samples analyzed by Criterion Laboratories, Inc. AIHA-LAP, LLC-EMLAP Lab 100424

Reviewed By:


Blythe Colsher
EMLAP Quality Manager

Date


11/2/18

CRITERION LABORATORIES, INC.
400 Street Road, Suite 100, Bensalem, PA 19020

Total Spore Count / ID Test Results (Method CLI 345)

Client: <u>The Oak Group, Inc.</u> <u>Cullum Hall at U. S. Military Academy</u> <u>WestPoint, NY</u>	Project #: <u>182365</u> Analyst: <u>B. Colsher / A. Schwab</u>	Date Sampled: <u>October 26, 2018</u> Date Received: <u>October 29, 2018</u> Date Analyzed: <u>November 2, 2018</u>
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Sample Type:	25mm Cassette			25mm Cassette			25mm Cassette		
Sample Number:	182365-01-192-01-04			182365-01-192-01-05			182365-01-192-01-06		
Sample Location:	2nd Floor Ballroom Stage			3rd Floor Balcony			Outdoor		
Volume (L):	75			75			75		
Total Spores/m ³ .*	6840			4573			6200		
	Raw Ct.**	Spores/m ³	%	Raw Ct.**	Spores/m ³	%	Raw Ct.**	Spores/m ³	%
Common Dominant Spores:									
Ascospores	36	480	7.0	15	200	4.4	11	147	2.4
Basidiospores	334	4453	65.1	176	2347	51.3	286	3813	61.5
Cladosporium sp.	30	400	5.8	14	187	4.1	7	93	1.5
Penicillium/Aspergillus Types [#]	110	1467	21.4	137	1827	39.9	147	1960	31.6
Indoor Hydrophillic Fungi:***									
Chaetomium sp.									
Memnoniella sp.									
Scopulariopsis sp.									
Stachybotrys sp.									
Trichoderma sp.									
Ulocladium sp.									
Others:									
Alternaria sp.									
Bipolaris/Drechslera Group									
Botryis sp.									
Cercospora sp.									
Curvularia sp.									
Epicoccum sp.									
Fusarium sp.									
Ganoderma sp.									
Myxomycetes,Smuts,Periconia sp.	3	40	0.6	1	13	0.3	4	53	0.9
Non-specified									
Pestlotia sp.									
Pithomyces sp.							1	13	0.2
Polythrincium sp.									
Nigrospora sp.							1	13	0.2
Oidium sp.									
Rusts							8	107	1.7
Speggazinia sp.									
Stemphylium sp.									
Torula sp.									
Hyphal Fragments	6	-	-	2	-	-		-	-
Background Debris: #	2			2			2		
Comments:									

Detection Limit = 7 Spores/m³ (Based on ~ 150 L)

100% of trace analyzed by 400X Phase Contrast using Lactophenol Cotton Blue

Guidelines for Interpretation:

From the amount of particulate matter present a debris rating on a scale from 0 to 5 is assigned. A rating of 0 indicates no particulate matter detected in impaction area. High levels of background particulate can obscure spores and other particulates leading to underestimation. A rating of 5 indicates an overloading of background particulates, prohibiting the accurate detection and quantification of spores that may be present. A rating of 1-4 indicates low to extremely high. Due to method stopping rules, raw counts in excess of 500 are extrapolated based on the percentage analyzed. Criterion maintains liability limited to cost of analysis. This report relates only to the samples reported above and may not be reproduced, except in full, without written approval by Criterion. Criterion bears no responsibility for sample collection activities or analytical method limitations. Interpretation and use of test results are the responsibility of the client. Samples received in good condition unless otherwise noted. Samples analyzed by Criterion Laboratories, Inc. AIHA-LAP, LLC-EMLAP Lab 100424

Reviewed By: Blythe Colsher
Blythe Colsher
EMLAP Quality Manager

11/2/18
Date



Samples

Date 10/26/2018
Day Friday
Sample Number 182365-01-192-01
Matrix Air
Analyte Air-O-Cell (Fungal)
Analysis Type Brightfield Microscopy
Container Cassette
Project 182365
Client The Oak Group, Inc.
Site Address Cullum Hall at United States Military Academy at West Point, NY
Location
Field Tech Melissa Billingsley
Notes
Status Complete
Created 10/29/2018
Created By mmccoy

Additional Analytes

Chain Of Custody

10/26/2018 12:00:00 am EDT Complete

Sample Number	Sample Type	Location	Pump #	Start	Stop	Mins	Pre	Post	Volume
182365-01-192-01-01	Area Sample	B2 Level - Room 3B		08:22	08:27	5	15.00	15.00	75.00
182365-01-192-01-02	Area Sample	B1 Level - Room 17		08:31	08:36	5	15.00	15.00	75.00



Combined Samples and Chain of Custody

182365-01-192-01-03	Area Sample	1st Floor - Cadet Hostest Office Copy Room	08:53	08:58	5	15.00	15.00	75.00
182365-01-192-01-04	Area Sample	2nd Floor Ballroom Stage	09:05	09:10	5	15.00	15.00	75.00
182365-01-192-01-05	Area Sample	3rd Floor Balcony	09:12	09:17	5	15.00	15.00	75.00
182365-01-192-01-06	Area Sample	Outdoor	09:25	09:30	5	15.00	15.00	75.00

Sample Count 6



Chain of Custody

Matrix Air
Analyte Air-O-Cell (Fungal)
Analysis Type Brightfield Microscopy
Container Cassette
Project 182365
Client The Oak Group, Inc.
Site Address Cullum Hall at United States Military Academy at West Point, NY
Turnaround 1 Week
Field Tech Andrew Schwab

Sample Notes

Chain of Custody
Notes

Additional Analytes

Sample Number	Sample Type	Location	Received Condition	Date	Notes
182365-01-192-01-01	Area Sample	B2 Level - Room 3B	Good	10/29/2018	
182365-01-192-01-02	Area Sample	B1 Level - Room 17	Good	10/29/2018	
182365-01-192-01-03	Area Sample	1st Floor - Cadet Hostest Office Copy Room	Good	10/29/2018	
182365-01-192-01-04	Area Sample	2nd Floor Ballroom Stage	Good	10/29/2018	
182365-01-192-01-05	Area Sample	3rd Floor Balcony	Good	10/29/2018	
182365-01-192-01-06	Area Sample	Outdoor	Good	10/29/2018	

Sample Count 6

Handling Chain Type	Handled By	Date	Time	Notes
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Combined Samples and Chain of Custody

Report Results To	Steven Vena	10/29/2018	08:57
Send Reports To	The Oak Group, Inc.	10/29/2018	08:57
Samples Taken By	Melissa Billingsley	10/29/2018	08:57
Transported By	Melissa Billingsley	10/29/2018	08:57
Relinquished By	Melissa Billingsley	10/29/2018	08:57
Received By	Andrew Schwab	10/29/2018	08:57
Analyzed By	Blythe Colsher	11/2/2018	07:18
Analyzed By	Andrew Schwab	11/2/2018	08:15



Lead Based Paint Survey Report

Cullum Hall

USMA West Point NY

Prepared for: Mr. Terry Allen
Mason and Hanger

Prepared by: **the oak group, inc.** 622 Cooper Street Camden, NJ 08102 (856) 377-0060 www.oakgroup.net

Mailing address: PO Box 2041 Voorhees, NJ 08043

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- ◆ XRF Testing Report Sheets
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- ◆ License Documentation

1.0 EXECUTIVE SUMMARY

A lead-based paint screening was performed at the Cullum Hall (the “Property”) located in West Point, NY. The purpose of the screening was to explore the presence and condition of painted surfaces for lead-based paint.

Ms. Melissa Billingsley, an EPA-certified Lead Risk Assessor in the state of New York performed the screening and risk assessment October 22, 2018

Painted surfaces were analyzed for lead using an X-ray Fluorescence Spectrometer (XRF) manufactured by Thermo Scientific-NITON.

The U.S. Department of Housing and Urban Development (HUD) considers 1.0 milligrams of lead per square centimeter of painted surface, or greater, to be lead based paint ($\geq 1.0 \text{ mg/c m}^2$).

2.0 FINDINGS AND RECOMMENDATIONS

During the screening, the presence of lead-based paint was detected in several areas. The inspector made recommendations based on many factors, i.e., condition, friction/non-friction surface, height at which lead-based paint is located, and other information that was obtained from the client. Listed on the attached sheets (Attachments) are location, components and the recommendation codes for the areas where painted surfaces were sampled. **A summary of the locations/components testing positive for lead-based paint is included in the following table. You will find a legend in the Attachments Section, which will explain the codes used in this table.**

The Environmental Protection Agency’s (EPA) Renovation, Repair, and Painting Program Final Rule (40 CFR Part 745) (RRP Rule) mandates that if lead-based paint is disturbed during renovation or painting activity then the work should be completed using lead-safe work practices as defined in the RRP Rule. In addition, the individual disturbing the lead-based paint has to be certified as well as the firm for whom he/she is employed.

Any painted surface that has lead content should not be sanded, demolished or disturbed without the proper engineering controls and work methods, as spelled out under the OSHA’s 29 CFR Part 1926.62 Lead Exposure in Construction, Interim Rule. Improper disturbance of any paint with lead content can cause lead to become airborne. The emphasis on controlling lead dust derives from the conclusion that lead dust appears to be the primary route of exposure to lead, especially of low-level exposure.

It is therefore important that occupants of the building and any contractors be made aware of the presence of the lead-based paint and the potential health risks associated with the ingestion of lead-based paint or the associated dust that results from the damaging of the painted surfaces. Occupants and/or contractors should also be made aware of the importance of not damaging the painted surfaces and creating loose and flaking paint or the creation of dust. If the painted surfaces are damaged this should be reported to the proper building representative/maintenance personnel to properly correct the problem to prevent an increased exposure potential.

The following is a list of paints that tested positive for lead content. The recommendation code indicates all acceptable response acts for that particular paint.

Cullum Hall- West Point, NY

<u>Location</u>	<u>Color/Substrate/ Component</u>	<u>Surface/Condition</u>	<u>Recommendation Code</u>
3rd Floor			
Lounge	Off White/Plaster/Wall	Non-Friction/Fair	HR, OSHA, A ENCP
Lounge	Off White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Lounge	Gray/Plaster/Baseboard	Non-Friction/Intact	HR, OSHA
Lounge	Off White/Plaster/Column	Non-Friction/Intact	HR, OSHA
Lounge	Brown/Plaster/Column	Non-Friction/Intact	HR, OSHA
Lounge	Off White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Lounge	Brown/Plaster/Picture Rail	Non-Friction/Intact	HR, OSHA
Lounge	Brown/Plaster/Crown Molding	Non-Friction/Intact	HR, OSHA
Lounge	Off White/Wood/Window Sill	Non-Friction/Intact	HR, OSHA
Stage	Off White/Plaster/Wall	Non-Friction/Fair	HR, OSHA
Stage	Off White/Wood/Door	Friction/Intact	HR, OSHA
Stage	Off White/Wood/ Door Jamb	Friction/Intact	HR, OSHA
Stage	White/Wood/Window Casing	Non-Friction/Intact	HR, OSHA
Stage	Off White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Stairs b/t 2nd and 3rd Floor			
	Off White/Plaster/Column	Non-Friction/Intact	HR, OSHA
	Brown/Plaster/Column	Non-Friction/Intact	HR, OSHA
	Green/Concrete/Baseboard	Non-Friction/Intact	HR, OSHA
	Gray/Metal/Spindle	Non-Friction/Intact	HR, OSHA
	Gray/Metal/Stair Stringer	Non-Friction/Intact	HR, OSHA
	Gray/Metal/Wall Cap	Non-Friction/Intact	HR, OSHA
	Off White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
	Brown/Plaster/Crown Molding	Non-Friction/Intact	HR, OSHA
2nd Floor			
Lobby of Auditorium	Off White/Plaster/Wall	Non-Friction/Intact	HR, OSHA

Cullum Hall- West Point, NY

<u>Location</u>	<u>Color/Substrate/ Component</u>	<u>Surface/Condition</u>	<u>Recommendation Code</u>
2nd Floor - Continued			
Lobby of Auditorium	Off White/Plaster/Column	Non-Friction/Intact	HR, OSHA
Lobby of Auditorium	Off White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Lobby of Auditorium	Brown/Plaster/Crown Molding	Non-Friction/Intact	HR, OSHA
Lobby of Auditorium	Brown/Plaster/Picture Rail	Non-Friction/Intact	HR, OSHA
Auditorium	Off White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Auditorium	Off White/Plaster/Column	Non-Friction/Intact	HR, OSHA
Auditorium	Green/Plaster/Column Base	Non-Friction/Intact	HR, OSHA
Auditorium	Green/Plaster/Baseboard	Non-Friction/Intact	HR, OSHA
Auditorium	Brown/Wood/Door	Friction/Intact	HR, OSHA
Auditorium	Brown/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Auditorium	Brown/Plaster/Column Cap	Non-Friction/Intact	HR, OSHA
Rear Stairs	Off White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Rear Stairs	Gray/Concrete/Floor	Friction/Intact	HR, OSHA
Rear Stairs	Gray/Concrete/Stair Tred	Friction/Intact	HR, OSHA
Rear Stairs	Dark Green/Metal/Hand Rail	Friction/Intact	HR, OSHA
Rear Stairs	Dark Green/Metal/Spindle	Non-Friction/Intact	HR, OSHA
Rear Stairs	Dark Green/Metal/Stair Riser	Non-Friction/Intact	HR, OSHA
Rear Stairs	Dark Gray/Meal/Stair Stringer	Non-Friction/Intact	HR, OSHA
Rear Stairs	White/Wood/Door	Friction/Intact	HR, OSHA
Rear Stairs	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Rear Stairs	White/Wood/Window Casing	Non-Friction/Intact	HR, OSHA
1st Floor			
Stairs and Lobby	Off White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Stairs and Lobby	Green/Metal/Stair Stringer	Non-Friction/Intact	HR, OSHA
Stairs and Lobby	Green/Metal/Stair Spindle	Non-Friction/Intact	HR, OSHA
Stairs and Lobby	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Stairs and Lobby	Gray/Metal/Heater	Non-Friction/Intact	HR, OSHA

Cullum Hall - West Point, NY

<u>Location</u>	<u>Color/Substrate/ Component</u>	<u>Surface/Condition</u>	<u>Recommendation Code</u>
1st Floor - Continued			
Stairs and Lobby	Dk. Green/ Plaster/Baseboards	Non-Friction/Intact	HR, OSHA
Bathroom and Janitors area	White/Wood/Window Casing	Non-Friction/Intact	HR, OSHA
Main Hallway	Off White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Main Hallway	Off White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Main Hallway	Off White/Wood/Door	Friction/Intact	HR, OSHA
Main Hallway	Off White/Plaster/Column	Non-Friction/Intact	HR, OSHA
Main Hallway	Dk. Green/Plaster/Baseboard	Non-Friction/Intact	HR, OSHA
Main Hallway	Off White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Main Hallway	Off White/Plaster/Crown Molding	Non-Friction/Intact	HR, OSHA
Main Hallway	Brown/Plaster/Crown Molding	Non-Friction/Intact	HR, OSHA
Main Hallway	Brown/Plaster/Column Caps	Non-Friction/Intact	HR, OSHA
Memorial Room	Off White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Memorial Room	Off White/Plaster/Column	Non-Friction/Intact	HR, OSHA
Memorial Room	Off White/Plaster/Baseboards	Non-Friction/Intact	HR, OSHA
Memorial Room	Off White/Wood/Door	Non-Friction/Intact	HR, OSHA
Memorial Room	Off White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Memorial Room – Ladies Room	White/Wood/Wall Molding	Non-Friction/Intact	HR, OSHA
Memorial Room – Ladies Room	Off White/Wood/Door	Friction/Intact	HR, OSHA
Memorial Room – Ladies Room	Off White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
East Side Storage Room	Off White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
East Side Storage Room	Off White/Wood/Door	Friction/Intact	HR, OSHA
East Side Storage Room	Off White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
East Side Storage Room	Off White/Wood/Door Jamb	Friction/Intact	HR, OSHA
East Side Storage Room	Off White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
East Side Storage Room	Off White/Plaster/Crown Molding	Non-Friction/Intact	HR, OSHA

Cullum Hall- West Point, NY

<u>Location</u>	<u>Color/Substrate/ Component</u>	<u>Surface/Condition</u>	<u>Recommendation Code</u>
1st Floor - Continued			
East Side Storage Room	Brown/Plaster/Crown Molding	Non-Friction-Intact	HR, OSHA
East Side Storage Room	Green/Plaster/Baseboard	Non-Friction/Intact	HR, OSHA
Cadet Host Office	Off White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Cadet Host Office	Off White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Cadet Host Office	Off White/Plaster/Crown Molding	Non-Friction/Intact	HR, OSHA
Cadet Host Office	Brown/Plaster/Crown Molding	Non-Friction/Intact	HR, OSHA
Cadet Host Office	Drk. Green/Plaster/Baseboard	Non-Friction/Intact	HR, OSHA
Cadet Host Office	Off White/Wood/Door	Friction/Intact	HR, OSHA
Cadet Host Office	Off White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Cadet Host Office	Off White/Wood/Door Jamb	Friction/Intact	HR, OSHA
Cadet Host Office	Off white/Wood/Pocket Doors	Friction/Intact	HR, OSHA
Cadet Host Office	Off White/Wood/Pocket Door Casing	Non-Friction/Intact	HR, OSHA
Cadet Host Office	Off White/Plaster/Wall	Friction/Fair	HR, OSHA, A ENCP
Cadet Host Office	Off White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Cadet Host Office	Off White/Plaster/Ceiling	Non-Friction/Fair	HR, OSHA, A ENCP
Stairs between 1st, G1 and G2			
	Lt. Green/Metal/Stair Spindle	Non-Friction/Intact	HR, OSHA
	Lt. Green/Metal/Stair Stringer	Non-Friction/Intact	HR, OSHA
	Lt. Green/Metal/Wall Cap	Non-Friction/Intact	HR, OSHA
	Lt. Green/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
	Lt. Green/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Level G1			
Hallway	White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Hallway	Gray/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Hallway	Gray/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA

Cullum Hall- West Point, NY

<u>Location</u>	<u>Color/Substrate/ Component</u>	<u>Surface/Condition</u>	<u>Recommendation Code</u>
Level G1 - Continued			
Hallway	Gray/Wood/Door	Friction/Intact	HR, OSHA
Hallway	Gray/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Hallway	Gray/Metal/Heater	Non-Friction/Intact	HR, OSHA
Hallway	White/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Hallway	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Hallway	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Hallway	White/Wood/Door	Friction/Intact	HR, OSHA
Room 2	White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Room 2	White/Wood/Door	Friction/Intact	HR, OSHA
Room 2	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Room 2	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Room 2	White/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Room 2	White/Wood/Window Sill	Non-Friction/Intact	HR, OSHA
Room 2	White/Wood/Window Casing	Non-Friction/Intact	HR, OSHA
Room 6	White/Plaster/Ceiling	Non-Friction/Poor	HR, OSHA,CA
Room 6	White/Wood/Door	Friction/Poor	HR, OSHA, CA
Room 6	White/Wood/Door Casing	Non-Friction/Poor	HR, OSHA, CA
Room 6	White/Wood/Chair Rail	Non-Friction/Poor	HR, OSHA, CA
Room 6	White/Wood/Baseboard	Non-Friction/Poor	HR, OSHA, CA
Room 6	White/Wood/Window Sill	Non-Friction/Poor	HR, OSHA, CA
Room 6	White/Wood/Window Casing	Non-Friction/Poor	HR, OSHA, CA
Room 6	White/Plaster/Wall	Non-Friction/Poor	HR, OSHA, CA
Room 7	White/Plaster/Ceiling	Non-Friction/Fair	HR, OSHA,A ENCP
Room 7	White/Wood/Door	Friction/Intact	HR, OSHA,A ENCP
Room 7	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA,A ENCP
Room 7	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA,A ENCP
Room 7	White/Wood/Baseboard	Non-Friction/Fair	HR, OSHA,A ENCP

<u>Cullum Hall- West Point, NY</u>			
	Color/Substrate/		Recommendation
<u>Location</u>	<u>Component</u>	<u>Surface/Condition</u>	<u>Code</u>
Level G1 - Continued			
Room 7	White/Wood/Window Sill	Non-Friction/Fair	HR, OSHA,A ENCP
Room 7	White/Wood/Window Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 7	White/Plaster/Wall	Non-Friction/Fair	HR, OSHA,A ENCP
Room 8	White/Plaster/Ceiling	Non-Friction/Fair	HR, OSHA,A ENCP
Room 8	White/Wood/Door	Friction/Fair	HR, OSHA,A ENCP
Room 8	White/Wood/Door Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 8	White/Wood/Chair Rail	Non-Friction/Fair	HR, OSHA,A ENCP
Room 8	White/Wood/Baseboard	Non-Friction/Fair	HR, OSHA,A ENCP
Room 8	White/Wood/Window Sill	Non-Friction/Fair	HR, OSHA,A ENCP
Room 8	White/Wood/Window Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 8	White/Plaster/Wall	Non-Friction/Fair	HR, OSHA,A ENCP
Room 10	White/Plaster/Ceiling	Non-Friction/Fair	HR, OSHA,A ENCP
Room 10	White/Wood/Door	Friction/Fair	HR, OSHA,A ENCP
Room 10	White/Wood/Door Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 10	White/Wood/Chair Rail	Non-Friction/Fair	HR, OSHA,A ENCP
Room 10	White/Wood/Baseboard	Non-Friction/Fair	HR, OSHA,A ENCP
Room 10	White/Wood/Window Sill	Non-Friction/Intact	HR, OSHA
Room 10	White/Wood/Window Casing	Non-Friction/Intact	HR, OSHA
Room 11	White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Room 11	White/Wood/Door	Friction/Intact	HR, OSHA
Room 11	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Room 11	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Room 11	White/Wood/Baseboard	Non-Friction/Fair	HR, OSHA,A ENCP
Room 11	White/Wood/Window Sill	Non-Friction/Fair	HR, OSHA,A ENCP
Room 11	White/Wood/Window Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 11	White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Room 12	White/Plaster/Ceiling	Non-Friction/Fair	HR, OSHA,A ENCP

<u>Cullum Hall- West Point, NY</u>			
	Color/Substrate/		Recommendation
<u>Location</u>	<u>Component</u>	<u>Surface/Condition</u>	<u>Code</u>
Level G1 - Continued			
Room 12	White/Wood/Door	Non-Friction/Fair	HR, OSHA,A ENCP
Room 12	White/Wood/Door Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 12	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Room 12	White/Wood/Baseboard	Non-Friction/Fair	HR, OSHA,A ENCP
Room 12	White/Wood/Window Sill	Non-Friction/Fair	HR, OSHA,A ENCP
Room 12	White/Wood/Window Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 12	White/Plaster/Wall	Non-Friction/Fair	HR, OSHA,A ENCP
Room 13	White/Plaster/Ceiling	Non-Friction/Fair	HR, OSHA,A ENCP
Room 13	White/Wood/Door	Friction/Fair	HR, OSHA,CA
Room 13	White/Wood/Door Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 13	White/Wood/Chair Rail	Non-Friction/Fair	HR, OSHA,A ENCP
Room 13	White/Wood/Baseboard	Non-Friction/Fair	HR, OSHA,A ENCP
Room 13	White/Wood/Window Sill	Non-Friction/Fair	HR, OSHA,A ENCP
Room 13	White/Wood/Window Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 13	White/Plaster/Wall	Non-Friction/Fair	HR, OSHA,A ENCP
Room 15	White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Room 15	White/Wood/Door	Friction/Intact	HR, OSHA
Room 15	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Room 15	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Room 15	White/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Room 15	White/Wood/Window Sill	Non-Friction/Intact	HR, OSHA
Room 15	White/Wood/Window Casing	Non-Friction/Intact	HR, OSHA
Room 15	White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Room 16	White/Plaster/Ceiling	Non-Friction/Fair	HR, OSHA,A ENCP
Room 16	White/Wood/Door	Friction/Fair	HR, OSHA,A ENCP
Room 16	White/Wood/Door Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 16	White/Wood/Chair Rail	Non-Friction/Fair	HR, OSHA,A ENCP

<u>Cullum Hall- West Point, NY</u>			
	Color/Substrate/		Recommendation
<u>Location</u>	<u>Component</u>	<u>Surface/Condition</u>	<u>Code</u>
Level G1 - Continued			
Room 16	White/Wood/Baseboard	Non-Friction/Fair	HR, OSHA,A ENCP
Room 16	White/Plaster/Wall	Non-Friction/Fair	HR, OSHA,A ENCP
Room 17	White/Plaster/Ceiling	Non-Friction/Fair	HR, OSHA,A ENCP
Room 17	White/Wood/Door	Friction/Fair	HR, OSHA,CA
Room 17	White/Wood/Door Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 17	White/Wood/Chair Rail	Non-Friction/Fair	HR, OSHA,A ENCP
Room 17	White/Wood/Baseboard	Non-Friction/Fair	HR, OSHA,A ENCP
Room 17	White/Wood/Window Sill	Non-Friction/Fair	HR, OSHA,A ENCP
Room 17	White/Wood/Window Casing	Non-Friction/Fair	HR, OSHA,A ENCP
Room 17	White/Plaster/Wall	Non-Friction/Fair	HR, OSHA,A ENCP
Level G2			
Hallway	White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Hallway	Gray/Wood/Door	Friction/Intact	HR, OSHA
Hallway	Gray/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Hallway	Gray/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Hallway	Gray/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Hallway	Gray/Metal/Heater	Non-Friction/Intact	HR, OSHA
Hallway	White/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Hallway	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Hallway	White/Wood/Door	Friction/Intact	HR, OSHA
Hallway	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Room 3B	White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Room 3B	White/Wood/Door	Friction/Intact	HR, OSHA
Room 3B	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Room 3B	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Room 3B	White/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Room 3B	White/Wood/Window Sill	Non-Friction/Intact	HR, OSHA

<u>Cullum Hall- West Point, NY</u>			
	Color/Substrate/		Recommendation
<u>Location</u>	<u>Component</u>	<u>Surface/Condition</u>	<u>Code</u>
Level G2 - Continued			
Room 3B	White/Wood/Window Casing	Non-Friction/Intact	HR, OSHA
Room 3B	White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Suite 1A	White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Suite 1A	White/Wood/Door	Friction/Intact	HR, OSHA
Suite 1A	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Suite 1A	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Suite 1A	White/Sheetrock/Wall	Non-Friction/Intact	HR, OSHA
Suite 1A	White/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Suite 1A	White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Room 2B	White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Room 2B	White/Wood/Door	Friction/Intact	HR, OSHA
Room 2B	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Room 2B	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Room 2B	White/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Room 2B	White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Room 6B	White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Room 6B	White/Wood/Door	Friction/Intact	HR, OSHA
Room 6B	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Room 6B	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Room 6B	White/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Room 6B	White/Wood/Window Sill	Non-Friction/Intact	HR, OSHA
Room 6B	White/Wood/Window Casing	Non-Friction/Intact	HR, OSHA
Room 6B	White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Room 8B	White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA

<u>Cullum Hall- West Point, NY</u>			
	Color/Substrate/		Recommendation
<u>Location</u>	<u>Component</u>	<u>Surface/Condition</u>	<u>Code</u>
Level G2 - Continued			
Room 8B	White/Wood/Door	Friction/Intact	HR, OSHA
Room 8B	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Room 8B	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Room 8B	White/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Room 8B	White/Wood/Window Sill	Non-Friction/Intact	HR, OSHA
Room 8B	White/Wood/Window Casing	Non-Friction/Intact	HR, OSHA
Room 9B	White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Room 9B	White/Wood/Door	Friction/Intact	HR, OSHA
Room 9B	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Room 9B	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Room 9B	White/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Room 9B	White/Wood/Window Sill	Non-Friction/Intact	HR, OSHA
Room 9B	White/Wood/Window Casing	Non-Friction/Intact	HR, OSHA
Room 9B	White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Room 10B	White/Plaster/Ceiling	Non-Friction/Intact	HR, OSHA
Room 10B	White/Wood/Door	Friction/Intact	HR, OSHA
Room 10B	White/Wood/Door Casing	Non-Friction/Intact	HR, OSHA
Room 10B	White/Wood/Chair Rail	Non-Friction/Intact	HR, OSHA
Room 10B	White/Wood/Baseboard	Non-Friction/Intact	HR, OSHA
Room 10B	White/Wood/Window Sill	Non-Friction/Intact	HR, OSHA
Room 10B	White/Wood/Window Casing	Non-Friction/Intact	HR, OSHA
Room 10B	White/Plaster/Wall	Non-Friction/Intact	HR, OSHA
Stairs b/t G2 and Mechanical room	Off White/Plaster/Wall	Non-Friction/Fair	HR, OSHA, A ENCP
Stairs b/t G2 and Mechanical room	Black/Metal/Hand Rail	Friction/Intact	HR, OSHA
Stairs b/t G2 and Mechanical room	Lt. Green/Concrete/Baseboard	Non-Friction/Intact	HR, OSHA

<u>Cullum Hall- West Point, NY</u>			
	Color/Substrate/		Recommendation
<u>Location</u>	<u>Component</u>	<u>Surface/Condition</u>	<u>Code</u>
Level G2 - Continued			
Stairs b/t G2 and Mechanical room	Lt. Green/Metal/Door	Friction/Intact	HR, OSHA
Stairs b/t G2 and Mechanical room	Lt. Green/Metal/Door Casing	Non-Friction/Intact	HR, OSHA
Mechanical Room	White/Metal/Hand Rail	Friction/Fair	HR, OSHA, A ENCP
Mechanical Room	Yellow/Metal/Hand Rail	Friction/Fair	HR, OSHA, A ENCP
Mechanical Room	Drk. Gray/Brick/Wall	Non-Friction/Fair	HR, OSHA, A ENCP
Mechanical Room	Yellow/Metal/Duct	Non-Friction/Fair	HR, OSHA, A ENCP
Mechanical Room	Lt. Green/Wood/Door	Friction/Fair	HR, OSHA, A ENCP
Mechanical Room	Drk. Green/Brick/Column	Non-Friction/Fair	HR, OSHA, A ENCP
Mechanical Room	Yellow/Metal/Pipe	Non-Friction/Intact	HR, OSHA, A ENCP

ATTACHMENTS

Testing Report Legend

Recommendations

HR – Hazard Reduction

It is recommended that these surfaces be periodically observed for chalking, peeling or cracking.

If the surface is chalking, it can be cleaned with trisodium phosphate and repainted. If it is peeling or cracking, it should be repaired or abated.

AR – Abatement Replacement

A strategy of abatement that entails the removal of building components coated with lead-based paint and installation of new components free of lead-based paint.

A Encp – Abatement Encapsulation

“Encapsulant” means a coating or rigid material that relies on adhesion to a lead-based paint surface and is not mechanically fastened to the substrate with a 20-year warranty.

“Encapsulation” means a process to make lead-based paint inaccessible by providing a barrier between the lead-based paint and the environment, where the primary means of attachment for the encapsulant is bonding of a product to the surface covered either by the product itself or through the use of an adhesive.

A Encl – Abatement Enclosure

“Enclosure” means the installation of a rigid, durable barrier that is mechanically attached to building components, with all edges and seams sealed with caulk or other sealant and having a design life of at least 20 years.

CA – Complete Abatement

A process designed either to permanently eliminate lead-based paint hazards on a component and includes, but is not limited to: the removal of lead-based paint and lead-contaminated dust.

OSHA

Any painted surface that has lead content should not be sanded, demolished or disturbed without the proper engineering controls and work methods. As spelled out under OSHA’s CFR Part 1926 Lead Exposure in Construction, Interim Rule. Improper disturbance of any paint with lead content can cause lead to become airborne.

NA – Non-applicable

X-ray Fluorescence Spectrometer (XRF) results indicated 0.0 or below, which indicates no lead detected by the XRF Spectrometer.

Surface/Condition

Surface

- ◆ A determination of whether a painted surface is considered friction/impact surface or non-friction impact surface.
- ◆ Friction/Impact Surface – any interior or exterior surface subject to abrasion, friction or damage by repeated impact or contact.
- ◆ Non-friction/Impact Surface – any interior or exterior surface not subject to abrasion, friction or damage by repeated impact or contact.

Condition

- ◆ An intact good paint surface is smooth, continuous and free of surface defect, which would result in the release of paint dust or chips.
- ◆ Large surfaces such as walls, floors and ceilings should be rated as follows:
 - ◆ Good or intact condition shall indicate a surface that is entirely intact;
 - ◆ Fair condition shall indicate a surface where less than or equal to two square feet of surface are not intact;
 - ◆ Poor condition shall indicate a surface where more than two square feet of surface are not intact.
- ◆ Components without large surfaces, such as window sills, baseboards, or other small areas, shall be rated as follows:
 - ◆ Good or intact condition shall indicate that the surface is entirely intact;
 - ◆ Fair condition shall indicate that less than or equal to 10 percent of the surface is not intact;
 - ◆ Poor condition shall indicate that more than 10 percent of the surface is not intact.

- ◆ Exterior components with large surface areas shall be rated as follows:
 - ◆ Good or intact condition shall indicate that the surface is entirely intact;
 - ◆ Fair condition shall indicate that less than or equal to ten square feet of surface is not intact;
 - ◆ Poor condition shall indicate that more than ten square feet of surface is not intact.

Wall

When entering a room the wall that is the address side of the room is labeled as “A” Wall. The walls are then labeled in a clockwise fashion as “B” Wall and “D” Wall.



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Date:

Page 32 of 16/22/18

Sampling Location:

Cellum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

GI Hallway

Room #:

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	232		Center	17.1		POS	FRICTION INTACT	A ENCP CA OSHA N/A
			233			18.2	10.6	NEG	NON-FRICTION FAIR	HR AR A ENCL
			234			10.1		INC	NON-FRICTION POOR	
			235			10.6				
* Gray	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	236		Center	16.9		POS	FRICTION INTACT	A ENCP CA OSHA N/A
							16.9	NEG	NON-FRICTION FAIR	HR AR A ENCL
								INC	NON-FRICTION POOR	
* Gray	Wood Brick Sheetrock Plaster Metal Concrete	Chair Panel	237		Center	5.4		POS	FRICTION INTACT	A ENCP CA OSHA N/A
							5.4	NEG	NON-FRICTION FAIR	HR AR A ENCL
								INC	NON-FRICTION POOR	
* Gray	Wood Brick Sheetrock Plaster Metal Concrete	Door	238		Center	10.8		POS	FRICTION INTACT	A ENCP CA OSHA N/A
							10.8	NEG	NON-FRICTION FAIR	HR AR A ENCL
								INC	NON-FRICTION POOR	
* Gray	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	239		Center	9.4		POS	FRICTION INTACT	A ENCP CA OSHA N/A
							9.4	NEG	NON-FRICTION FAIR	HR AR A ENCL
								INC	NON-FRICTION POOR	



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Page 33 of

Date:

10/22/18

Sampling Location:

William Hall at The United States Military Academy at West Point, NY

Room Equivalent:

61

Room #:

Hallway

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* Grey	Wood Brick Sheetrock Plaster Metal Concrete	Heads	240		Top	17.1	17.1	POS	FRICION NON-FRICION INTACT	A ENCP CA OSHA N/A HR AR A ENCL
* White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	241		Center	10.2	10.2	POS	FRICION NON-FRICION INTACT	A ENCP CA OSHA N/A HR AR A ENCL
* White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	242		Center	11.6	11.6	POS	FRICION NON-FRICION INTACT	A ENCP CA OSHA N/A HR AR A ENCL
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	243		Center	17.4	17.4	POS	FRICION NON-FRICION INTACT	A ENCP CA OSHA N/A HR AR A ENCL
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	244		Center	16.2	16.2	POS	FRICION NON-FRICION INTACT	A ENCP CA OSHA N/A HR AR A ENCL



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Page 34 of

Date:

10/22/18

Sampling Location:

Cellum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

G1

Room #:

Rm 2

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	245	A	Center	0.01		POS	FRICITION	HR
			246	B		0.06	0.01	NEG	NON-FRICITION	CA
			247	C		0.00				OSHA
			248	D		0.00		INC	POOR	A ENCL N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	249		Center	17.1	17.1	POS	FRICITION	HR
								NEG	NON-FRICITION	CA
								INC	POOR	OSHA
										A ENCL N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Door	250		Center	16.2	16.2	POS	FRICITION	HR
								NEG	NON-FRICITION	CA
								INC	POOR	OSHA
										A ENCL N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	251		Center	10.1	10.1	POS	FRICITION	HR
								NEG	NON-FRICITION	CA
								INC	POOR	OSHA
										A ENCL N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	252		Center	9.0	9.0	POS	FRICITION	HR
								NEG	NON-FRICITION	CA
								INC	POOR	OSHA
										A ENCL N/A

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Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Sampling Location:

Cullum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

G1

Room #:

Rm 2

Date:

Page 38 of 16/22/18

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	253		Center	17.1	17.1	POS NEG INC	FRICITION (INTACT) NON-FRICITION POOR	A ENCP CA OSHA A ENCL N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	254		Center	10.2	10.2	POS NEG INC	FRICITION (INTACT) NON-FRICITION POOR	A ENCP CA OSHA A ENCL N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window Casing	255		Center	8.6	8.6	POS NEG INC	FRICITION (INTACT) NON-FRICITION POOR	A ENCP CA OSHA A ENCL N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS NEG INC	FRICITION (INTACT) NON-FRICITION POOR	A ENCP CA OSHA A ENCL N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS NEG INC	FRICITION (INTACT) NON-FRICITION POOR	A ENCP CA OSHA A ENCL N/A



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

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Date:

10/22/18

Sampling Location:

Cellum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor 61

Room #:

Room 6

Signature:

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	256	A	Center	8.2		POS	FRICION INTACT	HR A ENCL A ENCP CA OSHA N/A
			257	B		10.3	8.1	NEG	NON-FRICION FAIR	HR A ENCL A ENCP CA OSHA N/A
			258	C		8.1		INC	NON-FRICION POOR	HR A ENCL A ENCP CA OSHA N/A
			259	D		6.3				
White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	260		Center	17.6	17.6	POS	FRICION INTACT	HR A ENCL A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	HR A ENCL A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Door	261		Center	10.6	10.6	POS	FRICION INTACT	HR A ENCL A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	HR A ENCL A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casings	262		Center	7.6	7.6	POS	FRICION INTACT	HR A ENCL A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	HR A ENCL A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	263		Center	9.1	9.1	POS	FRICION INTACT	HR A ENCL A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	HR A ENCL A ENCP CA OSHA N/A

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XRF Testing Report

Client:

The Oak Group, Inc.

Sampling Location:

William Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Room 61

Room #:

Rm 6

Date:

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Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	264		Center	7.8	7.8	POS NEG INC	FRICION NON-FRICION POOR	A ENCP CA OSHA N/A HR AR A ENCL
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	265		Center	6.3	6.3	POS NEG INC	FRICION NON-FRICION POOR	A ENCP CA OSHA N/A HR AR A ENCL
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Casing	266		Center	7.1	7.1	POS NEG INC	FRICION NON-FRICION POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS NEG INC	FRICION NON-FRICION POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS NEG INC	FRICION NON-FRICION POOR	A ENCP CA OSHA N/A HR AR A ENCL



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Page 38 of

Date:

10/22/16

Sampling Location:

Cellum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G1

Room #:

Rm 7

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	267	A	Center	16.2	16.2	POS	FRICION INTACT	A ENCP HR CA OSHA N/A
			268	B		10.1		NEG	FAIR	AR A ENCL
			269	C		19.4		INC	NON-FRICION	
			270	D		9.8				
White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	271		Center	12.1	12.1	POS	FRICION INTACT	A ENCP HR CA OSHA N/A
								NEG	FAIR	AR A ENCL
								INC	NON-FRICION	
White	Wood Brick Sheetrock Plaster Metal Concrete	Door	272		Center	16.2	16.2	POS	FRICION INTACT	A ENCP HR CA OSHA N/A
								NEG	FAIR	AR A ENCL
								INC	NON-FRICION	
White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	273		Center	10.1	10.1	POS	FRICION INTACT	A ENCP HR CA OSHA N/A
								NEG	FAIR	AR A ENCL
								INC	NON-FRICION	
White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	274		Center	9.8	9.8	POS	FRICION INTACT	A ENCP HR CA OSHA N/A
								NEG	FAIR	AR A ENCL
								INC	NON-FRICION	

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Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

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Date:

10/22/18

Sampling Location:

Cellum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Flwr 61

Room #:

Rm 7

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	275		Center	10.2	10.2	POS NEG INC	FRICION NON-FRICION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	276		Top	9.1	9.1	POS NEG INC	FRICION NON-FRICION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window casing	277		Center	9.8	9.8	POS NEG INC	FRICION NON-FRICION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS NEG INC	FRICION NON-FRICION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS NEG INC	FRICION NON-FRICION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL



XRF Testing Report

Client:

The Oak Group, Inc.

Sampling Location:

Cellum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor 61

Room #:

Rm 8

Date:

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Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	276	A	Center	10.1		POS	FRICTION NON-FRICTION	A ENCP CA OSHA N/A
			279	B		9.8	9.8	NEG	FAIR	HR AR A ENCL
			280	C		7.6		INC	POOR	
			281	D		11.8				
* White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	282		Center	7.2		POS	FRICTION NON-FRICTION	A ENCP CA OSHA N/A
							7.2	NEG	FAIR	HR AR A ENCL
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	283		Center	6.3		POS	FRICTION NON-FRICTION	A ENCP CA OSHA N/A
							6.3	NEG	FAIR	HR AR A ENCL
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	284		Center	7.2		POS	FRICTION NON-FRICTION	A ENCP CA OSHA N/A
							7.2	NEG	FAIR	HR AR A ENCL
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Choir Rail	285		Center	1.4		POS	FRICTION NON-FRICTION	A ENCP CA OSHA N/A
							1.4	NEG	FAIR	HR AR A ENCL
								INC	POOR	



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

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Date:

10/22/10

Sampling Location:

Callum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor 61

Room #:

Rm 8

Signature:

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	286		Center	7.6	7.6	POS	FRICTION INTACT NON-FRICTION FAIR FRICTION POOR	A ENCP CA OSHA N/A HR AR A ENCL
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	287		Top	9.1	9.1	POS	FRICTION INTACT NON-FRICTION FAIR FRICTION POOR	A ENCP CA OSHA N/A HR AR A ENCL
White	Wood Brick Sheetrock Plaster Metal Concrete	Window casing	288		Center	7.4	7.4	POS	FRICTION INTACT NON-FRICTION FAIR FRICTION POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR FRICTION POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR FRICTION POOR	A ENCP CA OSHA N/A HR AR A ENCL



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Date:

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Sampling Location:

Callum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G1

Room #:

Rm 10

Signature:

Project No.:

XRF Serial No.:

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	289	A	Center	0.11	0.2	POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
			290	B		0.14		NEG	NON-FRICTION FAIR	HR AR A ENCL
			291	C		0.2		INC	POOR	
			292	D		0.4				
White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	293		Center	1.5	1.5	POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
								NEG	NON-FRICTION FAIR	HR AR A ENCL
								INC	POOR	
White	Wood Brick Sheetrock Plaster Metal Concrete	Door	294		Center	7.8	7.8	POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
								NEG	NON-FRICTION FAIR	HR AR A ENCL
								INC	POOR	
White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	295		Center	9.2	9.2	POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
								NEG	NON-FRICTION FAIR	HR AR A ENCL
								INC	POOR	
White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	296		Center	1.5	1.5	POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
								NEG	NON-FRICTION FAIR	HR AR A ENCL
								INC	POOR	

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Criterion

Client:

XRF Testing Report

The Oak Group, Inc.

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Date:

Sampling Location:

Collum Hall at The United States Military Academy at West Point, NY

Room Equivalent:

Floor 61

Room #:

Rm 16

Signature:

Project No.:

XRF Serial No.:

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	297		Center	7.8	7.8	POS	FRICION INTACT NON-FRICION FAIR FRICION POOR	A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	298		Top	9.2	9.2	POS	FRICION INTACT NON-FRICION FAIR FRICION POOR	A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Window casing	299		Center	1.4	1.4	POS	FRICION INTACT NON-FRICION FAIR FRICION POOR	A ENCP CA OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT NON-FRICION FAIR FRICION POOR	A ENCP CA OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT NON-FRICION FAIR FRICION POOR	A ENCP CA OSHA N/A

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Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Date:

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Sampling Location:

Callum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Flour 61

Room #:

Rm 11

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	300	A	Center	9.6		POS	FRICION INTACT	A ENCP CA OSHA N/A
			301	B		7.4	7.4	NEG	NON-FRICION FAIR	HR AR A ENCL
			302	C		5.2		INC	POOR	
			303	D	↓	7.0				
* White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	304		Center	6.1	6.1	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	305		Center	8.2	8.2	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	306		Center	1.9	1.9	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	307		Center	5.4	5.4	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL
								INC	POOR	



XRF Testing Report

Client:

The Oak Group, Inc.

Sampling Location:

Cullum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Class G1

Room #:

2m 11

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[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	308		Center	9.8	9.8	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP HR AR A ENCL OSHA N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	309		Center	7.1	7.1	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP HR AR A ENCL OSHA N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window Casing	310		Center	6.2	6.2	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP HR AR A ENCL OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP HR AR A ENCL OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP HR AR A ENCL OSHA N/A



XRF Testing Report

Client:

The Oak Group, Inc.

Sampling Location:

Collum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G1

Room #:

Rm 12

Date:

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[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	311	A	Center	17.6		POS	FRICTION	HR A ENCL
			312	B		10.2	10.2	NEG	NON-FRICTION	AR A ENCL
			313	C		1.4		INC	POOR	OSHA N/A
			314	D	*	9.9				
* White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	315		Center	6.8	6.8	POS	FRICTION	HR A ENCL
								NEG	NON-FRICTION	AR A ENCL
								INC	POOR	OSHA N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	316		Center	7.4	7.4	POS	FRICTION	HR A ENCL
								NEG	NON-FRICTION	AR A ENCL
								INC	POOR	OSHA N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	317		Center	10.2	10.2	POS	FRICTION	HR A ENCL
								NEG	NON-FRICTION	AR A ENCL
								INC	POOR	OSHA N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	318		Center	11.4	11.4	POS	FRICTION	HR A ENCL
								NEG	NON-FRICTION	AR A ENCL
								INC	POOR	OSHA N/A



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

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Date:

10/22/18

Sampling Location:

Cellum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G1

Room #:

Rm 12

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	319		Center	12.2		POS	FRICION INTACT	HR A ENCP AR CA A ENCL OSHA N/A
							12.2	NEG	NON-FRICION FAIR	
								INC	POOR	
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	320		Center	10.1		POS	FRICION INTACT	HR A ENCP AR CA A ENCL OSHA N/A
							10.1	NEG	NON-FRICION FAIR	
								INC	POOR	
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Casing	321		Center	9.8		POS	FRICION INTACT	HR A ENCP AR CA A ENCL OSHA N/A
							9.8	NEG	NON-FRICION FAIR	
								INC	POOR	
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT	HR A ENCP AR CA A ENCL OSHA N/A
								NEG	NON-FRICION FAIR	
								INC	POOR	
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT	HR A ENCP AR CA A ENCL OSHA N/A
								NEG	NON-FRICION FAIR	
								INC	POOR	

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Criterion

Client:

The Oak Group, Inc.

Sampling Location:

Cullum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G1

Room #:

Rm 13

XRF Testing Report

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Date:

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Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	322	A	Center	16.4	19.9	POS	FRICTION INTACT	<div> <div>HR</div> <div>AR</div> <div>A ENCL</div> <div>A ENCP</div> <div>CA</div> <div>OSHA</div> <div>N/A</div> </div>
			323	B		20.2		NEG	NON-FRICTION FAIR	
			324	C		19.9		INC	POOR	
			325	D		21.4				
* White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	326		Center	17.2	17.2	POS	FRICTION INTACT	<div> <div>HR</div> <div>AR</div> <div>A ENCL</div> <div>A ENCP</div> <div>CA</div> <div>OSHA</div> <div>N/A</div> </div>
								NEG	NON-FRICTION FAIR	
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	327	A	Center	6.2	6.2	POS	FRICTION INTACT	<div> <div>HR</div> <div>AR</div> <div>A ENCL</div> <div>A ENCP</div> <div>CA</div> <div>OSHA</div> <div>N/A</div> </div>
								NEG	NON-FRICTION FAIR	
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	328	A	Center	7.2	7.2	POS	FRICTION INTACT	<div> <div>HR</div> <div>AR</div> <div>A ENCL</div> <div>A ENCP</div> <div>CA</div> <div>OSHA</div> <div>N/A</div> </div>
								NEG	NON-FRICTION FAIR	
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	329		Center	9.0	9.0	POS	FRICTION INTACT	<div> <div>HR</div> <div>AR</div> <div>A ENCL</div> <div>A ENCP</div> <div>CA</div> <div>OSHA</div> <div>N/A</div> </div>
								NEG	NON-FRICTION FAIR	
								INC	POOR	



Criterion

Client:

XRF Testing Report

Page 44 of

Date:

The Oak Group, Inc.

Sampling Location:

Room Equivalent:

Room #:

Cullum Hall at The United States
Military Academy at West Point, NY

Floor 61

Rm 13

Date:

Signature:

Project No.:

XRF Serial No.:

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	330		Center	16.0	16.0	POS	FRICION NON-FRICION POOR	HR AR A ENCL A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	331	C	Top	12.2	12.2	POS	FRICION NON-FRICION POOR	HR AR A ENCL A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Casing	332	C	Center	9.9	9.9	POS	FRICION NON-FRICION POOR	HR AR A ENCL A ENCP CA OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION NON-FRICION POOR	HR AR A ENCL A ENCP CA OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION NON-FRICION POOR	HR AR A ENCL A ENCP CA OSHA N/A



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

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Date:

10/22/16

Sampling Location:

Callum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor 6I

Room #:

Rm 15

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	333	A	Center	21.2	17.8	POS	FRICION NON-FRICION	A ENCP CA OSHA N/A
			334	B		10.9		NEG	INTACT FAIR	HR AR A ENCL
			335	C		17.8		INC	POOR	
			336	D		9.4				
* White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	337		Center	6.4	6.4	POS	FRICION NON-FRICION	A ENCP CA OSHA N/A
								NEG	INTACT FAIR	HR AR A ENCL
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	338		Center	2.1	2.1	POS	FRICION NON-FRICION	A ENCP CA OSHA N/A
								NEG	INTACT FAIR	HR AR A ENCL
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	339		Center	4.8	4.8	POS	FRICION NON-FRICION	A ENCP CA OSHA N/A
								NEG	INTACT FAIR	HR AR A ENCL
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rack	340		Center	7.3	7.3	POS	FRICION NON-FRICION	A ENCP CA OSHA N/A
								NEG	INTACT FAIR	HR AR A ENCL
								INC	POOR	



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Sampling Location:

Cullum Hall at the United States
Military Academy at West Point, NY

Room Equivalent:

Floor 67

Room #:

Rm 15

Date:

10/22/18

Signature:

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	341		Center	12.2	12.2	POS	FRICTION (NON-FRICTION) INTACT FAIR POOR	A ENCP CA OSHA N/A (HR) AR A ENCL
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	342		Top	6.6	6.6	POS	FRICTION (NON-FRICTION) INTACT FAIR POOR	A ENCP CA OSHA N/A (HR) AR A ENCL
White	Wood Brick Sheetrock Plaster Metal Concrete	Window casing	343		Center	9.2	9.2	POS	FRICTION (NON-FRICTION) INTACT FAIR POOR	A ENCP CA OSHA N/A (HR) AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL

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XRF Testing Report

Client:

The Oak Group, Inc.

Date:

10/22/18

Sampling Location:

Cullum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Plur 61

Room #:

Rm 16

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	344	A	Center	16.2	10.3	POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
			345	B	↓	9.1		NEG	NON-FRICTION FAIR	CA A ENCL OSHA
			346	C		10.3		INC	POOR	
			347	D	↓	7.4				
* White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	348		Center	6.2	6.2	POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
								NEG	NON-FRICTION FAIR	CA A ENCL OSHA
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	349		Center	15.1	15.1	POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
								NEG	NON-FRICTION FAIR	CA A ENCL OSHA
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	350		Center	16.8	16.8	POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
								NEG	NON-FRICTION FAIR	CA A ENCL OSHA
								INC	POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	351		Center	17.9	17.9	POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
								NEG	NON-FRICTION FAIR	CA A ENCL OSHA
								INC	POOR	



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Client:

The Oak Group, Inc.

XRF Testing Report

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Date:

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Sampling Location:

Cullum Hall at The United States
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Room #:

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Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	352		Center	17.6		POS	FRICION NON- FRICION	HR AR A ENCL A ENCP CA OSHA N/A
							17.2	NEG	FAIR	
								INC	POOR	
	Wood Brick Sheetrock Plaster Metal Concrete							POS	INTACT	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	FAIR	
								INC	POOR	
	Wood Brick Sheetrock Plaster Metal Concrete							POS	INTACT	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	FAIR	
								INC	POOR	
	Wood Brick Sheetrock Plaster Metal Concrete							POS	INTACT	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	FAIR	
								INC	POOR	
	Wood Brick Sheetrock Plaster Metal Concrete							POS	INTACT	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	FAIR	
								INC	POOR	



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

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Date:

Sampling Location:

Collum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G1

Room #:

Rm 16

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	353	A	Center	16.2		POS	FRICITION INTACT	HR A ENCL A ENCP CA OSHA N/A
			354	B		10.7	10.7	NEG	NON-FRICITION FAIR	HR A ENCL A ENCP CA OSHA N/A
			355	C		9.4				
			356	D		10.2		INC		
* White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	357		Center	16.2		POS	FRICITION INTACT	HR A ENCL A ENCP CA OSHA N/A
							16.2	NEG	NON-FRICITION FAIR	HR A ENCL A ENCP CA OSHA N/A
								INC		
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	358		Center	10.7		POS	FRICITION INTACT	HR A ENCL A ENCP CA OSHA N/A
							10.7	NEG	NON-FRICITION FAIR	HR A ENCL A ENCP CA OSHA N/A
								INC		
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casings	359		Center	9.8		POS	FRICITION INTACT	HR A ENCL A ENCP CA OSHA N/A
							9.8	NEG	NON-FRICITION FAIR	HR A ENCL A ENCP CA OSHA N/A
								INC		
* White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	360		Center	7.2		POS	FRICITION INTACT	HR A ENCL A ENCP CA OSHA N/A
							7.2	NEG	NON-FRICITION FAIR	HR A ENCL A ENCP CA OSHA N/A
								INC		



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

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Date:

10/22/18

Sampling Location:

Cullum Hall at The United States Military Academy at West Point, NY

Room Equivalent:

Floor 61

Room #:

Rm17

Signature:

Project No.:

XRF Serial No.:

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	361	A	Center	17.1	17.1	POS	FRICION INTACT	HR AR A ENCL A ENCP CA OSHA N/A
			362	B		21.8		NEG	NON-FRICION FAIR	HR AR A ENCL A ENCP CA OSHA N/A
			363	C		16.2		INC	NON-FRICION POOR	HR AR A ENCL A ENCP CA OSHA N/A
			364	D		14.1				
White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	365		Center	12.8	12.8	POS	FRICION INTACT	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	HR AR A ENCL A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Door	366		Center	16.2	16.2	POS	FRICION INTACT	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	HR AR A ENCL A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	367		Center	5.8	5.8	POS	FRICION INTACT	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	HR AR A ENCL A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	368		Center	9.1	9.1	POS	FRICION INTACT	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	HR AR A ENCL A ENCP CA OSHA N/A

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Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

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Date:

10/22/18

Sampling Location:

Cellum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Plur 61

Room #:

Rm 17

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	369		Center	12.4	12.4	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP HR CA AR OSHA A ENCL N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	370		Center	16.2	16.2	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP HR CA AR OSHA A ENCL N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window Casing	371		Center	19.8	19.8	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP HR CA AR OSHA A ENCL N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP HR CA AR OSHA A ENCL N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP HR CA AR OSHA A ENCL N/A



XRF Testing Report

Client:

The Oak Group, Inc.

Sampling Location:

William Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Room #:

Room #:

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10/22/18

Date:

Signature:

Project No.:

XRF Serial No.:

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
gray	Wood Brick Sheetrock Plaster Metal Concrete	Heater	380		Top	7.4	7.4	POS	FRICION (INTACT) NON-FRICION FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
white	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	381		Center	8.2	8.2	POS	FRICION (INTACT) NON-FRICION FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
white	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	382		Center	6.9	6.9	POS	FRICION (INTACT) NON-FRICION FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
white	Wood Brick Sheetrock Plaster Metal Concrete	Door	383		Center	21.4	21.4	POS	FRICION (INTACT) NON-FRICION FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
white	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	384		Center	19.2	19.2	POS	FRICION (INTACT) NON-FRICION FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL



XRF Testing Report

Client:

The Oak Group, Inc.

Criterion

Date:

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Sampling Location:

Callum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G2
Rm 3B

Room #:

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	385	A	Center	21.0	17.6	POS	FRICION NON- FRICION	HR AR A ENCL A ENCP CA OSHA N/A
			386	B		9.2		NEG	INTACT FAIR	HR AR A ENCL A ENCP CA OSHA N/A
			387	C		10.1		INC	POOR	HR AR A ENCL A ENCP CA OSHA N/A
			388	D		17.6		POS	FRICION NON- FRICION	HR AR A ENCL A ENCP CA OSHA N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	389		Center	19.1	19.1	POS	FRICION NON- FRICION	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	INTACT FAIR	HR AR A ENCL A ENCP CA OSHA N/A
								INC	POOR	HR AR A ENCL A ENCP CA OSHA N/A
								POS	FRICION NON- FRICION	HR AR A ENCL A ENCP CA OSHA N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	390		Center	21.5	21.5	POS	FRICION NON- FRICION	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	INTACT FAIR	HR AR A ENCL A ENCP CA OSHA N/A
								INC	POOR	HR AR A ENCL A ENCP CA OSHA N/A
								POS	FRICION NON- FRICION	HR AR A ENCL A ENCP CA OSHA N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	391		Center	6.2	6.2	POS	FRICION NON- FRICION	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	INTACT FAIR	HR AR A ENCL A ENCP CA OSHA N/A
								INC	POOR	HR AR A ENCL A ENCP CA OSHA N/A
								POS	FRICION NON- FRICION	HR AR A ENCL A ENCP CA OSHA N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	392		Center	7.5	7.5	POS	FRICION NON- FRICION	HR AR A ENCL A ENCP CA OSHA N/A
								NEG	INTACT FAIR	HR AR A ENCL A ENCP CA OSHA N/A
								INC	POOR	HR AR A ENCL A ENCP CA OSHA N/A
								POS	FRICION NON- FRICION	HR AR A ENCL A ENCP CA OSHA N/A



XRF Testing Report

Client:

The Oak Group, Inc.

Sampling Location:

Cullum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G2
Rm 3B

Room #:

Room #:

Date:

10/22/18

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	393		Center	10.2	10.2	POS	FRICION INTACT NON-FRICION FAIR POOR	A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	394		Center	17.1	17.1	POS	FRICION INTACT NON-FRICION FAIR POOR	A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Casing	395		Center	6.2	6.2	POS	FRICION INTACT NON-FRICION FAIR POOR	A ENCP CA OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT NON-FRICION FAIR POOR	A ENCP CA OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT NON-FRICION FAIR POOR	A ENCP CA OSHA N/A

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XRF Testing Report

Client:

The Oak Group, Inc.

Sampling Location:

Colburn Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Flour 62 Suite 1A

Room #:

Date:

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[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	396	A	Center	17.1	19.2	POS	FRICION INTACT	A ENCP CA OSHA N/A
			397	B		19.2		NEG	NON-FRICION FAIR	
			398	C		21.7		INC	NON-FRICION POOR	
			399	D		10.0				
* White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	400		Center	6.4	6.4	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	
								INC	NON-FRICION POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	401		Center	12.0	12.0	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	
								INC	NON-FRICION POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	402		Center	17.2	17.2	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	
								INC	NON-FRICION POOR	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	403		Center	19.0	19.0	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	
								INC	NON-FRICION POOR	



XRF Testing Report

Client:

The Oak Group, Inc.

Sampling Location:

Column Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G2

Room #:

Rm 2B

Date:

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Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	409	A	Center	10.6	17.4	POS	FRICION	HR
			410	B		9.8		NEG	NON-FRICION	AR
			411	C		17.4		INC		A ENCL
			412	D		21.2				OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	413		Center	6.9	6.9	POS	FRICION	HR
								NEG	NON-FRICION	AR
								INC		A ENCL
										OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Door	414		Center	5.4	5.4	POS	FRICION	HR
								NEG	NON-FRICION	AR
								INC		A ENCL
										OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	415		Center	21.8	21.8	POS	FRICION	HR
								NEG	NON-FRICION	AR
								INC		A ENCL
										OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Choir Rail	416		Center	22.7	22.7	POS	FRICION	HR
								NEG	NON-FRICION	AR
								INC		A ENCL
										OSHA N/A

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Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Page 62 of

Date:

10/22/16

Sampling Location:

William Hall at the United States
Military Academy at West Point, NY

Room Equivalent:

Floor G2

Room #:

Suite 1A

Signature:

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	404	A	Center	8.3	7.6	POS	FRICION INTACT	HR A ENCL A ENCP CA OSHA N/A
			405	B		9.2		NEG	NON-FRICION FAIR	AR A ENCL A ENCP CA OSHA N/A
			406	C		7.6		INC	NON-FRICION POOR	AR A ENCL A ENCP CA OSHA N/A
			407	D		10.3		INC	NON-FRICION POOR	AR A ENCL A ENCP CA OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	408		Center	4.2	4.2	POS	FRICION INTACT	HR A ENCL A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	AR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	AR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	AR A ENCL A ENCP CA OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT	HR A ENCL A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	AR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	AR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	AR A ENCL A ENCP CA OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT	HR A ENCL A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	AR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	AR A ENCL A ENCP CA OSHA N/A
								INC	NON-FRICION POOR	AR A ENCL A ENCP CA OSHA N/A



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Sampling Location:

Cullum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G2

Room #:

Rm 6B

Date:

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Signature:

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	417	A	Center	9.8	9.9	POS	FRICITION (INTACT)	HR A ENCP
			418	B		21.4		NEG	NON-FRICITION FAIR	CA A ENCL
			419	C		7.6		INC	NON-FRICITION POOR	OSHA N/A
			420	D	↓	9.9				
White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	421		Center	6.2	6.2	POS	FRICITION (INTACT)	HR A ENCP
								NEG	NON-FRICITION FAIR	CA A ENCL
								INC	NON-FRICITION POOR	OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Door	422		Center	7.1	7.1	POS	FRICITION (INTACT)	HR A ENCP
								NEG	NON-FRICITION FAIR	CA A ENCL
								INC	NON-FRICITION POOR	OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casings	423		Center	6.3	6.3	POS	FRICITION (INTACT)	HR A ENCP
								NEG	NON-FRICITION FAIR	CA A ENCL
								INC	NON-FRICITION POOR	OSHA N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	424		Center	5.8	5.8	POS	FRICITION (INTACT)	HR A ENCP
								NEG	NON-FRICITION FAIR	CA A ENCL
								INC	NON-FRICITION POOR	OSHA N/A

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Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Sampling Location:

Collum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor 62

Room #:

Rm 6B

Date:

10/22/18

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	425		Center	7.1	7.1	POS	FRICTION INTACT NON-FRICTION FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	426		Top	6.2	6.2	POS	FRICTION INTACT NON-FRICTION FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window Casing	427		Center	8.7	8.7	POS	FRICTION INTACT NON-FRICTION FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION INTACT NON-FRICTION FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL



XRF Testing Report

Client:

The Oak Group, Inc.

Date:

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Sampling Location:

Cullum Hall at the United States Military Academy at West Point, NY

Signature:

[Signature]

Room Equivalent:

Project No.: 182365

Room #:

Floor G2
Rm 8B

XRF Serial No.: 25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	428	A	Center	0.15	0.33	POS	FRICION INTACT	A ENCP CA OSHA N/A
			429	B		0.2		NEG	NON-FRICION FAIR	HR AR A ENCL
			430	C		0.33		INC	POOR	
			431	D	+	0.7				
White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	432		Center	7.1	7.1	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL
								INC	POOR	
White	Wood Brick Sheetrock Plaster Metal Concrete	Door	433		Center	6.2	6.2	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL
								INC	POOR	
White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	434		Center	8.4	8.4	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL
								INC	POOR	
White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	435		Center	7.1	7.1	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION FAIR	HR AR A ENCL
								INC	POOR	

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Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Sampling Location:

Collum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G2

Room #:

Rm 8B

Date:

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Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	436		Center	10.2	10.2	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	437		Center	16.4	16.4	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Casing	438		Center	9.9	9.9	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL

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Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

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Date:

10/22/18

Sampling Location:

Collum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G2

Room #:

Rm 9B

Signature:

Project No.:

XRF Serial No.:

182365

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	439	A	Center	6.7	9.2	POS	FRICTION	A ENCP CA OSHA N/A
			440	B		9.2		NEG	INTACT	HR AR A ENCL
			441	C		10.0		INC	NON-FRICTION	
			442	D		7.9				
* White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	443		Center	7.1	7.1	POS	FRICTION	A ENCP CA OSHA N/A
								NEG	INTACT	HR AR A ENCL
								INC	NON-FRICTION	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	444		Center	6.2	6.2	POS	FRICTION	A ENCP CA OSHA N/A
								NEG	INTACT	HR AR A ENCL
								INC	NON-FRICTION	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	445		Center	7.9	7.9	POS	FRICTION	A ENCP CA OSHA N/A
		Ceiling						NEG	INTACT	HR AR A ENCL
								INC	NON-FRICTION	
* White	Wood Brick Sheetrock Plaster Metal Concrete	Chair	446		Center	16.2	16.2	POS	FRICTION	A ENCP CA OSHA N/A
		Panel						NEG	INTACT	HR AR A ENCL
								INC	NON-FRICTION	



XRF Testing Report

Client:

The Oak Group, Inc.

Sampling Location:

Collum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Floor G2

Room #:

Rm 9B

Date:

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Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	447		Center	7.1	7.1	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	448		Center	6.2	6.2	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
White	Wood Brick Sheetrock Plaster Metal Concrete	Window casing	449		Center	9.9	9.9	POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICTION NON-FRICTION INTACT FAIR POOR	A ENCP CA OSHA N/A HR AR A ENCL

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Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Date:

Page 69 of

10/22/18

Sampling Location:

Cullum Hall at The United States
Military Academy at West Point, NY

Room Equivalent:

Flur 62

Room #:

Rm 10B

Signature:

Project No.:

XRF Serial No.:

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	450	A	Center	9.1		POS	FRICION	A ENCP CA OSHA N/A
			451	B		10.8	10.8	NEG	NON-FRICION	HR AR A ENCL
			452	C		11.6		INC		
			453	D		9.4				
* White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	454		Center	16.2		POS	FRICION	A ENCP CA OSHA N/A
							16.2	NEG	NON-FRICION	HR AR A ENCL
								INC		
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door	455		Center	21.8		POS	FRICION	A ENCP CA OSHA N/A
							21.8	NEG	NON-FRICION	HR AR A ENCL
								INC		
* White	Wood Brick Sheetrock Plaster Metal Concrete	Door Casing	456		Center	6.2		POS	FRICION	A ENCP CA OSHA N/A
							6.2	NEG	NON-FRICION	HR AR A ENCL
								INC		
* White	Wood Brick Sheetrock Plaster Metal Concrete	Chair Rail	457		Center	5.3		POS	FRICION	A ENCP CA OSHA N/A
							5.3	NEG	NON-FRICION	HR AR A ENCL
								INC		



Criterion

Client:

XRF Testing Report

The Oak Group, Inc.

Page 76 of

Date:

10/22/18

Sampling Location:

Cullum Hall at the United States
Military Academy at West Point, NY

Room Equivalent:

Floor G2

Room #:

Rm 10B

Signature:

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
* White	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	458		Center	10.1	10.1	POS	FRICION NON-FRICION POOR	A ENCP CA OSHA N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window Sill	459		Center	9.1	9.1	POS	FRICION NON-FRICION POOR	A ENCP CA OSHA N/A
* White	Wood Brick Sheetrock Plaster Metal Concrete	Window Casing	460		Center	16.2	16.2	POS	FRICION NON-FRICION POOR	A ENCP CA OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION NON-FRICION POOR	A ENCP CA OSHA N/A
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION NON-FRICION POOR	A ENCP CA OSHA N/A



Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Sampling Location:

Cullum Hall at The United States
Military Academy at West Point, NY

Room Equivalent:

Room #:

SH-15 B/T G-2 + Mechanical Rm

Date:

10/22/18

Signature:

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
off white	Wood Brick Sheetrock Plaster Metal Concrete	Wall	461	A	Center	17.1		POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
			462	B		8.9	10.2	NEG	NON-FRICTION FAIR	AR A ENCL
			463	C		10.2				
			464	D		21.4		INC		
			465		Top	10.9		POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
Black	Wood Brick Sheetrock Plaster Metal Concrete	Hand Rail					16.9	NEG	NON-FRICTION FAIR	AR A ENCL
								INC		
Black	Wood Brick Sheetrock Plaster Metal Concrete	Door	466		Center	0.07		POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
							0.07	NEG	NON-FRICTION FAIR	AR A ENCL
								INC		
Black	Wood Brick Sheetrock Plaster Metal Concrete	SH-15	467		Tread	0.01		POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
			468		Riser	0.02	0.01	NEG	NON-FRICTION FAIR	AR A ENCL
								INC		
W. green	Wood Brick Sheetrock Plaster Metal Concrete	Baseboard	469		Center	6.3	6.3	POS	FRICTION INTACT	A ENCP HR CA OSHA N/A
								NEG	NON-FRICTION FAIR	AR A ENCL
								INC		

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*



XRF Testing Report

Client:

The Oak Group, Inc.

Sampling Location:

Collum Hall at The United States Military Academy at West Point, NY

Room Equivalent:

Room #:

Shr's B/T G2 & Mechanical Rm

Date:

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Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
lt. green	Wood Brick Sheetrock Plaster Metal Concrete	Door	470		Center	25.8	25.8	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION	HR AR A ENCL
								INC	POOR	
lt. green	Wood Brick Sheetrock Plaster Metal Concrete	Door casing	471		Center	17.9	17.9	POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION	HR AR A ENCL
								INC	POOR	
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION	HR AR A ENCL
								INC	POOR	
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION	HR AR A ENCL
								INC	POOR	
	Wood Brick Sheetrock Plaster Metal Concrete							POS	FRICION INTACT	A ENCP CA OSHA N/A
								NEG	NON-FRICION	HR AR A ENCL
								INC	POOR	

*

*



XRF Testing Report

Client:

The Oak Group, Inc.

Criterion

Sampling Location:

Collum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Room #:

Mechanics Rm

Date:

Page 73 of 10/22/18

Signature:

[Signature]

Project No.:

182365

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
Gray	Wood Brick Sheetrock Plaster Metal Concrete	Wall	472		electrical Rm ↓ Φ	0.01		POS	FRICITION	HR A ENCP
			473			0.02	0.02	NEG	NON-FRICITION	CA AR OSHA A ENCL
			474			0.03				
			475			0.02		INC	POOR	N/A
Black	Wood Brick Sheetrock Plaster Metal Concrete	Wall	476		electrical Rm ↓ Φ	0.01		POS	FRICITION	HR A ENCP
			477			0.04	0.02	NEG	NON-FRICITION	CA AR OSHA A ENCL
			478			0.02				
			479			0.02		INC	POOR	N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Hand Rail	480		Main Rm	10.1	10.1	POS	FRICITION	HR A ENCP
								NEG	NON-FRICITION	CA AR OSHA A ENCL
								INC	POOR	N/A
Yellow	Wood Brick Sheetrock Plaster Metal Concrete	Hand Rail	481		Main Rm	12.6	12.6	POS	FRICITION	HR A ENCP
								NEG	NON-FRICITION	CA AR OSHA A ENCL
								INC	POOR	N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	482		Main Rm	0.3	0.3	POS	FRICITION	HR A ENCP
								NEG	NON-FRICITION	CA AR OSHA A ENCL
								INC	POOR	N/A

*

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Criterion

Client:

The Oak Group, Inc.

XRF Testing Report

Page 74 of

Date:

10/22/10

Sampling Location:

Cullum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Room #:

Signature:

Project No:

XRF Serial No.:

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
Black	Wood Brick Sheetrock Plaster Metal Concrete	Duct	483		Main Rm.	0.02	0.02	POS NEG	FRICION NON-FRICION POOR	A ENCP HR CA AR OSHA A ENCL N/A
Dk. grey	Wood Brick Sheetrock Plaster Metal Concrete	Wall	484		Main Rm.	7.1	7.1	POS NEG INC	FRICION NON-FRICION POOR	A ENCP HR CA AR OSHA A ENCL N/A
Yellow	Wood Brick Sheetrock Plaster Metal Concrete	Duct	485		Main Rm.	1.7	1.7	POS NEG INC	FRICION NON-FRICION POOR	A ENCP HR CA AR OSHA A ENCL N/A
lt. green	Wood Brick Sheetrock Plaster Metal Concrete	Duct	486		Main Rm.	27.8	27.8	POS NEG INC	FRICION NON-FRICION POOR	A ENCP HR CA AR OSHA A ENCL N/A
Dk. green	Wood Brick Sheetrock Plaster Metal Concrete	Column	487		Main Rm.	10.8	10.8	POS NEG INC	FRICION NON-FRICION POOR	A ENCP HR CA AR OSHA A ENCL N/A

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Criterion

XRF Testing Report

Client:

The Oak Group, Inc.

Page 75 of 75

Date:

10/22/18

Sampling Location:

Cullum Hall at the United States Military Academy at West Point, NY

Room Equivalent:

Project No.:

182365

Room #:

XRF Serial No.:

25357

Color	Substrate	Component	Reading No.	Wall	Test Location	XRF Reading mg/cm ²	Results mg/cm ²	Classification	Surface/Condition	Recommendation
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	488		Center	0.02	0.02	POS	FRICION NON- FRICION	A ENCP HR CA AR OSHA A ENCL N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Ceiling	489		Tunnel	0.01	0.01	POS	FRICION NON- FRICION	A ENCP HR CA AR OSHA A ENCL N/A
White	Wood Brick Sheetrock Plaster Metal Concrete	Wall	490		Tunnel	0.00	0.00	POS	FRICION NON- FRICION	A ENCP HR CA AR OSHA A ENCL N/A
Yellow	Wood Brick Sheetrock Plaster Metal Concrete	Pipe	491		Tunnel	1.7	1.7	POS	FRICION NON- FRICION	A ENCP HR CA AR OSHA A ENCL N/A
Black	Wood Brick Sheetrock Plaster Metal Concrete	Door	492		Tunnel	0.07	0.07	POS	FRICION NON- FRICION	A ENCP HR CA AR OSHA A ENCL N/A



Calibration Check Test Results

Client: The Oak Group, Inc.
Address: Collum Hall at The United States
Military Academy at West Point, NY
Date: 10/22/18 XRF Serial #: 25357
Project Number: 182365
Inspector: Melissa Billingsley
Inspector Signature: [Signature]

Lead Paint Standards Surface Lead mg/cm ²	Start of Job 1 st Calibration Check		2 nd Calibration Check		3 rd Calibration Check		4 th Calibration Check	
	Reading #	Result	Reading #	Result	Reading #	Result	Reading #	Result
<0.01	1	0.0	216	0.0	493	0.0		
1.04 ± 0.06	2	1.0	217	1.0	494	1.0		
0.71 ± 0.08	3	0.7	218	0.7	495	0.7		
3.58 ± 0.39								
1.53 ± 0.09								
0.31 ± 0.02								
Detector Resolution	374.9							

Note: At least three (3) calibration samples should be taken before and after the inspection has been complete. In addition three (3) calibration samples should be taken at four (4) hour intervals.

United States Environmental Protection Agency

This is to certify that

Melissa Billingsley

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires

November 24, 2021

LBP-R-124044-1

Certification #

September 24, 2018

Issued On



Adrienne Prisela, Manager, Toxics Office
Land Division



the oak group inc. 622 Cooper Street Camden, NJ 08102 (856) 377-0060 www.oakgroup.net

Mailing address: PO Box 2041 Voorhees, NJ 08043

15 November, 2018

Mr. Terry Allen
Mason and Hanger

Re: Radon Results Lincoln and Cullum Halls USMA

Via: Email

Mr. Allen,

Pursuant to your request, Radon sampling was conducted for Lincoln and Cullum Halls located on Thayer Rd. Bldg USMA West Point, NY. Testing was performed by Mr. Kenneth Carr of Precision Inspections, LCC on October 23-25, 2018.

A total of 12 locations were tested within Lincoln Hall. Eleven test results were below the US EPA recommended threshold of 4pCi/L. One sample located in Room B-100 indicated a level of 4.6pCi/L.

A total of 6 locations were tested within Cullum Hall. Test results ranged from which are all below the US EPA recommended threshold of 4pCi/L.

Attached are the results of testing.

The OAK Group, Inc.

Eduard J. Eichen, CIH

West Point Military Academy
600 Thayer Road
West Point, NY 10996-1726

<u>Building</u>	<u>Location</u>	<u>Test ID#</u>	<u>Results</u>	<u>Remarks</u>
Cullum Hall	Lower basement/Rm 1A	7234034	<0.3 pCi/l	Blank Duplicate
Cullum Hall	Lower basement/Rm 1A	7234035	<0.3 pCi/l	
Cullum Hall	Lower basement/Rm 1A	7234031	<0.3 pCi/l	
Cullum Hall	Lower basement/Rm 3B	7234027	<0.3 pCi/l	
Cullum Hall	Lower basement/Corridor	7234030	<0.3 pCi/l	
Cullum Hall	Basement/Pantry	7234029	<0.3 pCi/l	
Cullum Hall	Basement/Chair room	7234028	<0.3 pCi/l	
Cullum Hall	Basement/Room 6	7234025	1.2 +/- 0.2 pCi/l	
Lincoln Hall	Mechanical section corridor	7234014	3.1 +/- 0.3 pCi/l	
Lincoln Hall	Room B201	7234023	0.8 +/- 0.2 pCi/l	
Lincoln Hall	Classroom corridor	7234024	0.9 +/- 0.3 pCi/l	
Lincoln Hall	Room B116	7234026	0.8 +/- 0.3 pCi/l	
Lincoln Hall	Room B106	7234019	<0.3 pCi/l	
Lincoln Hall	Room 109	7234020	<0.3 pCi/l	
Lincoln Hall	Room B-100	7234021	4.6 +/- 0.3 pCi/l	
Lincoln Hall	Room B-120	7234015	1.1 +/- 0.3 pCi/l	
Lincoln Hall	Room B-121	7234016	1.0 +/- 0.3 pCi/l	
Lincoln Hall	Room B-123	7234017	0.7 +/- 0.3 pCi/l	
Lincoln Hall	Room B-108	7234022	<0.3 pCi/l	
Lincoln Hall	Room B-103	7234018	1.1 +/- 0.3 pCi/l	



Air Chek
NRPP Lab ID: 101138 AL
NY ELAP Lab ID 11441
October 26, 2018

Radon Measurement Technician

Precision Inspections
Ken Carr
223 W 21st St Apt 4h
New York, NY 10011-3138
646-247-1867

Device Information

Pro Chek Activated Charcoal
Serial#: 7234016
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B121 West Point, NY 10996-1726	7234016	2018-10-26	1.0 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

ATTENTION NEW YORK STATE RESIDENT
This test was analyzed by Air Chek, Inc. NY ELAP Lab ID 11441
For further technical advice and assistance contact:

Bureau of Environmental Radiation Protection
2 University Place
Albany, New York, 12203
or call 800-458-1158

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Air Chek
NRPP Lab ID: 101138 AL
NY ELAP Lab ID 11441
October 26, 2018

Radon Measurement Technician

Precision Inspections
Ken Carr
223 W 21st St Apt 4h
New York, NY 10011-3138
646-247-1867

Device Information

Pro Chek Activated Charcoal
Serial#: 7234021
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B100 West Point, NY 10996-1726	7234021	2018-10-26	4.6 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA recommendation for test results in this range (4 to 8 pCi/L) is to conduct either a short- or long-term follow-up measurement. If, however, this is a follow-up (confirming) test, it is recommended that you take remedial action to reduce these radon levels.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Air Chek
NRPP Lab ID: 101138 AL
NY ELAP Lab ID 11441
October 26, 2018

Radon Measurement Technician

Precision Inspections
Ken Carr
223 W 21st St Apt 4h
New York, NY 10011-3138
646-247-1867

Device Information

Pro Chek Activated Charcoal
Serial#: 7234026
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd Rm B116 West Point, NY 10996-1726	7234026	2018-10-26	0.8 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Air Chek
NRPP Lab ID: 101138 AL
NY ELAP Lab ID 11441
October 26, 2018

Radon Measurement Technician

Precision Inspections
Ken Carr
223 W 21st St Apt 4h
New York, NY 10011-3138
646-247-1867

Device Information

Pro Chek Activated Charcoal
Serial#: 7234015
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B120 West Point, NY 10996-1726	7234015	2018-10-26	1.1 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Air Chek
NRPP Lab ID: 101138 AL
NY ELAP Lab ID 11441
October 26, 2018

Radon Measurement Technician

Precision Inspections
Ken Carr
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New York, NY 10011-3138
646-247-1867

Device Information

Pro Chek Activated Charcoal
Serial#: 7234018
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B103 West Point, NY 10996-1726	7234018	2018-10-26	1.1 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234014
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 9:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement B2 600 Thayer Rd West Point, NY 10996-1726	7234014	2018-10-26	3.1 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA recommendation for results in this range (2.0 to 3.9 pCi/L) is to conduct further tests to determine the true annual average, ideally with a long-term test kit. If the result remains between 2 and 4 there is little short-term risk, but you should consider fixing your home. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234024
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 9:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd West Point, NY 10996-1726	7234024	2018-10-26	0.9 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234019
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B106 West Point, NY 10996-1726	7234019	2018-10-26	< 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. Test results in this range(0.5 pCi/L or less) are, for all practical purposes, equivalent to the radon levels found in fresh air. However, if you make any structural changes or start to use a lower level of the building more frequently you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234017
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B123 West Point, NY 10996-1726	7234017	2018-10-26	0.7 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234023
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 9:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement B2 600 Thayer Rd B201 West Point, NY 10996-1726	7234023	2018-10-26	0.8 ± 0.2 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234022
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B108 West Point, NY 10996-1726	7234022	2018-10-26	< 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. Test results in this range(0.5 pCi/L or less) are, for all practical purposes, equivalent to the radon levels found in fresh air. However, if you make any structural changes or start to use a lower level of the building more frequently you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234020
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B109 West Point, NY 10996-1726	7234020	2018-10-26	< 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. Test results in this range(0.5 pCi/L or less) are, for all practical purposes, equivalent to the radon levels found in fresh air. However, if you make any structural changes or start to use a lower level of the building more frequently you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Your health risk

The primary health risk from long-term exposure to radon is lung cancer. The risk of developing a lung cancer from radon exposure depends both on how much radon is present and how long you are exposed to radon. The higher the radon level or the longer the time of exposure, even if the levels are relatively low, the greater the risk. Exposures up to 4 pCi/L may present some risk of contracting lung cancer to more sensitive occupants, especially children and those who live with smokers. The US Congress set as a goal the lowering of radon levels in buildings to equal the levels of outside air.

PERFORMING RADON TESTS FOR A REAL ESTATE TRANSACTION

US EPA protocols state that when using passive devices, such as activated charcoal tests, two short-term tests should be conducted, either together or sequentially, at the same location in the building. The tests should be averaged together and if the average is 4.0 pCi/L or higher, radon mitigation is recommended. Even if the average is below 4.0 pCi/L, the buyers should consider testing in a different season or deploy a long-term test device to assess their long-term risks. It is **highly recommended** that any property transaction tests be conducted by a non-interested third party. To locate a listed or certified radon tester, contact your state radon office or visit our website at <http://www.neha-nrpp.org> to download a list of NEHA-NRPP certified testers. You should also visit the EPA website to download a copy of EPA's Home Buyer's and Seller's Guide to Radon.

Radon Test Device Placement

The US EPA recommends that testing device(s) be placed in the lowest level of the home that could be used regularly, whether it is finished or unfinished. Conduct the test in any space that could be used by the buyer as a bedroom, play area, family room, den, exercise room, or workshop. Based on their client's intended use of the space, the qualified testing professional should identify the appropriate test location and inform their client (buyer). Do not test in a closet, stairway, hallway, crawl space or in an enclosed area of high humidity or high air velocity. An enclosed area may include a kitchen, bathroom, laundry room or furnace room.

Variations in Radon Levels

When tests are performed in different seasons or under different weather conditions, the initial screening and follow-up tests may vary considerably. Radon levels can vary significantly between seasons, so different values **are to be expected**. Even during normal weather, indoor radon levels may rise and fall by a factor of two on a daily cycle; for example, from 5 pCi/L to 10 pCi/L in 24 hours. During rapidly changing or stormy weather, the levels may change more dramatically. Because continual changes in radon levels are considered normal, expose the testing device for as long as is practical, while following the manufacturer's recommendations. This, of course, provides a better overall average of the measurement.

If you are comparing tests, or are averaging a series of tests, bear in mind that any radon test returns only the average of the levels present during a **specific period of time** at the **precise location** of the test. Conditions during a different test period or at a different location in the building are **expected to be different**.

Test results can also vary if the radon test instructions were not carefully followed. A laboratory measuring radon in samples taken outside the lab **must rely on the person conducting the test**. For example, the wrong starting or ending date of a test will significantly affect the calculated result. The location of each radon test can also influence the result. For example, a test placed in the blowing air stream of a fan is likely to collect more radon than it would under normal conditions. Also, three tests conducted in one home, but in three different rooms, **would be expected to have at least slightly different test results**.

Test results from a properly used activated charcoal test will more closely reflect the average radon concentrations over the last three to four days of the test period. This happens because the radon collected by the activated charcoal has a radioactive half-life of only four days. Thus, much of the radon collected early in a seven day test has already begun to decay prior to the conclusion of the test.

Retesting

It is important to understand that radon levels can change at some point in the future. Therefore, it is important to retest when there is occupancy by a new owner, before and after a new addition to the house, alterations that could alter ventilation patterns, if major cracks are noticed in foundation walls or the slab, you begin using a ground contact area of the home not previously tested, or even recent nearby construction blasting or earthquakes. EPA recommends that homes be retested every 2-3 years. If the home has been previously mitigated or alterations are made to the mitigation system, retesting should be done.

Mitigation

When radon mitigation is necessary, it is advisable that a state-licensed or nationally- certified contractor be used to design and install the mitigation system. For easy to read mitigation information, go to the US EPA website and download a copy of the Consumer's Guide to Radon Reduction.

For technical information, call (828) 684-0893. Office hours are Mon-Fri 8:30 to 5:30 EASTERN
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Web Site: <http://www.radon.com> Email to: info@radon.com

West Point Military Academy
600 Thayer Road
West Point, NY 10996-1726

<u>Building</u>	<u>Location</u>	<u>Test ID#</u>	<u>Results</u>	<u>Remarks</u>
Cullum Hall	Lower basement/Rm 1A	7234034	<0.3 pCi/l	Blank Duplicate
Cullum Hall	Lower basement/Rm 1A	7234035	<0.3 pCi/l	
Cullum Hall	Lower basement/Rm 1A	7234031	<0.3 pCi/l	
Cullum Hall	Lower basement/Rm 3B	7234027	<0.3 pCi/l	
Cullum Hall	Lower basement/Corridor	7234030	<0.3 pCi/l	
Cullum Hall	Basement/Pantry	7234029	<0.3 pCi/l	
Cullum Hall	Basement/Chair room	7234028	<0.3 pCi/l	
Cullum Hall	Basement/Room 6	7234025	1.2 +/- 0.2 pCi/l	
Lincoln Hall	Mechanical section corridor	7234014	3.1 +/- 0.3 pCi/l	
Lincoln Hall	Room B201	7234023	0.8 +/- 0.2 pCi/l	
Lincoln Hall	Classroom corridor	7234024	0.9 +/- 0.3 pCi/l	
Lincoln Hall	Room B116	7234026	0.8 +/- 0.3 pCi/l	
Lincoln Hall	Room B106	7234019	<0.3 pCi/l	
Lincoln Hall	Room 109	7234020	<0.3 pCi/l	
Lincoln Hall	Room B-100	7234021	4.6 +/- 0.3 pCi/l	
Lincoln Hall	Room B-120	7234015	1.1 +/- 0.3 pCi/l	
Lincoln Hall	Room B-121	7234016	1.0 +/- 0.3 pCi/l	
Lincoln Hall	Room B-123	7234017	0.7 +/- 0.3 pCi/l	
Lincoln Hall	Room B-108	7234022	<0.3 pCi/l	
Lincoln Hall	Room B-103	7234018	1.1 +/- 0.3 pCi/l	



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October 26, 2018

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234016
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B121 West Point, NY 10996-1726	7234016	2018-10-26	1.0 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

ATTENTION NEW YORK STATE RESIDENT
This test was analyzed by Air Chek, Inc. NY ELAP Lab ID 11441
For further technical advice and assistance contact:

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2 University Place
Albany, New York, 12203
or call 800-458-1158

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Air Chek
NRPP Lab ID: 101138 AL
NY ELAP Lab ID 11441
October 26, 2018

Radon Measurement Technician

Precision Inspections
Ken Carr
223 W 21st St Apt 4h
New York, NY 10011-3138
646-247-1867

Device Information

Pro Chek Activated Charcoal
Serial#: 7234021
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B100 West Point, NY 10996-1726	7234021	2018-10-26	4.6 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA recommendation for test results in this range (4 to 8 pCi/L) is to conduct either a short- or long-term follow-up measurement. If, however, this is a follow-up (confirming) test, it is recommended that you take remedial action to reduce these radon levels.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234026
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd Rm B116 West Point, NY 10996-1726	7234026	2018-10-26	0.8 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Radon Measurement Technician

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234015
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B120 West Point, NY 10996-1726	7234015	2018-10-26	1.1 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234018
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B103 West Point, NY 10996-1726	7234018	2018-10-26	1.1 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234014
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 9:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement B2 600 Thayer Rd West Point, NY 10996-1726	7234014	2018-10-26	3.1 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA recommendation for results in this range (2.0 to 3.9 pCi/L) is to conduct further tests to determine the true annual average, ideally with a long-term test kit. If the result remains between 2 and 4 there is little short-term risk, but you should consider fixing your home. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234024
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 9:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd West Point, NY 10996-1726	7234024	2018-10-26	0.9 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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646-247-1867

Device Information

Pro Chek Activated Charcoal
Serial#: 7234019
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B106 West Point, NY 10996-1726	7234019	2018-10-26	< 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. Test results in this range(0.5 pCi/L or less) are, for all practical purposes, equivalent to the radon levels found in fresh air. However, if you make any structural changes or start to use a lower level of the building more frequently you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234017
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B123 West Point, NY 10996-1726	7234017	2018-10-26	0.7 ± 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234023
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 9:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement B2 600 Thayer Rd B201 West Point, NY 10996-1726	7234023	2018-10-26	0.8 ± 0.2 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. The EPA indicates that there is little short-term risk with test results in this range (0.6 to 1.9 pCi/L). However, because radon levels fluctuate daily, as well as seasonally, you may want to retest during another season. Additionally, if you make any structural changes or start to use a lower level of the building more frequently, you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234022
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B108 West Point, NY 10996-1726	7234022	2018-10-26	< 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. Test results in this range(0.5 pCi/L or less) are, for all practical purposes, equivalent to the radon levels found in fresh air. However, if you make any structural changes or start to use a lower level of the building more frequently you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

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Device Information

Pro Chek Activated Charcoal
Serial#: 7234020
Analyzed by: Air Chek

Initial Radon Test Information

Dates of Test: 2018-10-23 @ 10:00 am to 2018-10-25 @ 12:00 pm

<u>Property Address</u>	<u>Test Number</u>	<u>Analysis Date</u>	<u>Result</u>
Basement 600 Thayer Rd B109 West Point, NY 10996-1726	7234020	2018-10-26	< 0.3 pCi/l

Interpreting your Test Result

The US EPA action level for indoor radon is 4.0 pCi/L. Test results in this range(0.5 pCi/L or less) are, for all practical purposes, equivalent to the radon levels found in fresh air. However, if you make any structural changes or start to use a lower level of the building more frequently you should test again.

- No tampering was observed during the radon test.

The subject home described has been tested for the presence of radon gas according to US EPA short-term testing protocols. The test and analysis have been performed to comply with EPA's *Home Buyer's and Seller's Guide to Radon*. This report represents the average radon concentration at the time of sampling and at the specific location in the building. However, it must be noted that radon concentrations will vary from day to day and from season to season.

ATTENTION NEW YORK STATE RESIDENT
This test was analyzed by Air Chek, Inc, NY ELAP Lab ID 11441
For further technical advice and assistance contact:

Bureau of Environmental Radiation Protection
2 University Place
Albany, New York, 12203
or call 800-458-1158

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Your health risk

The primary health risk from long-term exposure to radon is lung cancer. The risk of developing a lung cancer from radon exposure depends both on how much radon is present and how long you are exposed to radon. The higher the radon level or the longer the time of exposure, even if the levels are relatively low, the greater the risk. Exposures up to 4 pCi/L may present some risk of contracting lung cancer to more sensitive occupants, especially children and those who live with smokers. The US Congress set as a goal the lowering of radon levels in buildings to equal the levels of outside air.

PERFORMING RADON TESTS FOR A REAL ESTATE TRANSACTION

US EPA protocols state that when using passive devices, such as activated charcoal tests, two short-term tests should be conducted, either together or sequentially, at the same location in the building. The tests should be averaged together and if the average is 4.0 pCi/L or higher, radon mitigation is recommended. Even if the average is below 4.0 pCi/L, the buyers should consider testing in a different season or deploy a long-term test device to assess their long-term risks. It is **highly recommended** that any property transaction tests be conducted by a non-interested third party. To locate a listed or certified radon tester, contact your state radon office or visit our website at <http://www.neha-nrpp.org> to download a list of NEHA-NRPP certified testers. You should also visit the EPA website to download a copy of EPA's Home Buyer's and Seller's Guide to Radon.

Radon Test Device Placement

The US EPA recommends that testing device(s) be placed in the lowest level of the home that could be used regularly, whether it is finished or unfinished. Conduct the test in any space that could be used by the buyer as a bedroom, play area, family room, den, exercise room, or workshop. Based on their client's intended use of the space, the qualified testing professional should identify the appropriate test location and inform their client (buyer). Do not test in a closet, stairway, hallway, crawl space or in an enclosed area of high humidity or high air velocity. An enclosed area may include a kitchen, bathroom, laundry room or furnace room.

Variations in Radon Levels

When tests are performed in different seasons or under different weather conditions, the initial screening and follow-up tests may vary considerably. Radon levels can vary significantly between seasons, so different values **are to be expected**. Even during normal weather, indoor radon levels may rise and fall by a factor of two on a daily cycle; for example, from 5 pCi/L to 10 pCi/L in 24 hours. During rapidly changing or stormy weather, the levels may change more dramatically. Because continual changes in radon levels are considered normal, expose the testing device for as long as is practical, while following the manufacturer's recommendations. This, of course, provides a better overall average of the measurement.

If you are comparing tests, or are averaging a series of tests, bear in mind that any radon test returns only the average of the levels present during a **specific period of time** at the **precise location** of the test. Conditions during a different test period or at a different location in the building are **expected to be different**.

Test results can also vary if the radon test instructions were not carefully followed. A laboratory measuring radon in samples taken outside the lab **must rely on the person conducting the test**. For example, the wrong starting or ending date of a test will significantly affect the calculated result. The location of each radon test can also influence the result. For example, a test placed in the blowing air stream of a fan is likely to collect more radon than it would under normal conditions. Also, three tests conducted in one home, but in three different rooms, **would be expected to have at least slightly different test results**.

Test results from a properly used activated charcoal test will more closely reflect the average radon concentrations over the last three to four days of the test period. This happens because the radon collected by the activated charcoal has a radioactive half-life of only four days. Thus, much of the radon collected early in a seven day test has already begun to decay prior to the conclusion of the test.

Retesting

It is important to understand that radon levels can change at some point in the future. Therefore, it is important to retest when there is occupancy by a new owner, before and after a new addition to the house, alterations that could alter ventilation patterns, if major cracks are noticed in foundation walls or the slab, you begin using a ground contact area of the home not previously tested, or even recent nearby construction blasting or earthquakes. EPA recommends that homes be retested every 2-3 years. If the home has been previously mitigated or alterations are made to the mitigation system, retesting should be done.

Mitigation

When radon mitigation is necessary, it is advisable that a state-licensed or nationally- certified contractor be used to design and install the mitigation system. For easy to read mitigation information, go to the US EPA website and download a copy of the Consumer's Guide to Radon Reduction.

For technical information, call (828) 684-0893. Office hours are Mon-Fri 8:30 to 5:30 EASTERN
You can reach us by Fax at (828) 684-8498 or write to Air Chek, Inc., Box 2000, Naples, NC 28760
Web Site: <http://www.radon.com> Email to: info@radon.com



Universal Waste Survey Report

Cullum Hall

USMA West Point NY

Prepared for: Mr. Terry Allen
Mason and Hanger

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1.0 PROJECT OVERVIEW

1.0 PROJECT OVERVIEW

1.1 Purpose

The OAK Group, Inc. (OAK) was requested by Mason and Hanger to perform a Universal Waste Inspection of Cullum Hall at the United States Military Academy located in West Point, NY. The purpose of the investigation was to assess the presence of polychlorinated biphenyl's (PCB's), mercury, freon and other universal wastes. The site inspection was performed on October 22, 2018.

Fluorescent light ballasts contain capacitors that could be filled with PCB-laden dielectric fluid. PCB's may also be found in other mechanical, electrical and hydraulic devices. Generally, if the ballasts are not marked "No PCB's", they are assumed to contain PCB's. Accordingly, they should be containerized (i.e. 55-gallon drums) for characterization and disposal in a Toxic Substances Control Act (TSCA)-approved landfill.

Fluorescent light tubes and thermostat switch bulbs contain mercury and should also be properly packaged (i.e. cardboard boxes) and transported to a recycling facility prior to any demolition activities.

Ionization smoke detectors or fire alarms may contain the radioactive element Americium-241. When these detectors are removed they should be checked for a radioactive symbol. If they are ionization type detectors, they should be disposed of as hazardous waste.

1.2 Personnel

The Universal Waste Inspection was performed by Ms. Melissa Billingsley. The report was reviewed by Mr. Eduard Eichen, CIH.

1.3 Procedures

A. Inspection

Light ballasts were inspected for 'No PCB' labels. Fluorescent light tubes, containing mercury, were counted. The structures were inspected for any materials/equipment that could potentially contain hazardous substances.

1.4 Conclusions

A representative number of light ballasts were inspected. The light ballasts within Cullum Hall did contain 'No PCB's' labels. If light ballasts are discovered that do not have the 'No PCBs' label they should be assumed to contain PCB's and be

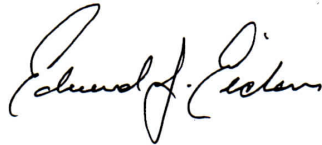
containerized (i.e. 55-gallon drums) for characterization and disposal in a Toxic Substances Control Act (TSCA)-approved landfill.

Mercury-containing fluorescent light tubes have been identified throughout the Cullum Hall. Fluorescent light tubes can be packaged in cardboard boxes and disposed of at a recycling facility if they are to be removed.

Fire alarms were observed throughout the Cullum Hall. Upon removal, the alarms should be checked for a radioactivity symbol. If they are determined to be ionization type detectors, they should be disposed of as hazardous waste.

Please refer to Section 2.0, Inventory of Universal Waste Materials, for specific quantities of universal waste.

If you should have any questions please do not hesitate to contact me at (856) 377-0060 or eje@oakgroup.net.

A handwritten signature in black ink, appearing to read 'Eduard J. Eichen', written in a cursive style.

Eduard J. Eichen, CIH

2.0 INVENTORY OF UNIVERSAL WASTE MATERIALS

2.0 Inventory of Universal Waste Materials

**United States Military Academy
Cullum Hall
West Point, NY**

	Mercury- Containing Fluorescent Light Tubes (Linear Feet)	Fire Alarms
<u>Location</u>		
G1 Floor	800	2
G2 Floor	800	2
Basement Mechanical	300	1
1st Floor	60	2
2nd Floor	0	2
3rd Floor	0	1

*The listed amounts of each universal waste are estimates and should be confirmed by removal contractor.

INTERIOR FINISH INVESTIGATION
CULLUM HALL
United States Military Academy at West Point



Prepared for:
US Military Academy at West Point
West Point, NY

Prepared by:
Jablonski Building Conservation
40 West 27th Street, Suite 1201
New York, NY 10001

January 15, 2020

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Appendix A: Paint Sample Locations

Appendix B: ChromoChronologies

Appendix C: Photomicrographs

INTRODUCTION

As part of the design for the renovation and restoration of Cullum Hall, Jablonski Building Conservation, Inc. (JBC) performed a paint color investigation of the interior finishes of the historically significant spaces. These spaces included the Main Stair, the East Stair, the Main Hall, the Reception Room, the Pershing Room, the Memorial Hall/Ballroom, and the Balcony. The purpose of this investigation was to determine the earliest known finish layer. Architectural Conservators Helen M. Thomas-Haney and Danielle Pape from JBC visited the site on November 12 and December 3, 2019 and removed a total of 185 paint samples from interior elements; however only 130 samples were analyzed. Access to the upper portions of walls and ceilings was provided by David Follett from Quality Restoration Works. The number of paint samples and sample locations were determined by the conservators.

METHODOLOGY

Samples measuring approximately three to six millimeters in length were removed using a scalpel for further examination. A minimum of three paint chip samples was taken from each element. In most cases, in situ cratering and close-up examination of the surfaces was performed to quickly determine the status (degree of surviving original paints) and complexity of the finishes before sample collection.

Upon returning to the laboratory, the samples were broken to reveal fresh cross-sections. Each sample was mounted in a clear resin and examined in reflected light under illumination conditions that simulate daylight (fiber optic illuminator) for the purpose of color-corrected stratigraphy identification. The samples were examined microscopically during the investigation using a Motic Stereo Zoom microscope with 10X - 63X magnification and a Zeiss Axioskop 40 polarizing light microscope with ultraviolet illuminator.

All layers have been recorded using a descriptive color name rather than a standardized color notation system. This was done to document the seriation of the samples for comparative purposes prior to the identification of early layers using both a standardized universal color system (Munsell) and a commercial paint color system (Benjamin Moore, Pittsburgh Paints, Sherwin-Williams).

Each paint layer was identified as a primer, base coat, glaze, or finish coat. While primers did not usually affect the color of the finish coat, they were important for the opacity and richness of the finish.

Under illumination conditions that simulate natural daylight, the original finish layers were matched to a commercially available paint system. A color designation and a representative color swatch from this system have been provided in the Summary section of this report. A chromochronology of each sample is included in Appendix B, and photomicrograph of each sample is included in Appendix C of this report.

PAINT SAMPLE LOCATIONS**Sample # Description**Main Stair

MS-001	Wall
MS-002	Band between the First and Second Floors
MS-003	Cornice, Top Acanthus Leaf Molding
MS-004	Cornice, Flat under Acanthus Leaf Molding
MS-005	Cornice, Soffit at Dentils
MS-006	Cornice, Dentil
MS-007	Cornice, Molding under Dentils
MS-008	Cornice, Cyma under Dentil
MS-009	Cornice, Calf's Tongue Molding
MS-010	Cornice, Flat Molding under Calf's Tongue Molding
MS-011	Cornice, Bottom "Metallic" Molding
MS-012	Cornice, Architrave
MS-013	Pilaster
MS-014	Pilaster, Corinthian Capital
MS-015	Underside of Stairs
MS-016	Underside of Stairs, Bead Molding
MS-017	Stair Railing

East Stair

ES-001	Wall at B1
ES-002	Chair Rail (trim)
ES-003	Ceiling under Stairs
ES-004	Molded Band between Floors
ES-005	Metal Railing

Main Hall

MH-001	Wall Field
MH-002	Wall Base
MH-003	Ceiling
MH-004	Pilaster
MH-005	Pilaster Capital
MH-006	Door to West Vestibule
MH-007	Door Frame to West Vestibule
MH-008	Door Frame to West Vestibule, Bracket
MH-009	Door Frame to West Vestibule, Top bronze molding
MH-010	Door Frame to West Vestibule, White Moldings
MH-011	Door Frame to West Vestibule, Background to Dentils
MH-012	Door Frame to West Vestibule, Lower Bronze Molding
MH-013	Cornice, Top Bronze Molding
MH-014	Cornice, Top Flat Molding
MH-015	Cornice, Corona Soffit

MH-016	Cornice, Dentil Background
MH-017	Cornice, Dentil
MH-018	Cornice, molding below Dentils
MH-019	Cornice, Egg & Dart and Bead molding
MH-020	Cornice, Lower Flat Molding

Reception Rooms

RR-001	North Reception Room Wall
RR-002	South Reception Room Wall Base
RR-003	North Reception Room Ceiling
RR-004	South Reception Room West Closet Door Frame
RR-005	Pocket Door Frame
RR-006	Pocket Door
RR-007	North Reception Room Picture Rail
RR-008	North Reception Room, Corona Soffit
RR-009	North Reception Room Cornice, White Moldings
RR-010	North Reception Room Cornice above Grille
RR-011	North Reception Room Cornice, Dentil Background
RR-012	North Reception Room, Cornice, Top "Bronze" Molding

Pershing Room

PR-001	Wall, Outer Frame
PR-002	Wall Grille, Cornice
PR-003	Wall Grille
PR-004	Ceiling
PR-005	Ceiling Beam Soffit, Center
PR-006	Pilaster
PR-007	Pilaster, Molding under Capital
PR-008	Pilaster Capital
PR-009	Cornice, Top Molding
PR-010	Cornice, Flat Molding under Top Molding
PR-011	Cornice, Corona Soffit
PR-012	Cornice, Bronze Molding above Dentil
PR-013	Cornice, Dentil Background
PR-014	Cornice, Dentil
PR-015	Cornice, Molding under Dentil
PR-016	Cornice, Bronze Molding under Dentil
PR-017	Cornice, Flat Molding above Calf's Tongue Molding
PR-018	Cornice, Background to Calf's Tongue Molding
PR-019	Cornice, Bronze Flat under Calf's Tongue Molding
PR-020	Cornice, Flat below Calf's Tongue Molding
PR-021	Cornice, Bottom Bead Molding
PR-022	Cornice, Architrave
PR-023	Door Surround, Bronze Molding above Dentil
PR-024	Door Surround, Dentil
PR-025	Door Surround, Flat Area above Door

PR-026 Door Surround Bracket
PR-027 Door

Memorial Hall--Ballroom

Ball-001 Coffor Molding
Ball-002 Frame around Coffor
Ball-003 Coffor Background to Rosette
Ball-004 Rosette in Coffor
Ball-005 Cornice Modillion
Ball-006 Cornice, Outer Frame between Modillions
Ball-007 Cornice, Gilded Frame between Modillions
Ball-008 Cornice, Center Panel between Modillions
Ball-009 Cornice, Egg & Dart Molding
Ball-010 Cornice, Bronze Strip between Dentils
Ball-011 Cornice, Dentil
Ball-012 Cornice, Egg & Dart Molding below Dentils
Ball-013 Frieze, Background to Letters
Ball-014 Frieze, Lettering, "U" in "PUERTO RICO"
Ball-015 Top of Architrave
Ball-016 Top Flat Band in Architrave
Ball-017 Top Bronze Band in Architrave
Ball-018 Second Bronze Band in Architrave
Ball-019 Band in Architrave between 2nd and 3rd Bronze Moldings
Ball-020 3rd Bronze Molding in Architrave, Background
Ball-021 3rd Bronze Molding in Architrave, Swag
Ball-022 White Molding between 3rd and Bottom Bronze Moldings
Ball-023 Lowest Bead Molding in Architrave
Ball-024 Lowest White Band in Architrave
Ball-025 Greek Key Motif
Ball-026 South Doorway, Acanthus Leaf Molding in Cornice
Ball-027 South Doorway, Cornice Dentil
Ball-028 South Doorway, Calf's Tongue Molding
Ball-029 South Doorway, Cornice, Coin Molding
Ball-030 South Doorway, Cornice, Egg & Dart above Caryatid
Ball-031 Caryatid
Ball-032 Caryatid Base
Ball-033 Caryatid Plinth Base
Ball-034 South Door
Ball-035 South Door Frame
Ball-036 Proscenium
Ball-037 Stage Front Cornice
Ball-038 Stage Front
Ball-039 Column Capital
Ball-040 Column Shaft
Ball-041 Wall Base
Ball-042 Grille Cornice

Ball-043 Grille

Mezzanine/Balcony

Balc-001	Lower Wall
Balc-002	Ceiling
Balc-003	Pilaster
Balc-004	Pilaster, Bronze molding
Balc-005	Pilaster capital, bronze element
Balc-006	Picture Rail
Balc-007	Cornice, white Moldings
Balc-008	Cornice, bronze Moldings

Photographs of sample locations can be found in Appendix A.

BRIEF HISTORY AND DESCRIPTION

Cullum Hall was designed by McKim, Mead and White Architects and constructed between 1896 and 1899. Major General George W. Cullum, class of 1833, Captain of Engineers, USMA from 1848-1855, and Superintendent from 1864 to 1866, died in 1892 and left \$250,000 for the construction of a memorial hall; statues, busts, and portraits of distinguished deceased officers and graduates; and the continuation of the publication of General Cullum's biographical register of graduates.¹

Of McKim, Mead and White's three buildings at West Point, Cullum Hall is the most architecturally significant. Its American Renaissance classicism is rare among the Academy's neo-gothic designs. The building is rectangular (approximately 143' by 66') with a five-bay façade. There are two principal floors, a gallery, and two basement floors.

¹ "U.S. Military Academy-Cullum Memorial Hall HABS No.NY-5708-42" National Park Service, Department of the Interior: Washington, DC, p3

Cullum was instrumental in the Association of Graduates that was formed in 1869 with Sylvannus Thayer as its president. In 1872 the presidency passes to Cullum and to Charles Davies. With Thayer's help, Cullum began a biographic register of alumni. This became "General Cullum's Biographical Register of the Officers and Graduates of the United States Military Academy".

SUMMARY OF FINISHES

The interior spaces of the first and second floors of Cullum Hall were treated as a whole and decorated with classical elements in keeping with the style of the exterior. The walls display commemorative bronze plaques and cannons and the applied finishes in each room compliment the bronze elements and often mimic bronze.

Walls and flat elements of the cornices were painted with a yellowish white base coat topped with a thin yellowish gray glaze. The cornice and ceiling moldings were decoratively finished with “silver” colored leaf topped with a dark grayish brown varnish and black, brown, green, and blue paints worked into the recesses of the moldings. Some moldings in the cornice are not leafed, and the bronze effect is achieved using a blue green base coats topped with brown varnishes and glazes. The wooden doors on the first floor are painted with a yellowish white base coat topped with a strong yellow brown varnish. The wooden doors on the second floor Memorial Hall/Ballroom are faux-finished to mimic bronze. They contain “silver” colored leaf topped with brown varnish.

The walls, doors, ceilings, and flat surfaces in the cornice have been over-painted several times. However, many moldings in the cornices of all the rooms and the ceiling of the Memorial Hall have remained untouched and the exposed finish is the original finish. For elements that have been repainted, the current finish is very similar to the original which suggests a recent restoration based on a finishes investigation.

Paint Technologies Used at Cullum Hall

While, ready-mixed paints were introduced to the American market in the late 1860s, hand-mixed paints continued to be used well into the twentieth century. Painters mixed the paint by adding ground pigment and lead or zinc into a base of linseed oil. A drier was often added to the mixture to provide more uniformity to the color and to speed the drying process. Hand-mixing of paint often resulted in slight variations of the same color. Several blue green base layers and varnishes found at Cullum Hall are very similar in color. The differences can be attributed to hand-mixing, as well as aging.

The original plaster and wood were primed with shellac to prevent the substrate from absorbing the paint. The earliest finishes found in Cullum Hall are zinc-based paints. Lead paints are present as later finishes.

Glazing

Glazing involves the application of a translucent or semi-translucent glaze color over a base coat of paint. Although the base coats were generally light in color, glazes were also used on dark colors to give dimension to the finish, change the color and sheen of the base coat, or to highlight certain elements. The color of the glaze often complemented the base color, but it could be contrasted with the base coat to produce a layered effect.

The applied glaze could be thinned using a brush or cloth immediately after brushing it on the surface to produce an antique appearance or highlights. The glaze could also be stippled or manipulated in other ways to give texture to the surface of the plaster.

Gilding/Leafing

Leafing or gilding is a process by which metallic leaf is applied to a surface treated with size. The size allows the leaf to adhere to the ground, which is often a surface painted with oil-based paint. Size may consist of a japan varnish, glue and water, or an “old, fatty linseed oil, plus a little japan drier and a little chrome yellow oil color.” The color of the ground and size is important to the appearance of the gilded surface as the ground color is visible under the thin leaf. The leaf is applied to the size with a static-charged soft gilder’s brush, and may be varnished to impart additional color to the leaf or to provide a glossy surface finish. A colored varnish may be applied to silver or aluminum leaf to give the element a more rich appearance. This inexpensive method for producing gold-colored leaf involved applying a spirit gold lacquer over the aluminum or silver leaf. A varnish or lacquer was also applied to leaf to delay oxidation and tarnishing of the surface.

Varnish

Varnish is a transparent, hard, protective finish or film primarily used in wood finishing, but which can also be used in faux finishes such as graining and marbleizing. Varnish is traditionally a combination of a drying oil, a resin, and a thinner or solvent. Varnish finishes are usually glossy but may be designed to produce satin or semi-gloss sheens by the addition of flattening agents. While varnish itself has no color, pigments can be added to provide a more opaque finish.

FINDINGS

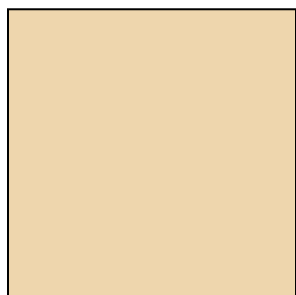
Main Stair

Walls (MS-001)

No original finishes were found on the samples from the wall or pilaster. The earliest finishes on those samples matches the second and third finishes on the flat elements of the cornice. The Main Stair is a high-traffic area and refinishing would be common. These samples retained approximately 12 finishes.

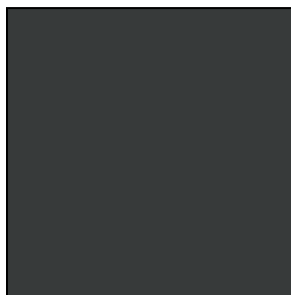
Band between First and Second Floor (MS-002)

The original finish of paneled band between the first and second floors of the Main Stair is a complex finish consisting of a yellow primer, followed by a pale yellow (between Munsell 2.5Y 9/2 & 9/4) base coat matching Benjamin Moore 192 “Key West Ivory”, topped with a blackish green (Munsell 10G 2/1) decorative layer matching Sherwin Williams 6994 “Greenblack” and a dark grayish brown (Munsell 5YR 2/1) decorative layer matching Sherwin Williams 2735 “Rockweed”. It is likely that the effect of the colors in this complex finish is to simulate bronze. Later finishes include shades of green for a total of 6 finishes.



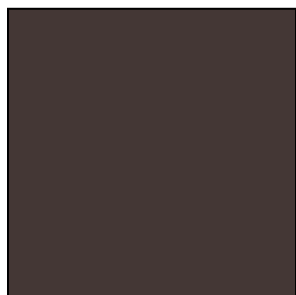
Base Coat
Band

Benjamin Moore
Color #192
Key West Ivory



Decorative Layer
Band

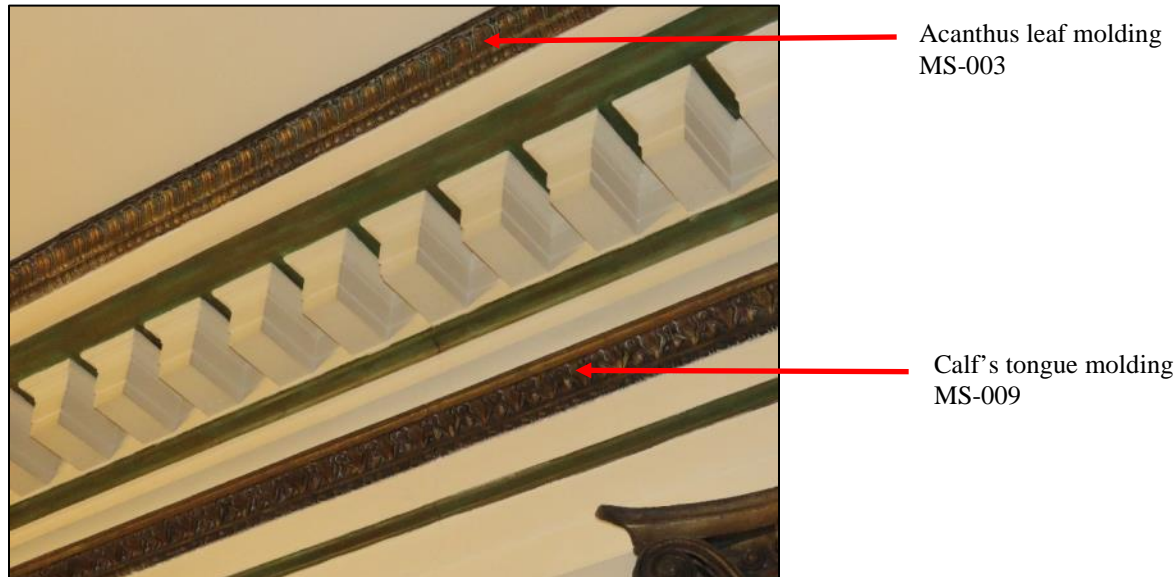
Sherwin Williams
Color #6994
Greenblack



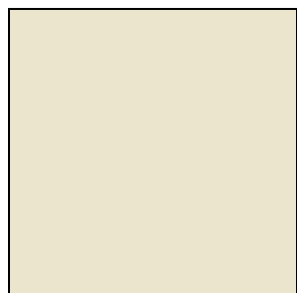
Decorative Layer
Band

Sherwin Williams
Color #2735
Rockweed

Cornice

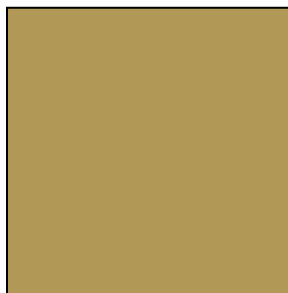


The original finish on the top acanthus leaf molding and the calf's tongue molding is the current finish. It is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 "Niveous", followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 "Egyptian Sand" and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 "French Roast". Black (Munsell N1.5/) paint matching Sherwin Williams 6991 "Black Magic" and dark green (Munsell 7.5G 3/4) paint matching Benjamin Moore 644 "Garden Cucumber" are found within the recesses of the moldings. The overall effect is to simulate real bronze with the verdigris occurring in the depressions.



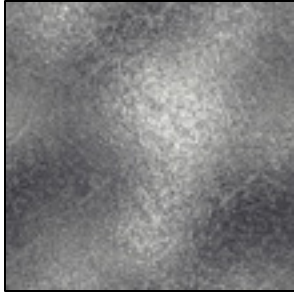
Primer
Cornice

Benjamin Moore
Color #OC-36
Niveous

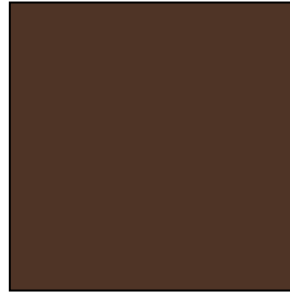


Size
Cornice

Benjamin Moore
Color #266
Egyptian Sand



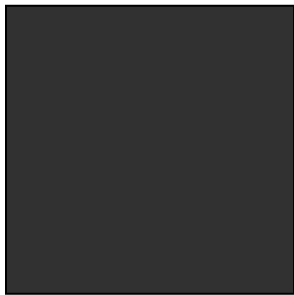
Metallic Leaf
Cornice



Varnish
Cornice

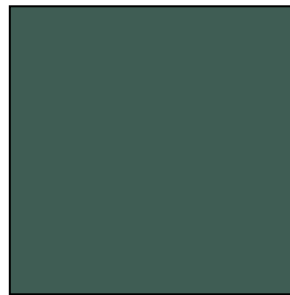
Sherwin Williams
Color #6069
French Roast

*This is not a paint. A transparent varnish
should be matched to this color.*



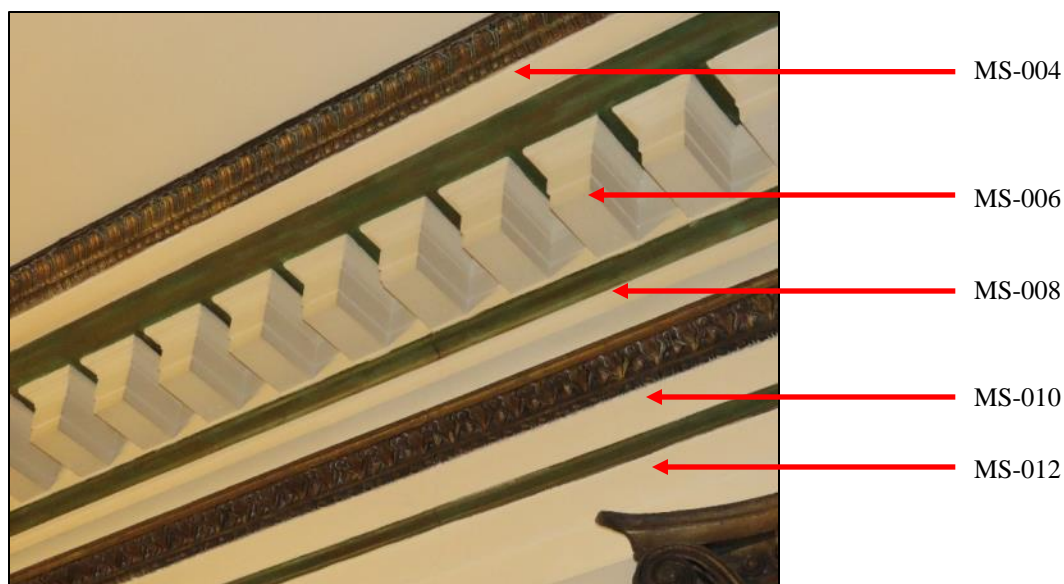
Decorative Layer
Cornice

Sherwin Williams
Color #6991
Black Magic

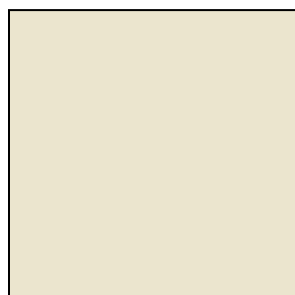


Decorative Layer
Cornice

Benjamin Moore
Color #644
Garden Cucumber

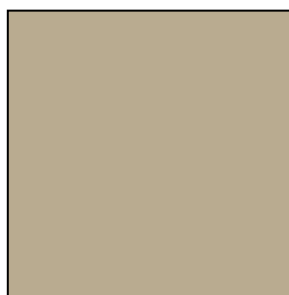


The moldings in the cornice that are currently painted light yellow, which include the flat molding under the acanthus leaf molding, the dentils, the cyma under the dentils, the flat molding under the calf's tongue molding, and the architrave, were originally finished with a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 "Niveous", followed by the yellowish gray (between Munsell 2.5Y 7/2 & 7/4) glaze matching Pittsburgh Paints PPG1102-4 "Prairie Dust". The glaze appears to have a high concentration of linseed oil which penetrated the base coat below. The overall appearance of the glaze on the base coat matches Pittsburgh Paints PPG1093-4 "Somber".



Primer and Base
Cornice

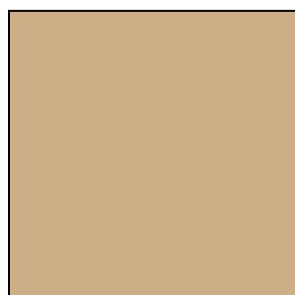
Benjamin Moore
Color #OC-36
Niveous



Glaze
Cornice

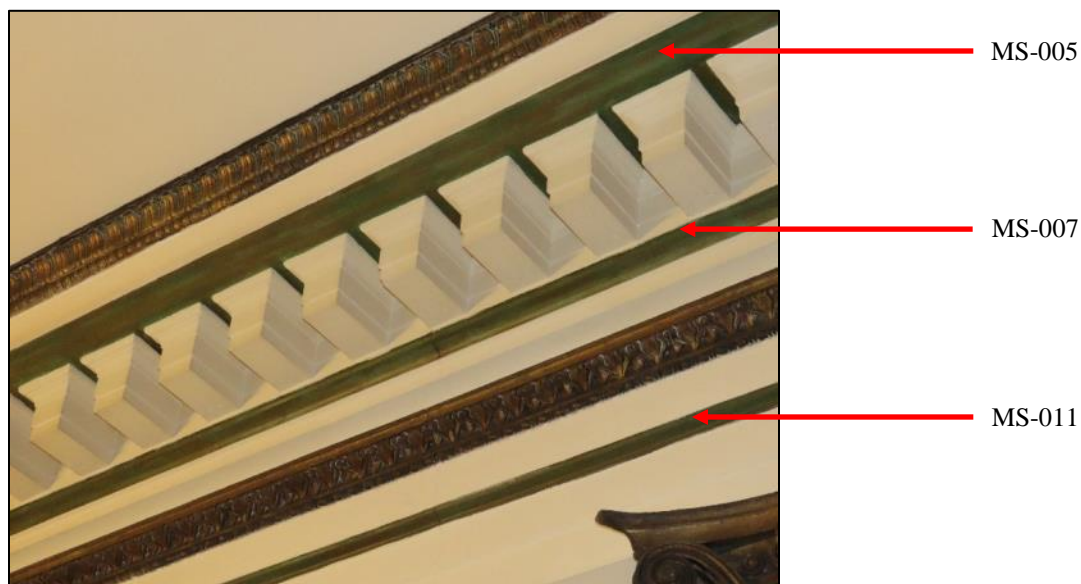
Pittsburgh Paints
Color #PPG1102-4
Prairie Dust

This is not a paint. A translucent glaze should be matched to this color.

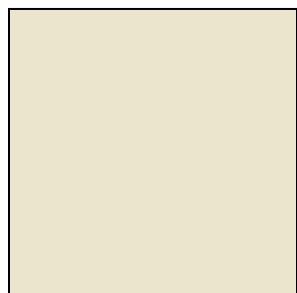


Overall Effect
Cornice

Pittsburgh Paints
Color #PPG1093-4
Somber

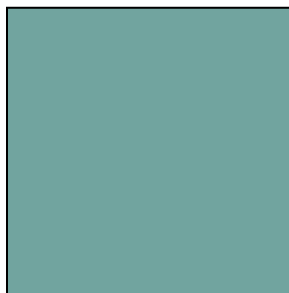


The original finish on the soffit at the dentils, the molding under the dentils, and the bottom molding is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) base coat/primer matching Benjamin Moore OC-36 “Niveous”, followed by a light blush green (approximately Munsell 2.5BG 6/4) base coat matching Pittsburgh Paints PPG1142-5 “Catalina”, topped with a dark grayish brown (Munsell 5YR 2/1) glaze matching Sherwin Williams 2735 “Rockweed” and a dark green (Munsell 7.5G 3/4) glaze matching Benjamin Moore 644 “Garden Cucumber”. While no metallic leaf was used to create this finish, the overall appearance simulates bronze. While this original finish is the current finish on the molding under the dentils and the bottom molding, the soffit contains an additon olive green colored and colorless varnish over the original finish.



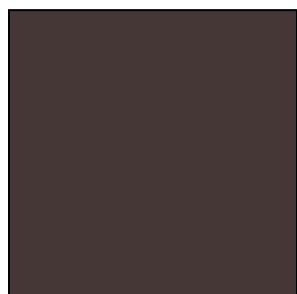
Base Coat
Cornice

Benjamin Moore
Color #OC-36
Niveous



Base Coat
Cornice

Pittsburgh Paints
Color #PPG1142-5
Catalina



Glaze
Cornice

Sherwin Williams
Color #2735
Rockweed

This is not a paint. A translucent glaze should be matched to this color



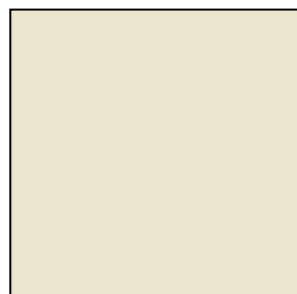
Glaze
Cornice

Benjamin Moore
Color #644
Garden Cucumber

This is not a paint. A translucent glaze should be matched to this color.

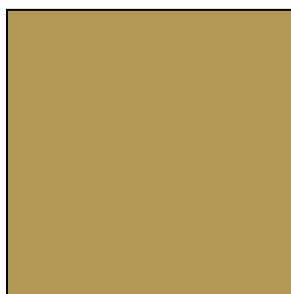
Corinthian Capital (MS-014) and Bead Molding under the Stairs (MS-016)

The original finish on the Corinthian capital and bead molding under the stairs is the current finish. It is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 "Niveous", followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 "Egyptian Sand" and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 "French Roast". Black (Munsell N1.5/) paint matching Sherwin Williams 6991 "Black Magic" and dark green (Munsell 7.5G 3/4) paint matching Benjamin Moore 644 "Garden Cucumber" are found within the recesses of the moldings. The overall effect is to simulate real bronze with the verdigris occurring in the depressions.



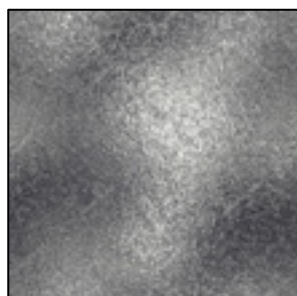
Primer
Cornice

Benjamin Moore
Color #OC-36
Niveous



Size
Cornice

Benjamin Moore
Color #266
Egyptian Sand



Metallic Leaf
Cornice



Varnish
Cornice

Sherwin Williams
Color #6069
French Roast

This is not a paint. A transparent varnish should be matched to this color.



Decorative Layer
Cornice

Sherwin Williams
Color #6991
Black Magic

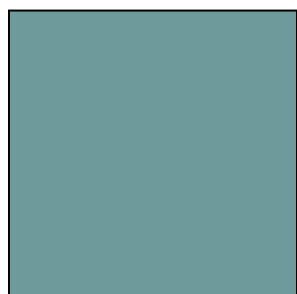


Decorative Layer
Cornice

Benjamin Moore
Color #644
Garden Cucumber

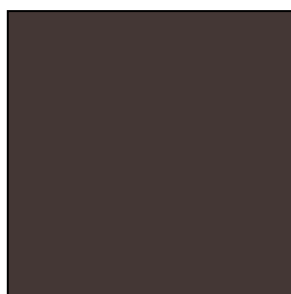
Railing (MS-017)

The original finish on the railing is a complex finish consisting of a red primer, followed by two layers of a light bluish green (between Munsell 7.5BG 6/4 & 5/4) base coat matching Pittsburgh Paints PPG 1146-5 “Palmetto”, topped with a dark grayish brown (Munsell 5YR 2/1) varnish matching Sherwin Williams 2735 “Rockweed”. The original specifications called out for the railing to be constructed of bronze. However, iron was substituted in a later addendum. The original complex finish was designed to most likely imitate bronze. Later finishes on the railing include shades of green. The current finish appears to be a recreation of the original finish.



Base Coat
Railing

Pittsburgh Paints
Color #PPG1146-5
Palmetto



Varnish
Railing

Sherwin Williams
Color #2735
Rockweed

This is not a paint. A transparent varnish should be matched to this color.

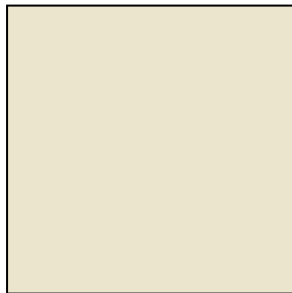
East Stair

Walls (ES-001) and Ceiling under the Stairs (ES-003)

No original finishes were found on the samples from the wall or the ceiling under the stairs. The earliest finishes on those samples matches the second finishes on the trim and Main Hall samples.

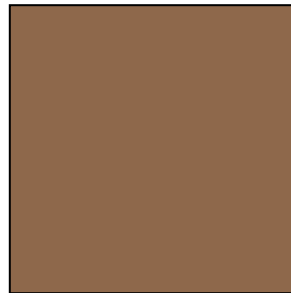
Wood Trim (ES-002)

The earliest finish found on the wood trim is complex finish consisting of a two layers of yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) base coat matching Benjamin Moore OC-36 “Niveous” followed by a strong yellowish brown (Munsell 10YR 4/6) varnish matching Pittsburgh Paints PPG1080-7 “Slippery Stone”. Subsequent finishes consist of several layers of yellow paints culminating in the current light blue green paint for a total of approximately 19 finishes.



Base Coat
Wood Trim

Benjamin Moore
Color #OC-36
Niveous



Varnish
Wood Trim

Pittsburgh Paints
Color #PPG1080-7
Slippery Stone

This is not a paint. A transparent varnish should be matched to this color.

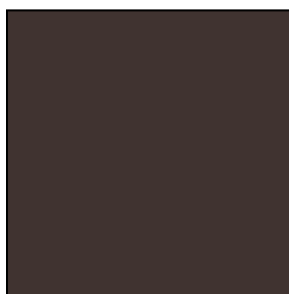
Band between First and Second Floor (ES-004)

The original finish of paneled band between the first and second floors of the East Stair is a complex finish consisting of a red primer, followed by a light bluish green (Munsell 2.5BG 6/4) base coat matching Pittsburgh Paints PPG1142-5 “Catalina”, topped with a dark grayish reddish brown (approximately Munsell 2.5YR 2/2) glaze matching Sherwin Williams 6006 “Black Bean”, and a blackish green (Munsell 10G 2/1) glaze matching Sherwin Williams 6994 “Greenblack”. It is likely that the effect of the colors in this complex finish is to simulate bronze. Though the colors are slightly different, it is possible that the general appearance was similar to the band in the Main Stair. Later finishes include shades of green for a total of 6 finishes.



Base Coat
Band

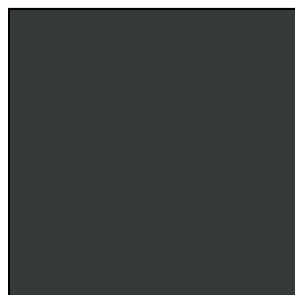
Pittsburgh Paints
Color #PPG1142-5
Catalina



Glaze
Band

Sherwin Williams
Color #6006
Black Bean

This is not a paint. A translucent glaze should be matched to this color.



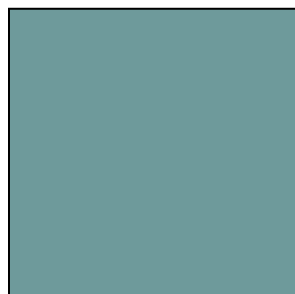
Glaze
Band

Sherwin Williams
Color #6994
Greenblack

This is not a paint. A translucent glaze should be matched to this color.

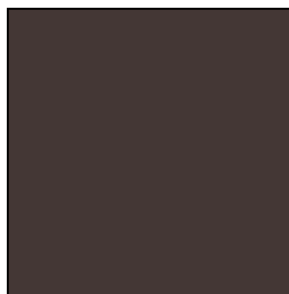
Railing (ES-005)

The original finish on the railing is a complex finish consisting of a red primer, followed by two layers of a light bluish green (between Munsell 7.5BG 6/4 & 5/4) base coat matching Pittsburgh Paints PPG 1146-5 “Palmetto”, topped with a dark grayish brown (Munsell 5YR 2/1) varnish matching Sherwin Williams 2735 “Rockweed”. The original specifications called out for the railing to be constructed of bronze. However, iron was substituted in a later addendum. The original complex finish was designed to most likely imitate bronze. Later finishes on the railing include shades of green. The current finish appears to be a recreation of the original finish.



Base Coat
Railing

Pittsburgh Paints
Color #PPG1146-5
Palmetto



Varnish
Railing

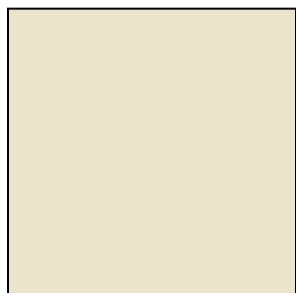
Sherwin Williams
Color #2735
Rockweed

This is not a paint. A transparent varnish should be matched to this color.

Main Hall

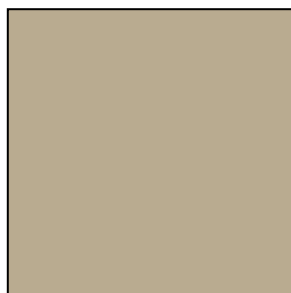
Walls (MH-001) and Ceiling (MH-003)

The earliest finish found on the walls and ceiling is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by the yellowish gray (between Munsell 2.5Y 7/2 & 7/4) glaze matching Pittsburgh Paints PPG1102-4 “Prairie Dust”. The glaze appears to have a high concentration of linseed oil which penetrated the base coat below. The overall appearance of the glaze on the base coat matches Pittsburgh Paints PPG1093-4 “Somber”. Later finishes consist of shades of yellow for a total of approximately 13 finishes.



Primer and Base
Walls and Ceiling

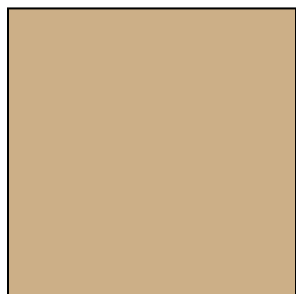
Benjamin Moore
Color #OC-36
Niveous



Glaze
Walls and Ceiling

Pittsburgh Paints
Color #PPG1102-4
Prairie Dust

This is not a paint. A translucent glaze should be matched to this color.

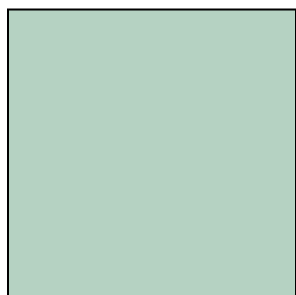


Overall Effect
Walls and Ceiling

Pittsburgh Paints
Color #PPG1093-4
Somber

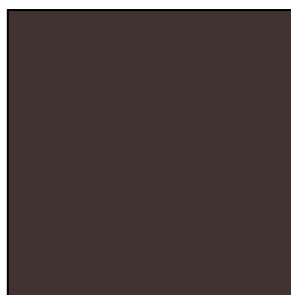
Wall Base (MH-002)

The earliest finish found on the wall base is a complex finish consisting of a very pale green (approximately Munsell 5G 8/2) primer and base coat matching Benjamin Moore 639 “Let It Rain” topped with a dark grayish reddish brown (approximately Munsell 2.5YR 2/2) glaze matching Sherwin Williams 6006 “Black Bean”. Later finishes include shades of green and bluish gray for a total of approximately 13 finishes.



Base Coat
Wall Base

Benjamin Moore
Color #639
Let It Rain



Glaze
Wall Base

Sherwin Williams
Color #6006
Black Bean

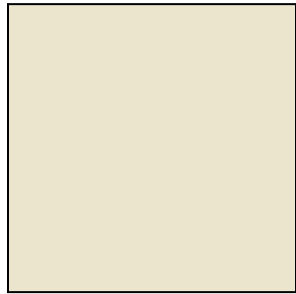
This is not a paint. A translucent glaze should be matched to this color.

Cornice



MS-013

The original finish on the top “bronze” molding of the cornice is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous” followed by a dark grayish brown (Munsell 7.5YR 2/2) glaze matching Sherwin Williams 6069 “French Roast”. A later yellow varnish was applied over the original finish.



Primer and Base
Cornice-Top Bronze
Molding

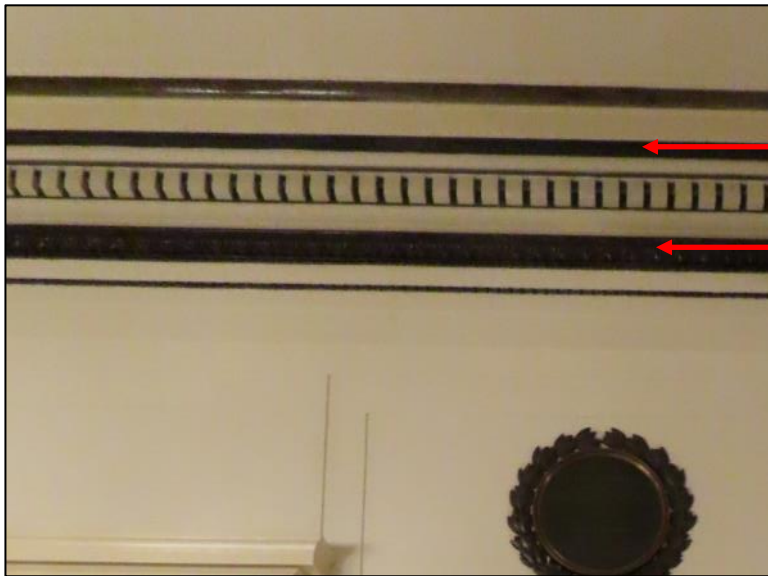
Benjamin Moore
Color #OC-36
Niveous



Glaze
Cornice-Top Bronze
Molding

Sherwin Williams
Color #6069
French Roast

This is not a paint. A translucent glaze should be matched to this color.

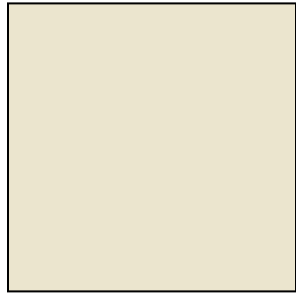


MH-015

MH-019

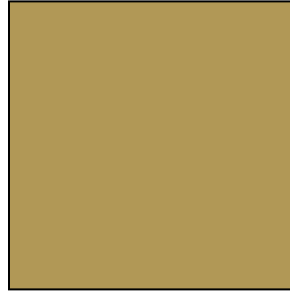
The original finish on the cornice soffit and egg & dart molding is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by a dark yellow (5Y 6/6) size matching Benjamin Moore 266 “Egyptian Sand” and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”. Black (Munsell N1.5/) paint matching Sherwin Williams 6991 “Black Magic” and dark green (Munsell 7.5G 3/4) paint matching Benjamin Moore 644 “Garden Cucumber” are found within the recesses of the moldings. The overall effect is to simulate real bronze with the verdigris occurring in the depressions.

A layer of a yellow brown varnish has been applied over the original finish which has changed the appearance of the leafed elements. The varnish was most likely applied as a means to refresh the original finish.



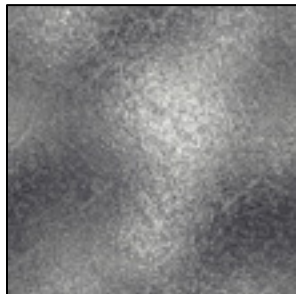
Primer
Cornice—Soffit and
Egg & Dart

Benjamin Moore
Color #OC-36
Niveous

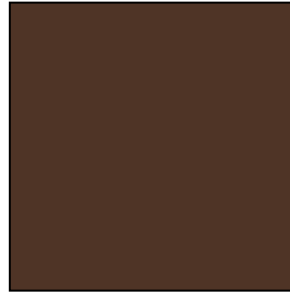


Size
Cornice—Soffit and
Egg & Dart

Benjamin Moore
Color #266
Egyptian Sand



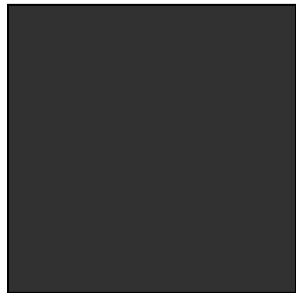
Metallic Leaf
Cornice—Soffit and
Egg & Dart



Varnish
Cornice—Soffit and
Egg & Dart

Sherwin Williams
Color #6069
French Roast

*This is not a paint. A transparent varnish
should be matched to this color.*



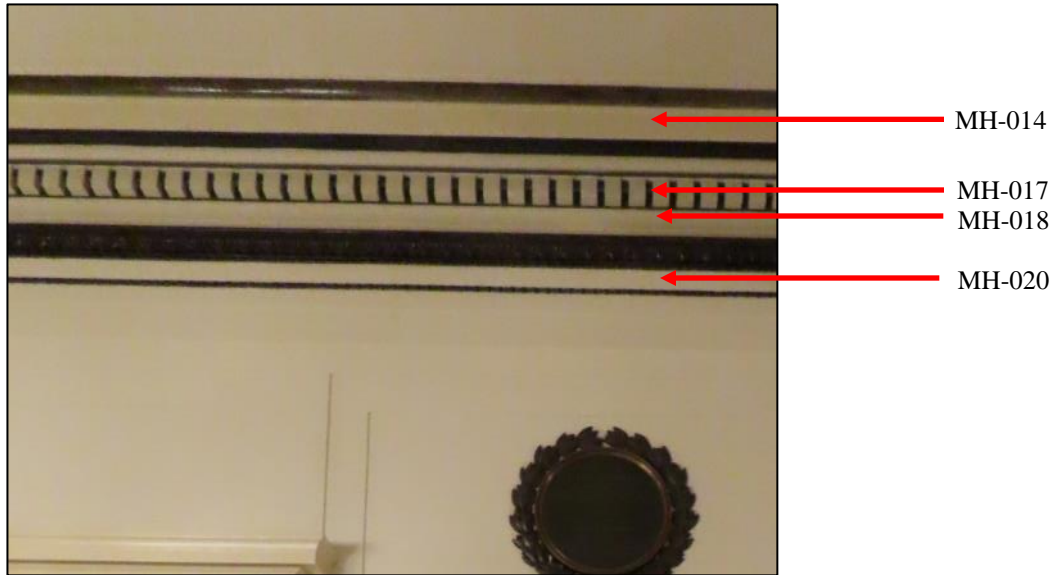
Decorative Layer
Cornice—Soffit and
Egg & Dart

Sherwin Williams
Color #6991
Black Magic

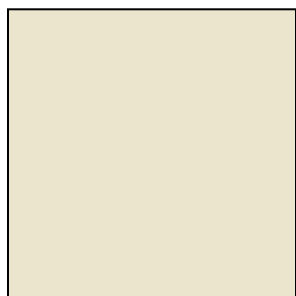


Decorative Layer
Cornice—Soffit and
Egg & Dart

Benjamin Moore
Color #644
Garden Cucumber

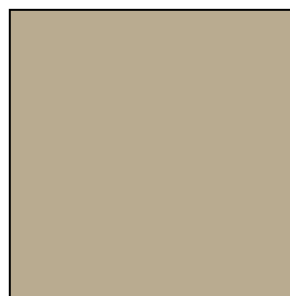


The earliest finish found on the light yellow elements of the cornice is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by the yellowish gray (between Munsell 2.5Y 7/2 & 7/4) glaze matching Pittsburgh Paints PPG1102-4 “Prairie Dust”. The glaze appears to have a high concentration of linseed oil which penetrated the base coat below. The overall appearance of the glaze on the base coat matches Pittsburgh Paints PPG1093-4 “Somber”. Later finishes consist of shades of yellow for a total of approximately 13 finishes.



Primer and Base
Cornice

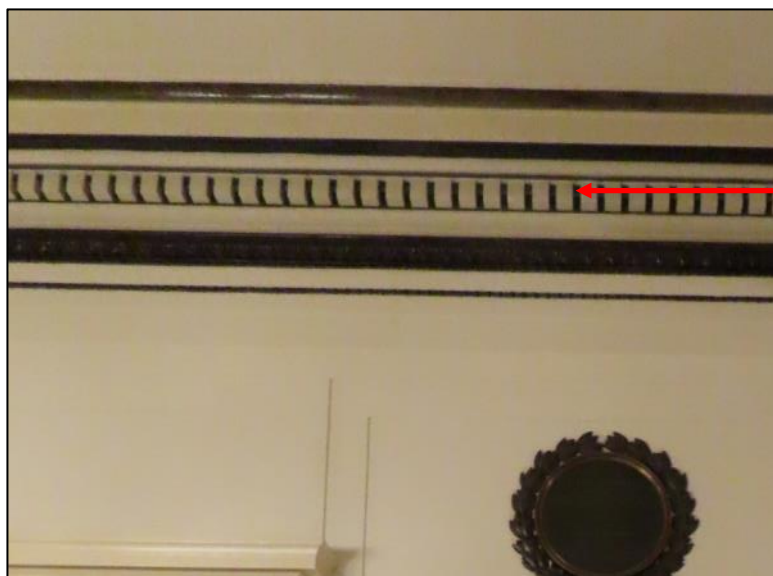
Benjamin Moore
Color #OC-36
Niveous



Glaze
Cornice

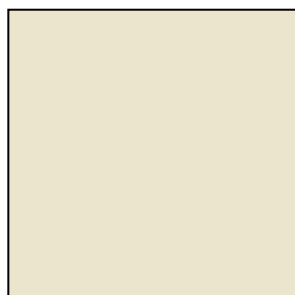
Pittsburgh Paints
Color #PPG1102-4
Prairie Dust

This is not a paint. A translucent glaze should be matched to this color.



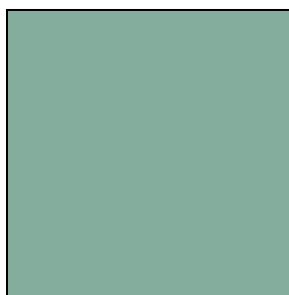
MH-016

The original finish on the background to the dentils in the cornice is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer matching Benjamin Moore OC-36 “Niveous”, followed by a light green (Munsell 7.5G 7/4) base coat matching Benjamin Moore 634 “Forest Valley Green”, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast.”



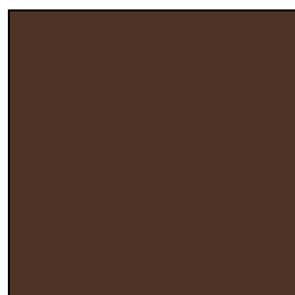
Primer
Cornice
Background to
Dentils

Benjamin Moore
Color #OC-36
Niveous



Base Coat
Cornice
Background to
Dentils

Benjamin Moore
Color #634
Forest Valley Green



Varnish
Cornice
Background to
Dentils

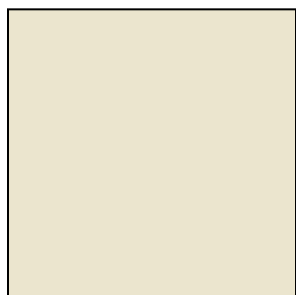
Sherwin Williams
Color #6069
French Roast

This is not a paint. A transparent varnish should be matched to this color.

Pilaster Capital (MH-005)

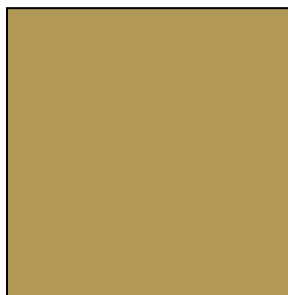
The original finish on the pilaster capital is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 “Egyptian Sand” and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”. Black (Munsell N1.5/) paint matching Sherwin Williams 6991 “Black Magic” and dark green (Munsell 7.5G 3/4) paint matching Benjamin Moore 644 “Garden Cucumber” are found within the recesses of the moldings. The overall effect is to simulate real bronze with the verdigris occurring in the depressions.

A layer of a yellow brown varnish has been applied over the original finish which has changed the appearance of the leafed elements. The varnish was most likely applied as a means to refresh the original finish.



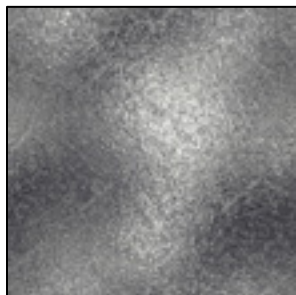
Primer
Pilaster Capital

Benjamin Moore
Color #OC-36
Niveous

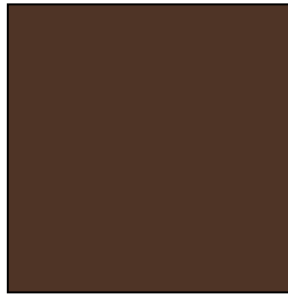


Size
Pilaster Capital

Benjamin Moore
Color #266
Egyptian Sand



Metallic Leaf
Pilaster Capital



Varnish
Pilaster Capital

Sherwin Williams
Color #6069
French Roast

This is not a paint. A transparent varnish should be matched to this color.



Decorative Layer
Pilaster Capital

Sherwin Williams
Color #6991
Black Magic



Decorative Layer
Pilaster Capital

Benjamin Moore
Color #644
Garden Cucumber

Doors and Door Surrounds

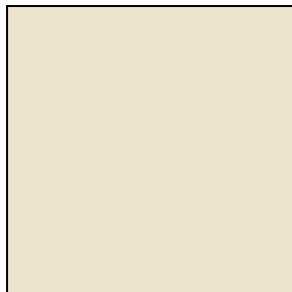


MH-010

MH-007

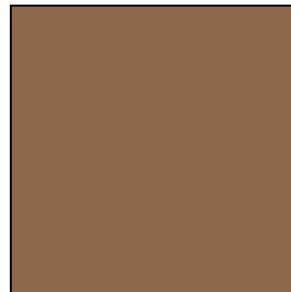
MH-008

The earliest finish found on the wood doors, frame, brackets, and white moldings of the pediment is a complex finish consisting of a two layers of yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) base coat matching Benjamin Moore OC-36 “Niveous” followed by a strong yellowish brown (Munsell 10YR 4/6) varnish matching Pittsburgh Paints PPG1080-7 “Slippery Stone”. Subsequent finishes consist of several layers of yellow paints for a total of approximately 13 finishes.



Base Coat
Door

Benjamin Moore
Color #OC-36
Niveous



Varnish
Door

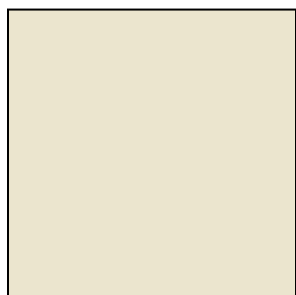
Pittsburgh Paints
Color #PPG1080-7
Slippery Stone

This is not a paint. A transparent varnish should be matched to this color.



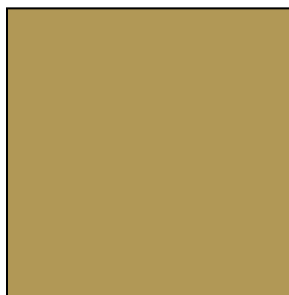
MH-009

The original finish on the bronze elements of the door pediment is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 “Egyptian Sand” and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”. Black (Munsell N1.5/) paint matching Sherwin Williams 6991 “Black Magic” and dark green (Munsell 7.5G 3/4) paint matching Benjamin Moore 644 “Garden Cucumber” are found within the recesses of the moldings. This is the only finish on these elements



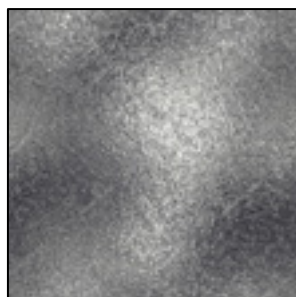
Primer
Door Cornice

Benjamin Moore
Color #OC-36
Niveous



Size
Door Cornice

Benjamin Moore
Color #266
Egyptian Sand



Metallic Leaf
Door Cornice



Varnish
Door Cornice

Sherwin Williams
Color #6069
French Roast

This is not a paint. A transparent varnish should be matched to this color.



Decorative Layer
Door Cornice

Sherwin Williams
Color #6991
Black Magic



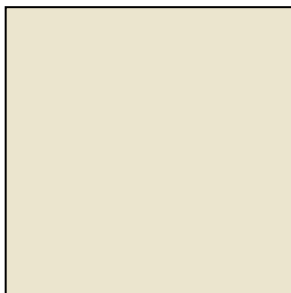
Decorative Layer
Door Cornice

Benjamin Moore
Color #644
Garden Cucumber



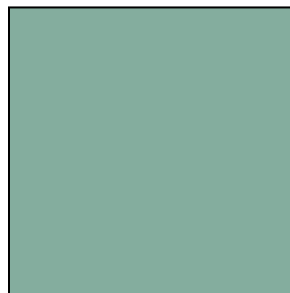
MH-011

The original finish on the background to the dentils in the entablature is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer matching Benjamin Moore OC-36 “Niveous”, followed by a bluish green (Munsell 7.5G 7/4) base coat matching Benjamin Moore 634 “Forest Valley Green”, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast.”



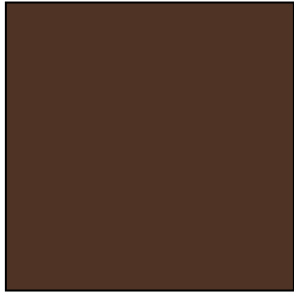
Primer
Door Cornice
Background to
Dentils

Benjamin Moore
Color #OC-36
Niveous



Base Coat
Door Cornice
Background to
Dentils

Benjamin Moore
Color #634
Forest Valley Green



Varnish

Door Cornice
Background to
Dentils

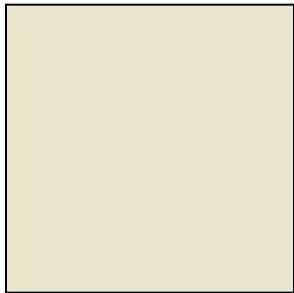
Sherwin Williams
Color #6069
French Roast

*This is not a paint. A transparent varnish
should be matched to this color.*

Reception Rooms

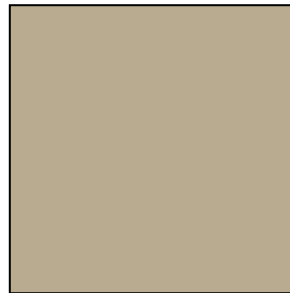
Walls (RR-001)

The earliest finish found on the walls is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by the yellowish gray (between Munsell 2.5Y 7/2 & 7/4) glaze matching Pittsburgh Paints PPG1102-4 “Prairie Dust”. The glaze appears to have a high concentration of linseed oil which penetrated the base coat below. The overall appearance of the glaze on the base coat matches Pittsburgh Paints PPG1093-4 “Somber”. Later finishes consist of shades of yellow for a total of approximately 14 finishes.



Primer and Base
Walls

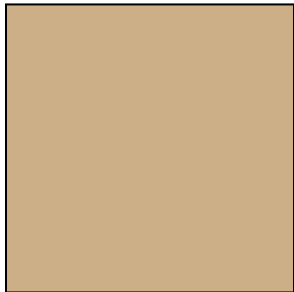
Benjamin Moore
Color #OC-36
Niveous



Glaze
Walls

Pittsburgh Paints
Color #PPG1102-4
Prairie Dust

*This is not a paint. A translucent glaze should
be matched to this color.*

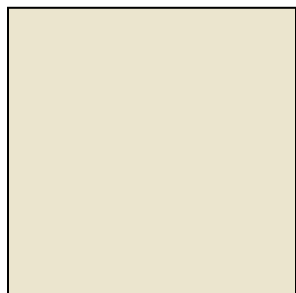


Overall Effect
Walls

Pittsburgh Paints
Color #PPG1093-4
Somber

Ceiling (RR-003)

The earliest finish found on the ceiling consisting of two coats of yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) paint matching Benjamin Moore OC-36 “Niveous”. Later finishes consist of shades of yellow for a total of approximately 11 finishes.

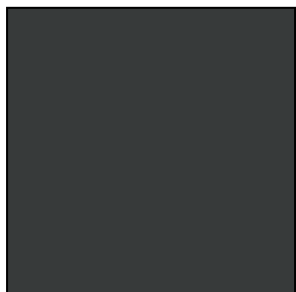


Finish
Ceiling

Benjamin Moore
Color #OC-36
Niveous

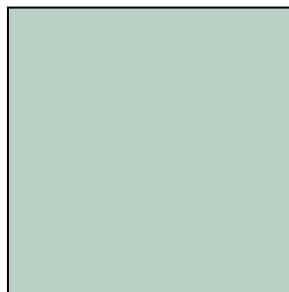
Wall Base (RR-004)

The earliest finish found on the wall base is a complex finish consisting of a blackish green (Munsell 10G 2/1) base coat matching Sherwin Williams 6994 “Greenblack”, followed by a very pale green (approximately Munsell 5G 8/2) glaze matching Benjamin Moore 639 “Let It Rain” and a dark grayish reddish brown (approximately Munsell 2.5YR 2/2) glaze matching Sherwin Williams 6006 “Black Bean”. Later finishes include shades of green and bluish gray for a total of approximately 8 finishes.



Base Coat
Band

Sherwin Williams
Color #6994
Greenblack



Glaze
Wall Base

Benjamin Moore
Color #639
Let It Rain

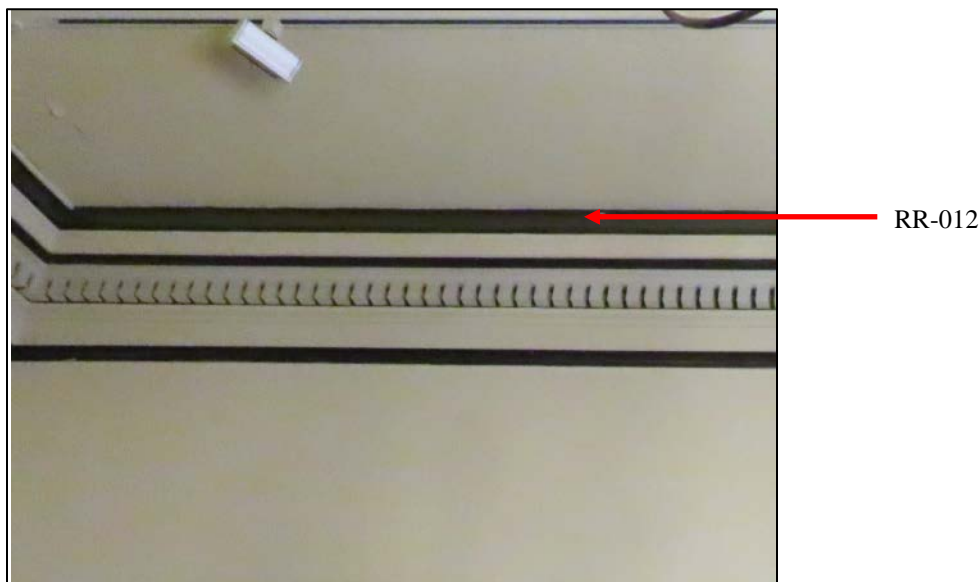
This is not a paint. A translucent glaze should be matched to this color.



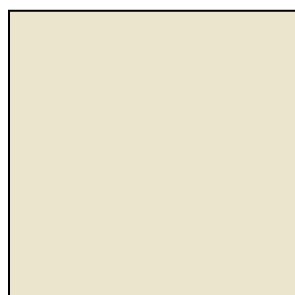
Glaze
Wall Base

Sherwin Williams
Color #6006
Black Bean

This is not a paint. A translucent glaze should be matched to this color.

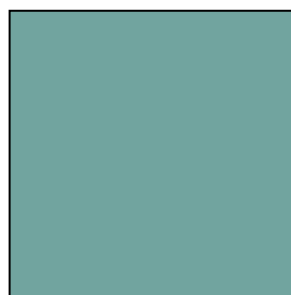
Cornice

The original finish on the top “bronze” molding of the cornice is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer matching Benjamin Moore OC-36 “Niveous” followed by a light bluish green (Munsell 2.5BG 6/4) base coat matching Pittsburgh Paints PPG1142-5 “Catalina”, a dark green (Munsell 7.5G 3/4) decorative layer matching Benjamin Moore 644 “Garden Cucumber”, and topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”.



Primer
Cornice-Top Bronze
Molding

Benjamin Moore
Color #OC-36
Niveous



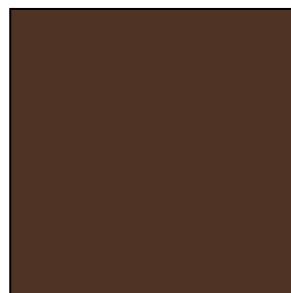
Base Coat
Cornice-Top Bronze
Molding

Pittsburgh Paints
Color #PPG1142-5
Catalina



Decorative Layer
Cornice-Top Bronze
Molding

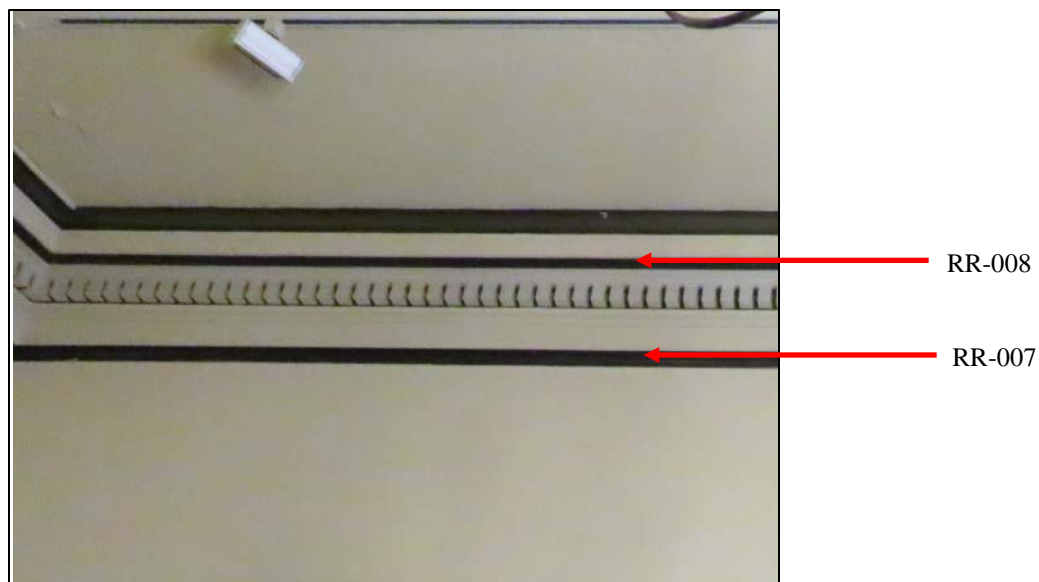
Benjamin Moore
Color #644
Garden Cucumber



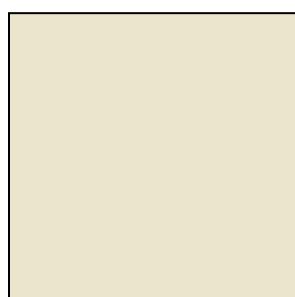
Varnish
Cornice-Top Bronze
Molding

Sherwin Williams
Color #6069
French Roast

This is not a paint. A translucent varnish should be matched to this color.

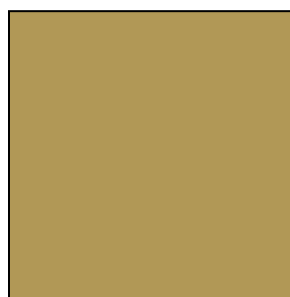


The original finish on the corona soffit and bottom picture rail molding is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 “Egyptian Sand” and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”. Black (Munsell N1.5/) paint matching Sherwin Williams 6991 “Black Magic” and dark green (Munsell 7.5G 3/4) paint matching Benjamin Moore 644 “Garden Cucumber” are found within the recesses of the moldings. The overall effect is to simulate real bronze with the verdigris occurring in the depressions.



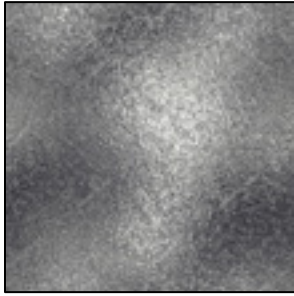
Primer
Cornice—Soffit and
Picture Rail

Benjamin Moore
Color #OC-36
Niveous



Size
Cornice— Soffit and
Picture Rail

Benjamin Moore
Color #266
Egyptian Sand



Metallic Leaf
Cornice— Soffit and
Picture Rail



Varnish
Cornice— Soffit and
Picture Rail

Sherwin Williams
Color #6069
French Roast

*This is not a paint. A transparent varnish
should be matched to this color.*



Decorative Layer
Cornice— Soffit and
Picture Rail

Sherwin Williams
Color #6991
Black Magic



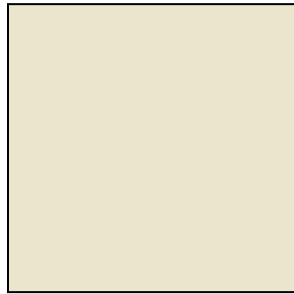
Decorative Layer
Cornice— Soffit and
Picture Rail

Benjamin Moore
Color #644
Garden Cucumber



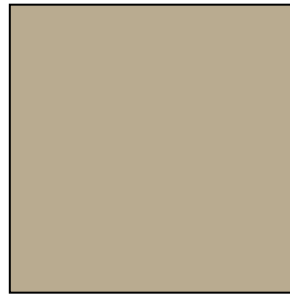
RR-009

The earliest finish found on the light yellow moldings of the cornice is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by the yellowish gray (between Munsell 2.5Y 7/2 & 7/4) glaze matching Pittsburgh Paints PPG1102-4 “Prairie Dust”. The glaze appears to have a high concentration of linseed oil which penetrated the base coat below. The overall appearance of the glaze on the base coat matches Pittsburgh Paints PPG1093-4 “Somber”. Later finishes consist of shades of yellow for a total of approximately 13 finishes.



Primer and Base
Cornice—Yellow
Moldings

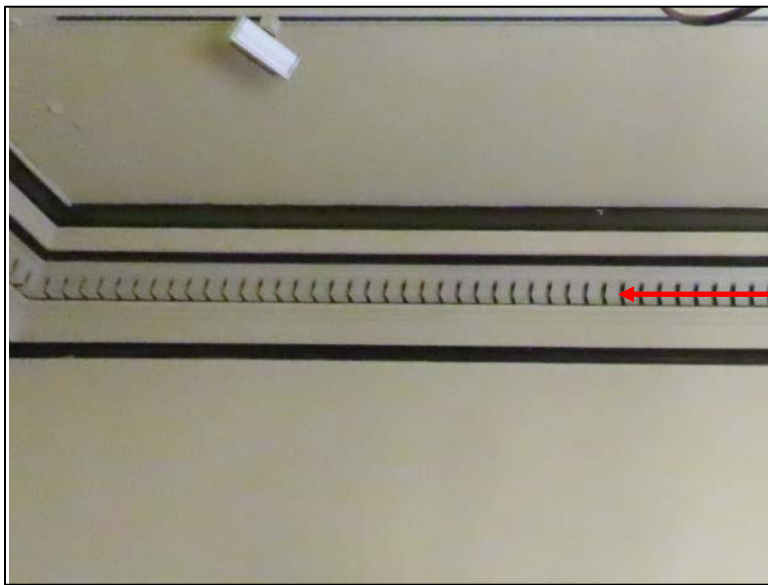
Benjamin Moore
Color #OC-36
Niveous



Glaze
Cornice—Yellow
Moldings

Pittsburgh Paints
Color #PPG1102-4
Prairie Dust

This is not a paint. A translucent glaze should be matched to this color.



RR-011

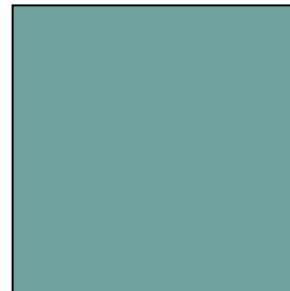
The original finish on the background to the dentils in the cornice is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer matching Benjamin Moore OC-36 “Niveous”, followed by a light bluish green (Munsell 2.5BG 6/4) base coat matching Pittsburgh Paints PPG1142-5 “Catalina”, topped with a dark grayish brown (Munsell 5YR 2/1) varnish matching Sherwin Williams 2735 “Rockweed.”



Primer
Cornice
Background
Dentils

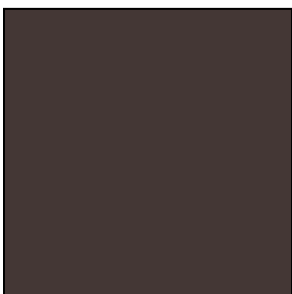
Benjamin Moore
Color #OC-36
Niveous

to



Base Coat
Cornice-Top Bronze
Molding

Pittsburgh Paints
Color #PPG1142-5
Catalina



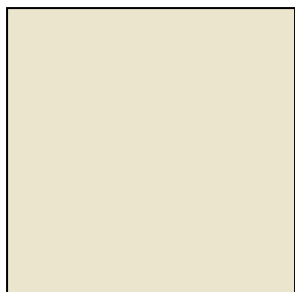
Varnish
Cornice
Background to
Dentils

Sherwin Williams
Color #2735
Rockweed

This is not a paint. A transparent varnish should be matched to this color.

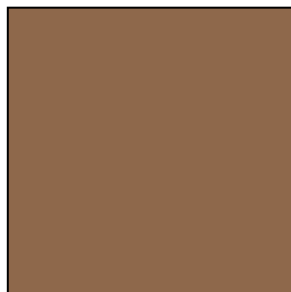
Doors (RR-006) and Door Surrounds (RR-004 and RR-005)

The earliest finish found on the wood doors and surrounds is a complex finish consisting of a two layers of yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) base coat matching Benjamin Moore OC-36 “Niveous” followed by a strong yellowish brown (Munsell 10YR 4/6) varnish matching Pittsburgh Paints PPG1080-7 “Slippery Stone”. Subsequent finishes consist of several layers of yellow paints for a total of approximately 13 finishes.



Base Coat
Door and Surround

Benjamin Moore
Color #OC-36
Niveous



Varnish
Door and Surround

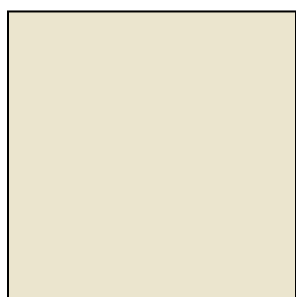
Pittsburgh Paints
Color #PPG1080-7
Slippery Stone

This is not a paint. A transparent varnish should be matched to this color.

Pershing Room

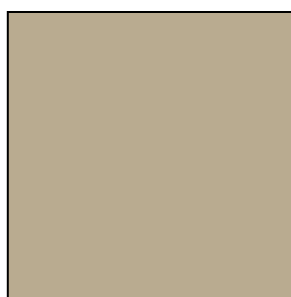
Walls (PR-001, PR-002, PR-003), Pilasters (PR-007), Ceiling (PR-004), and Beam Soffits (PR-005)

The earliest finish found on the walls, ceiling, and beam soffits is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by the yellowish gray (between Munsell 2.5Y 7/2 & 7/4) glaze matching Pittsburgh Paints PPG1102-4 “Prairie Dust”. The glaze appears to have a high concentration of linseed oil which penetrated the base coat below. The overall appearance of the glaze on the base coat matches Pittsburgh Paints PPG1093-4 “Somber”. Later finishes consist of shades of yellow and one finish of light blue green for a total of approximately 13 finishes.



Primer and Base
Walls, Pilasters,
Ceiling, Beam Soffits

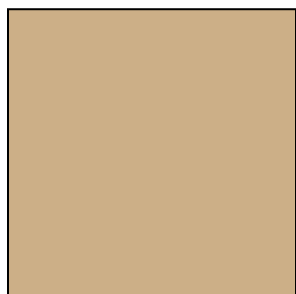
Benjamin Moore
Color #OC-36
Niveous



Glaze
Walls, Pilasters,
Ceiling, Beam Soffits

Pittsburgh Paints
Color #PPG1102-4
Prairie Dust

This is not a paint. A translucent glaze should be matched to this color.



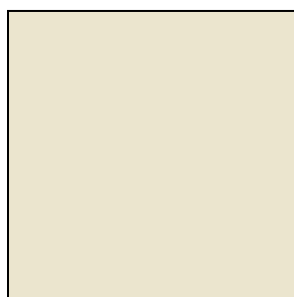
Overall Effect
Walls, Pilasters,
Ceiling, Beam Soffits

Pittsburgh Paints
Color #PPG1093-4
Somber

Pilaster Capital (PR-007, PR-008)

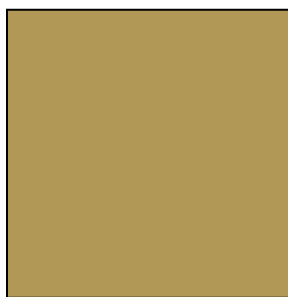
The original finish on the pilaster capital is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 “Egyptian Sand” and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”. Black (Munsell N1.5/) paint matching Sherwin Williams 6991 “Black Magic” and dark green (Munsell 7.5G 3/4) paint matching Benjamin Moore 644 “Garden Cucumber” are found within the recesses of the moldings.

A later layer of bronze flake paint has been applied over the original finish.



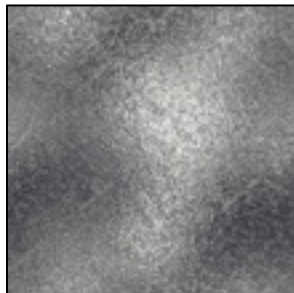
Primer
Pilaster Capital

Benjamin Moore
Color #OC-36
Niveous



Size
Pilaster Capital

Benjamin Moore
Color #266
Egyptian Sand



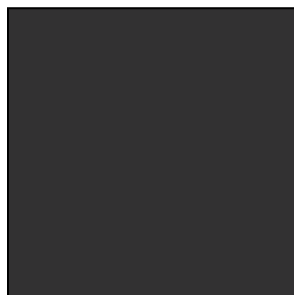
Metallic Leaf
Pilaster Capital



Varnish
Pilaster Capital

Sherwin Williams
Color #6069
French Roast

This is not a paint. A transparent varnish should be matched to this color.



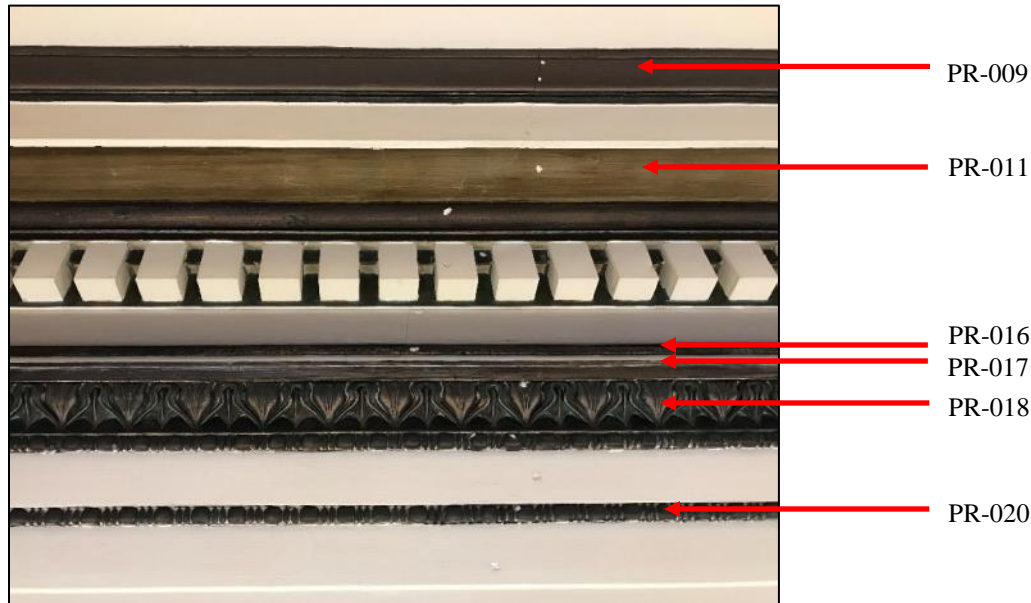
Decorative Layer
Pilaster Capital

Sherwin Williams
Color #6991
Black Magic



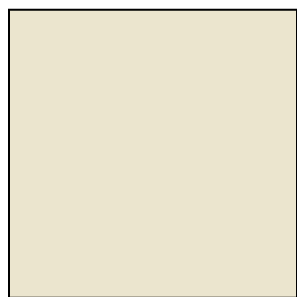
Decorative Layer
Pilaster Capital

Benjamin Moore
Color #644
Garden Cucumber

Cornice

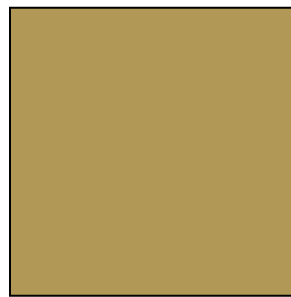
The original finish on the top molding, corona soffit, molding under the dentil, calf's tongue molding, and the bottom bead molding is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 "Niveous", followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 "Egyptian Sand" and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 "French Roast". Black (Munsell N1.5/) paint matching Sherwin Williams 6991 "Black Magic" and dark green (Munsell 7.5G 3/4) paint matching Benjamin Moore 644 "Garden Cucumber" are found within the recesses of the moldings. The overall effect is to simulate real bronze with the verdigris occurring in the depressions.

A later layer of bronze flake paint has been applied over the original finish of the top molding. The corona soffit has been overpainted with four yellow finishes, but the original leafed finish was replicated for the current campaign.



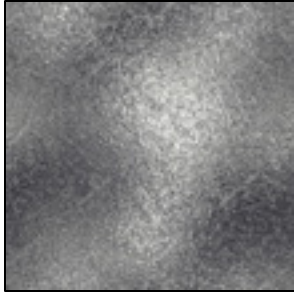
Primer
Cornice—Soffit and
Egg & Dart

Benjamin Moore
Color #OC-36
Niveous

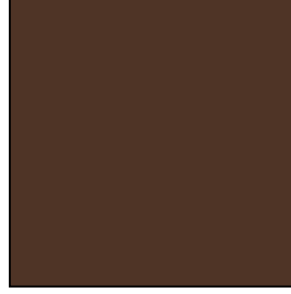


Size
Cornice—Soffit and
Egg & Dart

Benjamin Moore
Color #266
Egyptian Sand



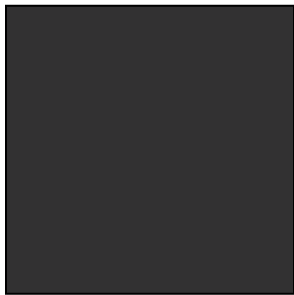
Metallic Leaf
Cornice—Soffit and
Egg & Dart



Varnish
Cornice—Soffit and
Egg & Dart

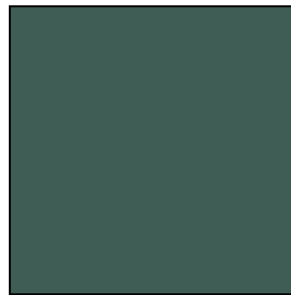
Sherwin Williams
Color #6069
French Roast

This is not a paint. A transparent varnish should be matched to this color.



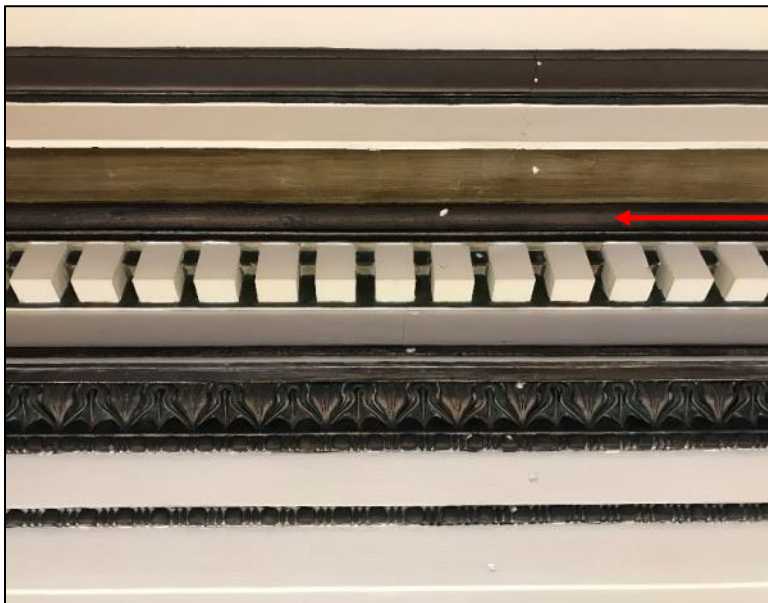
Decorative Layer
Cornice—Soffit and
Egg & Dart

Sherwin Williams
Color #6991
Black Magic



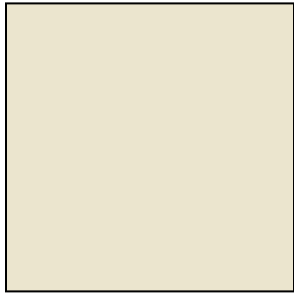
Decorative Layer
Cornice—Soffit and
Egg & Dart

Benjamin Moore
Color #644
Garden Cucumber



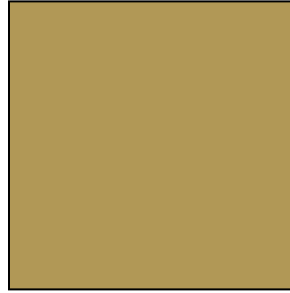
PR-012

The earliest finish on the bronze molding above the dentil is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 “Egyptian Sand” and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”. A dark grayish brown (Munsell 7.5YR 2/2) decorative layer matching Sherwin Williams 6069 “French Roast” is applied over the varnish.



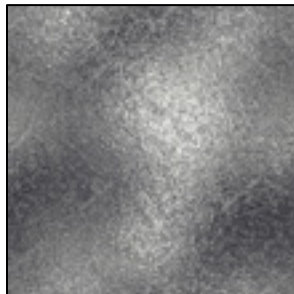
Primer
Cornice—Bronze
Molding above
Dentils

Benjamin Moore
Color #OC-36
Niveous

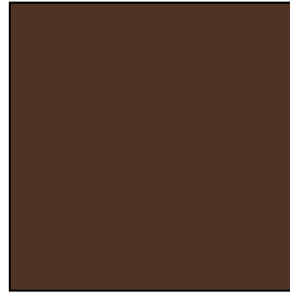


Size
Cornice—Bronze
Molding above
Dentils

Benjamin Moore
Color #266
Egyptian Sand



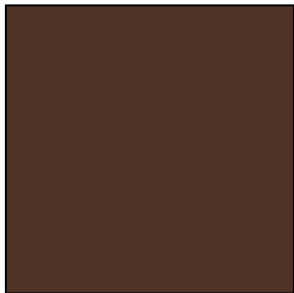
Metallic Leaf
Cornice—Bronze
Molding above
Dentils



Varnish
Cornice—Bronze
Molding above
Dentils

Sherwin Williams
Color #6069
French Roast

*This is not a paint. A transparent varnish
should be matched to this color.*



Decorative Layer
Cornice—Bronze
Molding above
Dentils

Sherwin Williams
Color #6069
French Roast



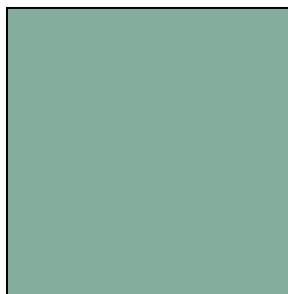
PR-013

The original finish on the background to the dentils in the cornice is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer matching Benjamin Moore OC-36 “Niveous”, followed by a bluish green (Munsell 7.5G 7/4) base coat matching Benjamin Moore 634 “Forest Valley Green”, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast.”

Primer

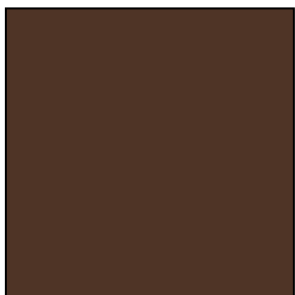
Door Cornice
Background to
Dentils

Benjamin Moore
Color #OC-36
Niveous

Base Coat

Door Cornice
Background to
Dentils

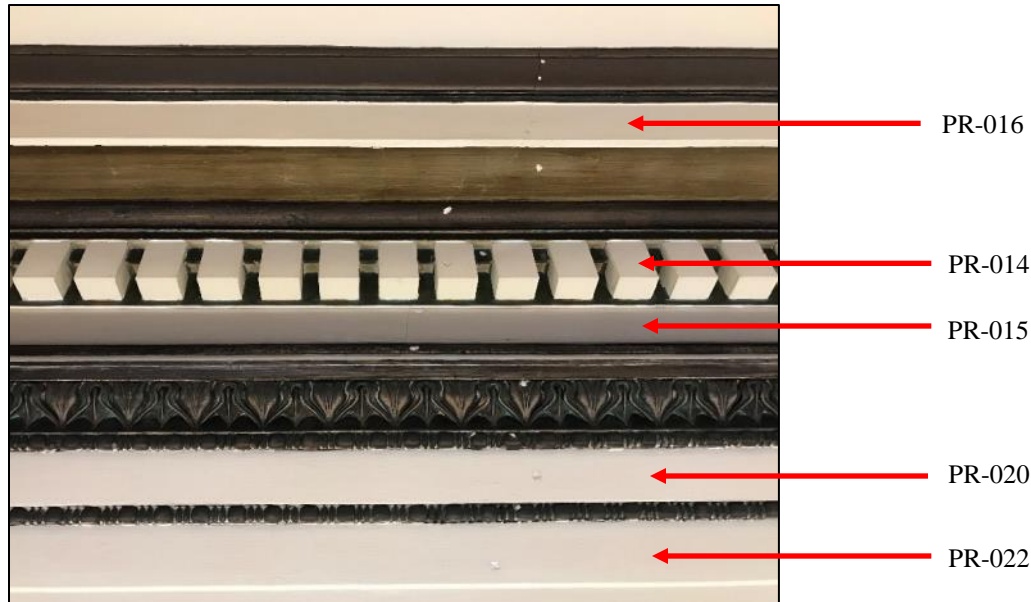
Benjamin Moore
Color #634
Forest Valley Green

Varnish

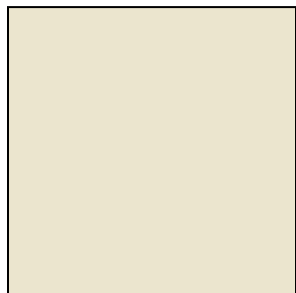
Door Cornice
Background to
Dentils

Sherwin Williams
Color #6069
French Roast

This is not a paint. A transparent varnish should be matched to this color.

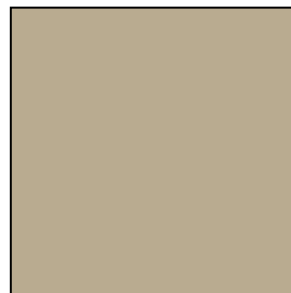


The earliest finish found on the light yellow elements of the cornice is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by the yellowish gray (between Munsell 2.5Y 7/2 & 7/4) glaze matching Pittsburgh Paints PPG1102-4 “Prairie Dust”. The glaze appears to have a high concentration of linseed oil which penetrated the base coat below. The overall appearance of the glaze on the base coat matches Pittsburgh Paints PPG1093-4 “Somber”. Later finishes consist of shades of yellow and one blue green finish for a total of approximately 7 finishes.



Primer and Base
Cornice

Benjamin Moore
Color #OC-36
Niveous



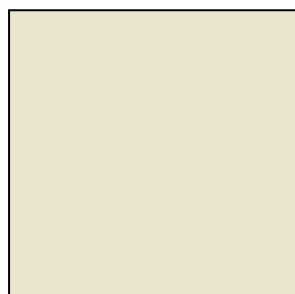
Glaze
Cornice

Pittsburgh Paints
Color #PPG1102-4
Prairie Dust

This is not a paint. A translucent glaze should be matched to this color.

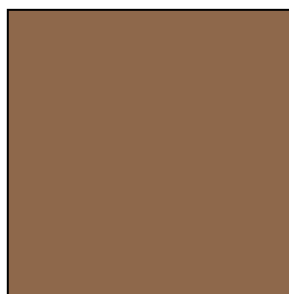
Doors (PR-027), Door Surrounds (PR-025), Brackets (PR-026), Dentils (PR-024)

The earliest finish found on the wood doors, surrounds, brackets, and dentil molding is a complex finish consisting of a two layers of yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) base coat matching Benjamin Moore OC-36 “Niveous” followed by a strong yellowish brown (Munsell 10YR 4/6) varnish matching Pittsburgh Paints PPG1080-7 “Slippery Stone”. Subsequent finishes consist of several layers of yellow paints for a total of approximately 9 finishes.



Base Coat
Door and Surround

Benjamin Moore
Color #OC-36
Niveous



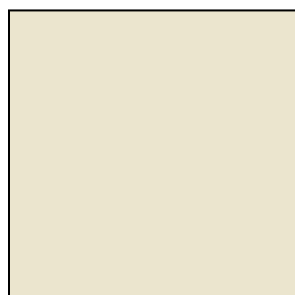
Varnish
Door and Surround

Pittsburgh Paints
Color #PPG1080-7
Slippery Stone

This is not a paint. A transparent varnish should be matched to this color.

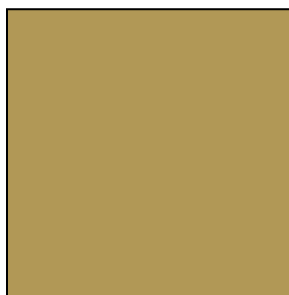
Door Surround—Bronze Molding above Dentils (PR-023)

The original finish on the bronze molding above the dentils on the door surround is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 “Egyptian Sand” and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”. Black (Munsell N1.5/) paint matching Sherwin Williams 6991 “Black Magic” and dark green (Munsell 7.5G 3/4) paint matching Benjamin Moore 644 “Garden Cucumber” are found within the recesses of the moldings.



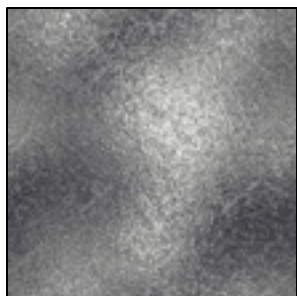
Primer
Pilaster Capital

Benjamin Moore
Color #OC-36
Niveous

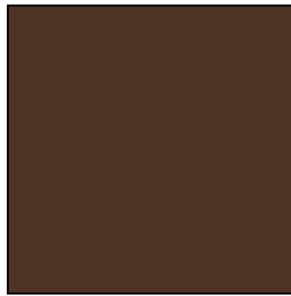


Size
Pilaster Capital

Benjamin Moore
Color #266
Egyptian Sand



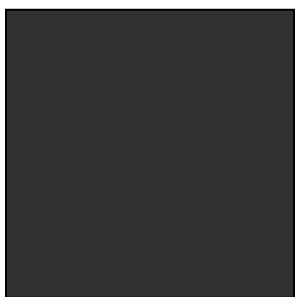
Metallic Leaf
Pilaster Capital



Varnish
Pilaster Capital

Sherwin Williams
Color #6069
French Roast

This is not a paint. A transparent varnish should be matched to this color.



Decorative Layer
Pilaster Capital

Sherwin Williams
Color #6991
Black Magic



Decorative Layer
Pilaster Capital

Benjamin Moore
Color #644
Garden Cucumber

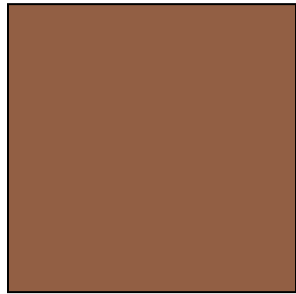
Memorial Hall/Ballroom

Moldings and Ornament (Ball-001, Ball-004, Ball-005, Ball-009, Ball-012, Ball-017, Ball-018, Ball-021, Ball-023, Ball-026, Ball-028, Ball-029, Ball-030, Ball-032, Ball-036, Ball-039, Ball-042, Ball-043)

As the Memorial Hall is the principal space in Cullum Hall, it is highly decorative. Many of these elements have the same finish.

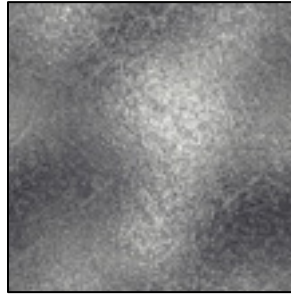
The original and only finish found on several moldings and ornament throughout the Memorial Hall consists of a strong brown (Munsell 7.5YR 4/8) shellac primer matching Pittsburgh Paints PPG1069-7 “Cinnamon Spice”, followed by a “silver” colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”. Black (Munsell N1.5/) paint matching Sherwin Williams 6991 “Black Magic”, dark green (Munsell 7.5G 3/4) paint matching Benjamin Moore 644 “Garden Cucumber”, and grayish blue (between Munsell 10B 6/4 & 5/4) matching Benjamin Moore 1664 “Sea Reflections” are found within the recesses of the moldings.

This finish is found on the molding around the coffers, the rosettes, the cornice brackets, the egg & dart moldings, the bands in the architrave, the acanthus leaf molding, the moldings around the south doorway, the caryatid bases, the column capitals, the proscenium, the stage front cornice, and the wall grilles.

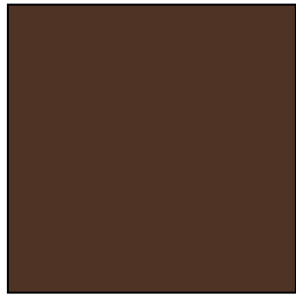


Shellac
Moldings and
Ornament

Pittsburgh Paints
Color #PPG1069-7
Cinnamon Spice



Metallic Leaf
Moldings and
Ornament



Varnish
Moldings and
Ornament

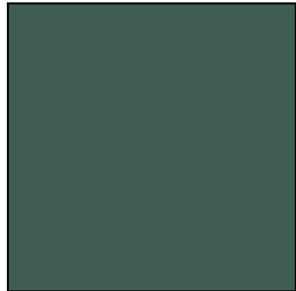
Sherwin Williams
Color #6069
French Roast



Decorative Layer
Moldings and
Ornament

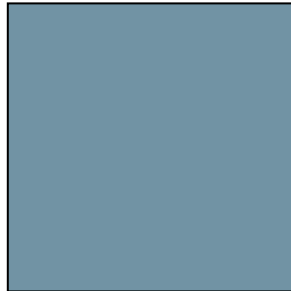
Sherwin Williams
Color #6991
Black Magic

This is not a paint. A transparent varnish should be matched to this color.



Decorative Layer
Moldings and
Ornament

Benjamin Moore
Color #644
Garden Cucumber

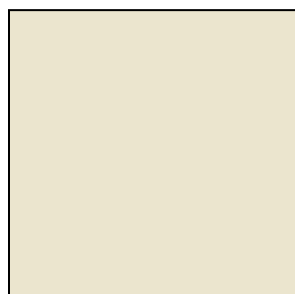


Decorative Layer
Moldings and
Ornament

Benjamin Moore
Color #1664
Sea Reflections

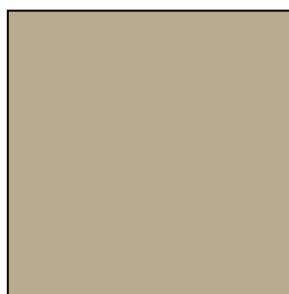
The earliest finish found on the flat moldings and spaces around the decorative moldings (Ball-002, Ball-003, Ball-006, Ball-008, Ball-011, Ball-013, Ball-015, Ball-016, Ball-019, Ball-022, Ball-024) is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by the yellowish gray (between Munsell 2.5Y 7/2 & 7/4) glaze matching Pittsburgh Paints PPG1102-4 “Prairie Dust”. The glaze appears to have a high concentration of linseed oil which penetrated the base coat below. The overall appearance of the glaze on the base coat matches Pittsburgh Paints PPG1093-4 “Somber”.

This finish is found on the frames around the coffers, the panels between modillions, the dentils, the frieze, and the flat fascia in the architrave.



Primer and Base
Moldings and
Ornament

Benjamin Moore
Color #OC-36
Niveous

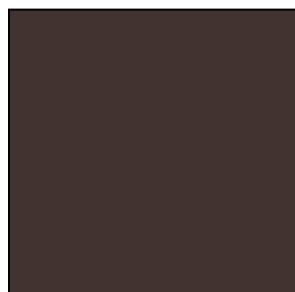


Glaze
Moldings and
Ornament

Pittsburgh Paints
Color #PPG1102-4
Prairie Dust

This is not a paint. A translucent glaze should be matched to this color.

The only finish on the background to the dentils (Ball-010) is a dark grayish reddish brown (approximately Munsell 2.5Y 2/2) base coat matching Sherwin Williams 6006 “Black Bean” followed by a dark green (Munsell 7.5G 3/4) decorative layer matching Benjamin Moore 644 “Garden Cucumber”. The dark brown base layer is unevenly applied. It is very thin in areas and the plaster can be seen through the paint. The dark green decorative layer is used as a highlight to simulate bronze corrosion.



Base Coat
Background to
Dentils

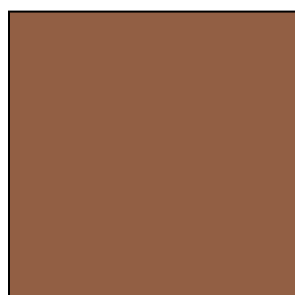
Sherwin Williams
Color #6006
Black Bean



Decorative Layer
Background to
Dentils

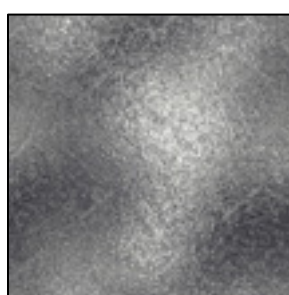
Benjamin Moore
Color #644
Garden Cucumber

The original and only finish found on the lettering in the frieze (Ball-014) is a complex finish consisting of a strong brown (Munsell 7.5YR 4/8) shellac primer matching Pittsburgh Paints PPG1069-7 “Cinnamon Spice”, followed by a “silver” colored leaf, topped with a dark grayish brown (approximately Munsell 2.5YR 2/2) varnish matching Sherwin Williams 6006 “Black Bean”, and a dark green (Munsell 7.5G 3/4) decorative layer matching Benjamin Moore 644 “Garden Cucumber”. The dark grayish reddish brown varnish is heavily applied and obscures most of the effect of the silver leaf.

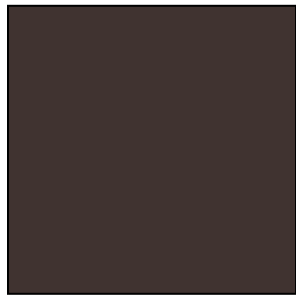


Shellac
Lettering in Frieze

Pittsburgh Paints
Color #PPG1069-7
Cinnamon Spice



Metallic Leaf
Lettering in Frieze



Varnish
Lettering in Frieze

Sherwin Williams
Color #6006
Black Bean

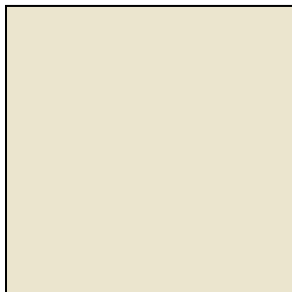


Decorative Layer
Lettering in Frieze

Benjamin Moore
Color #644
Garden Cucumber

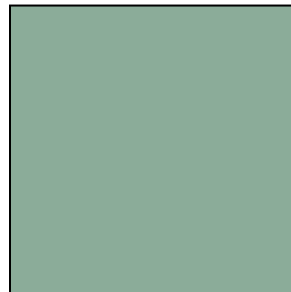
This is not a paint. A transparent varnish should be matched to this color.

The original and only finish on the Greek key motif (Ball-025) is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer matching Benjamin Moore OC-36 “Niveous”, followed by a bluish green (Munsell 7.5G 7/4) base coating matching Benjamin Moore 634 “Forest Valley Green”, topped with a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) decorative layer matching Benjamin Moore OC-36 “Niveous”, a dark grayish brown (Munsell 7.5YR 2/2) decorative layer matching Sherwin Williams 6069 “French Roast”, and a black (Munsell N1.5/) decorative layer matching Sherwin Williams 6991 “Black Magic”.



Primer
Greek Key

Benjamin Moore
Color #OC-36
Niveous



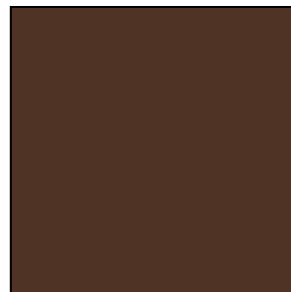
Base Coat
Greek Key

Benjamin Moore
Color #634
Forest Valley Green



Decorative Layer
Greek Key

Benjamin Moore
Color #OC-36
Niveous



Decorative Layer
Greek Key

Sherwin Williams
Color #6069
French Roast

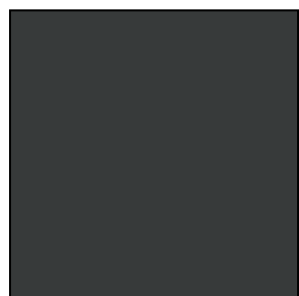


Decorative Layer
Greek Key

Sherwin Williams
Color #6991
Black Magic

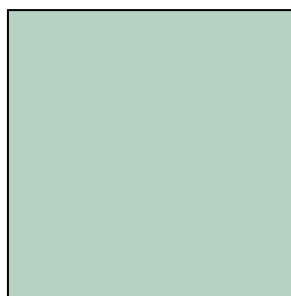
Wall Base (Ball-033, Ball-041)

The earliest finish found on the wall base is a complex finish consisting of a blackish green (Munsell 10G 2/1) base coat matching Sherwin Williams 6994 “Greenblack”, followed by a light bluish gray (Munsell 10BG 8/2) decorative layer matching Benjamin Moore 674 “Spring Sky” and a dark grayish brown (approximately Munsell 5YR 2/1) glaze matching Sherwin Williams 2735 “Rockweed”. Later finishes include shades of green, gray, and metallic flake paints for a total of approximately 8 finishes.



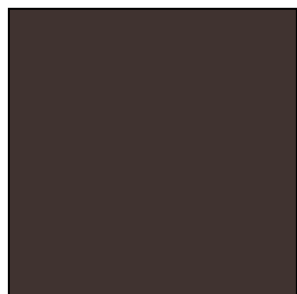
Base Coat
Band

Sherwin Williams
Color #6994
Greenblack



Decorative Layer
Wall Base

Benjamin Moore
Color #674
Spring Sky



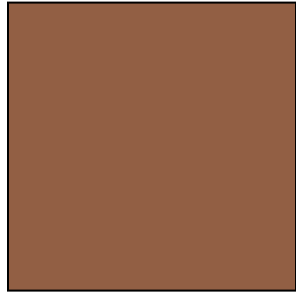
Glaze
Wall Base

Sherwin Williams
Color #2735
Rockweed

This is not a paint. A translucent glaze should be matched to this color.

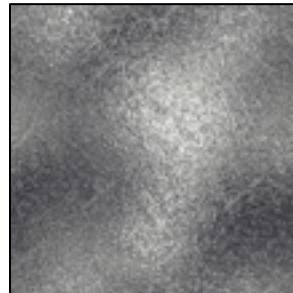
Caryatids (Ball-031)

The caryatids are plaster sculptures. Their current finish is the original finish, which is a complex finish consisting of a strong brown (Munsell 7.5YR 4/8) shellac matching Pittsburgh Paints PPG1068-7 “Cinnamon Spice”, silver-colored leaf topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”, followed by a dark green (Munsell 7.5G 3/4) decorative layer matching Benjamin Moore 644 “Garden Cucumber”, a light brown (Munsell 5YR 5/4) decorative layer matching Benjamin Moore 1161 “Birchwood”, and topped with a dark grayish reddish brown (approximately Munsell 2.5YR 2/2) varnish matching Sherwin Williams 6006 “Black Bean”. The overall effect is to simulate statuary bronze.

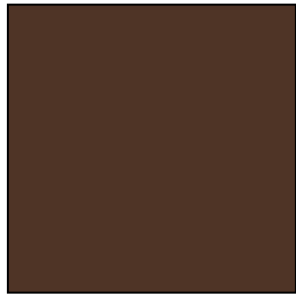


Shellac
Caryatid

Pittsburgh Paints
Color #PPG1069-7
Cinnamon Spice



Metallic Leaf
Caryatid



Varnish
Caryatids

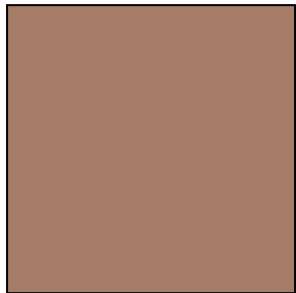
Sherwin Williams
Color #6069
French Roast



Decorative Layer
Caryatids

Benjamin Moore
Color #644
Garden Cucumber

This is not a paint. A transparent varnish should be matched to this color



Decorative Layer
Caryatid

Benjamin Moore
Color #1161
Birchwood



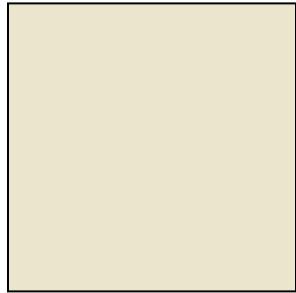
Varnish
Caryatid

Sherwin Williams
Color #6006
Black Bean

This is not a paint. A transparent varnish should be matched to this color.

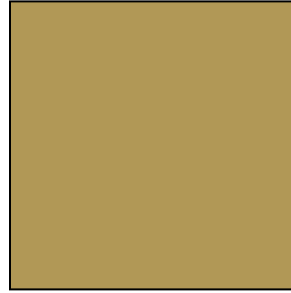
Doors (Ball-034) and Door Frames (Ball-035)

The earliest finish on doors and door frames a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 “Egyptian Sand” and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”. The overall effect is to simulate bronze doors. Later finishes include metallic flake paints, blue greens, and leafed finishes for a total of 10 finishes.



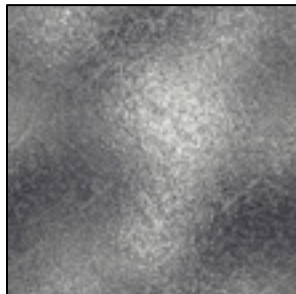
Primer
Doors and Door
Frames

Benjamin Moore
Color #OC-36
Niveous

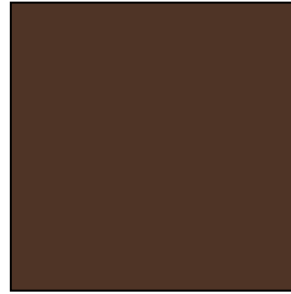


Size
Doors and Door
Frames

Benjamin Moore
Color #266
Egyptian Sand



Metallic Leaf
Doors and Door
Frames



Varnish
Door and Door
Frames

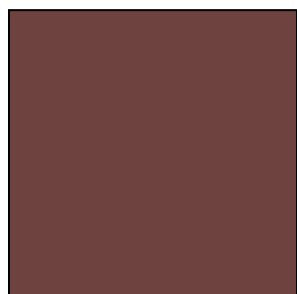
Sherwin Williams
Color #6069
French Roast

*This is not a paint. A transparent varnish
should be matched to this color.*

Column Shafts (Ball-040) and Stage Front (Ball-038)

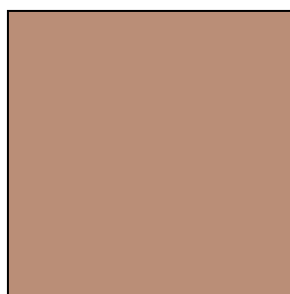
The earliest finish on the column shafts and stage front is a complex finish consisting of a dark reddish brown (between Munsell 10R 2/4 & 3/4) base coat matching Sherwin Williams 7594 “Carriage Door”, followed by a light brown (between Munsell 5YR & 2.5YR 6/4) decorative layer matching Benjamin Moore 1228 “Roman Shade”, a dark reddish brown (Munsell 2.5YR 2/4) decorative varnish matching Sherwin Williams 9182 “Rojo Maron”, a dark grayish reddish brown (Munsell 10R 2/2) decorative layer matching Sherwin Williams 2838 “Polished Mahogany”, another dark reddish brown (Munsell 2.5YR 2/4) decorative varnish matching Sherwin Williams 9182 “Rojo Maron”, a dark grayish reddish brown (Munsell 10R 2/2) decorative layer matching Sherwin Williams 2838 “Polished Mahogany”, a yellowish white (between Munsell 2.5Y 9/2 & 9/4) decorative layer matching YYY, and a dark reddish brown (Munsell 2.5YR 2/4) decorative varnish matching Sherwin Williams 9182 “Rojo Maron”. Without performing exposure windows, the exact appearance of this finish is unknown. However, it is likely to match the scagliola used on the caryatid plinths.

The column shafts and stage front were later painted grayish red, then yellow. The current finish appears to be an attempt to recreate the original finish.



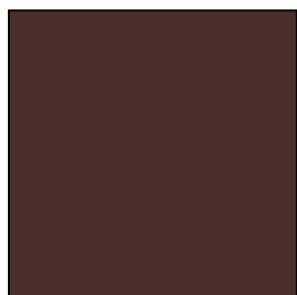
Base Coat
Column Shaft and
Stage Front

Sherwin Williams
Color #7594
Carriage Door



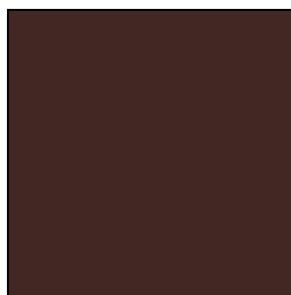
Decorative Layer
Column Shaft and
Stage Front

Benjamin Moore
Color #1128
Roman Shade



Decorative Varnish
Column Shaft and
Stage Front

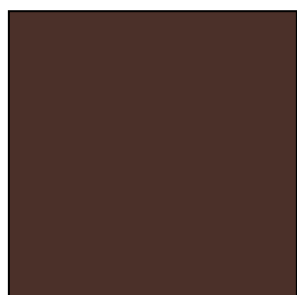
Sherwin Williams
Color #9182
Rojo Maron



Decorative Layer
Column Shaft and
Stage Front

Sherwin Williams
Color #2838
Polished Mahogany

*This is not a paint. A transparent varnish
should be matched to this color.*



Decorative Varnish
Column Shaft and
Stage Front

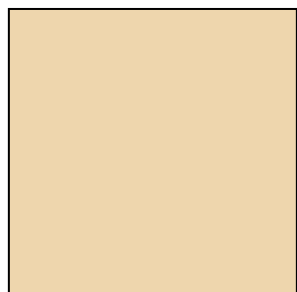
Sherwin Williams
Color #9182
Rojo Maron



Decorative Layer
Column Shaft and
Stage Front

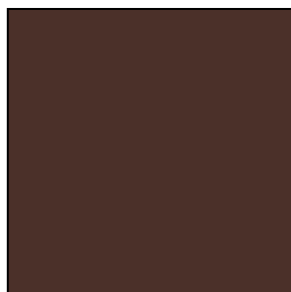
Sherwin Williams
Color #2838
Polished Mahogany

*This is not a paint. A transparent varnish
should be matched to this color.*



Decorative Layer
Column Shaft and
Stage Front

Benjamin Moore
Color #192
Key West Ivory



Finish Varnish
Column Shaft and
Stage Front

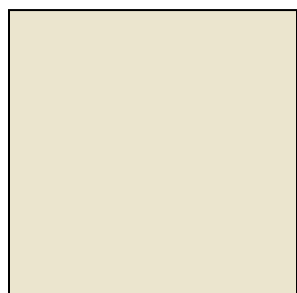
Sherwin Williams
Color #9182
Rojo Maron

*This is not a paint. A transparent varnish
should be matched to this color.*

Mezzanine/Balcony

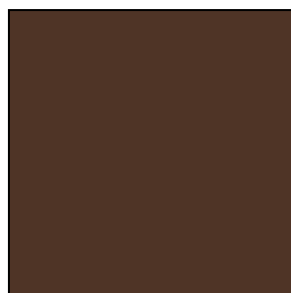
Walls (Balc-001)

No original finishes were found on the upper walls. However, the earliest finish on the lower wall is a complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) base coat matching Benjamin Moore OC-36 “Niveous” followed by a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”. Subsequent finishes include shades of yellow for a total of approximately 19 finishes.



Primer and Base
Walls

Benjamin Moore
Color #OC-36
Niveous



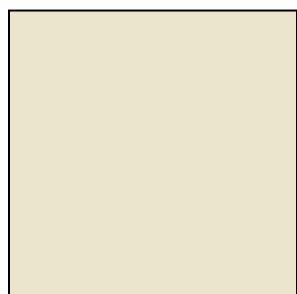
Varnish
Walls

Sherwin Williams
Color #6069
French Roast

This is not a paint. A translucent varnish should be matched to this color.

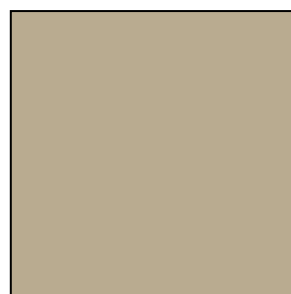
Pilaster (Balc-003, Balc-004, Balc-005)

The earliest finish found on the pilaster is complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by the yellowish gray (between Munsell 2.5Y 7/2 & 7/4) glaze matching Pittsburgh Paints PPG1102-4 “Prairie Dust”. The glaze appears to have a high concentration of linseed oil which penetrated the base coat below. The overall appearance of the glaze on the base coat matches Pittsburgh Paints PPG1093-4 “Somber”. It is likely that this was the original finish on the upper walls. Subsequent finishes include shades of yellow for a total of approximately 17 finishes.



Primer and Base
Pilaster

Benjamin Moore
Color #OC-36
Niveous

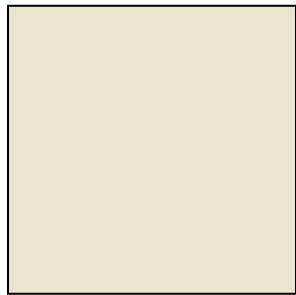


Glaze
Pilaster

Pittsburgh Paints
Color #PPG1102-4
Prairie Dust

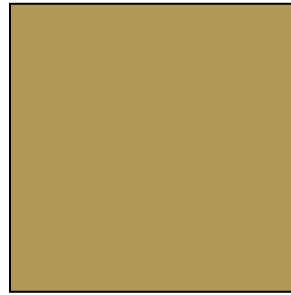
This is not a paint. A translucent glaze should be matched to this color.

The earliest finish on the pilaster capital and molding is complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 “Egyptian Sand” and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”. Later finishes include metallic flake paints, greens, browns, and leafed finishes for a total of 6 finishes.



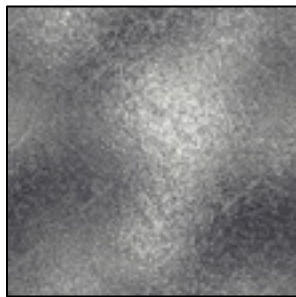
Primer
Pilaster Capital and
Molding

Benjamin Moore
Color #OC-36
Niveous

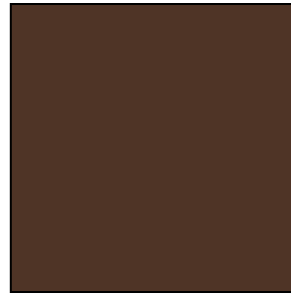


Size
Pilaster Capital and
Molding

Benjamin Moore
Color #266
Egyptian Sand



Metallic Leaf
Pilaster Capital and
Molding



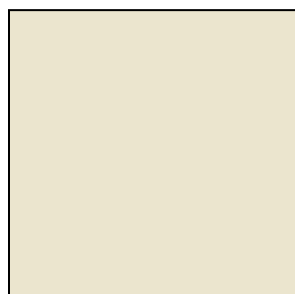
Varnish
Pilaster Capital and
Molding

Sherwin Williams
Color #6069
French Roast

*This is not a paint. A transparent varnish
should be matched to this color.*

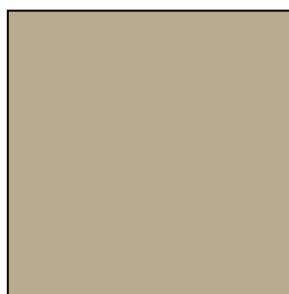
Cornice

The earliest finish found on the yellow painted molding of the cornice (Balc-007) is complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by the yellowish gray (between Munsell 2.5Y 7/2 & 7/4) glaze matching Pittsburgh Paints PPG1102-4 “Prairie Dust”. The glaze appears to have a high concentration of linseed oil which penetrated the base coat below. The overall appearance of the glaze on the base coat matches Pittsburgh Paints PPG1093-4 “Somber”. It is likely that this was the original finish on the upper walls. Subsequent finishes include shades of yellow for a total of approximately 17 finishes.



Primer and Base
Cornice

Benjamin Moore
Color #OC-36
Niveous

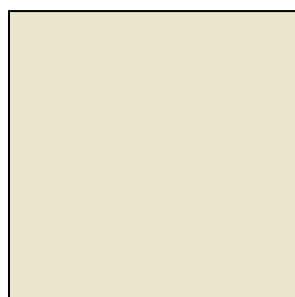


Glaze
Cornice

Pittsburgh Paints
Color #PPG1102-4
Prairie Dust

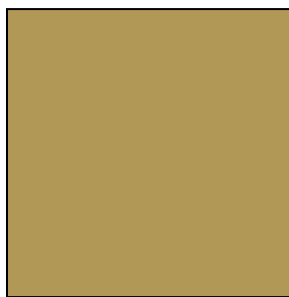
This is not a paint. A translucent glaze should be matched to this color.

The earliest finish on the bronze elements of the cornice (Balc-006, Balc-008) is complex finish consisting of a yellowish white (between Munsell 7.5Y 9/2 & 8.5/2) primer and base coat matching Benjamin Moore OC-36 “Niveous”, followed by a dark yellow (Munsell 5Y 6/6) size matching Benjamin Moore 266 “Egyptian Sand” and silver-colored leaf, topped with a dark grayish brown (Munsell 7.5YR 2/2) varnish matching Sherwin Williams 6069 “French Roast”.



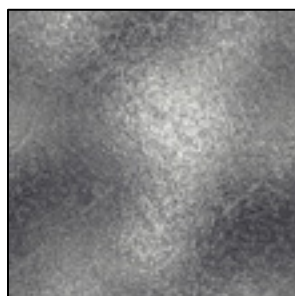
Primer
Cornice

Benjamin Moore
Color #OC-36
Niveous



Size
Cornice

Benjamin Moore
Color #266
Egyptian Sand



Metallic Leaf
Cornice



Varnish
Cornice

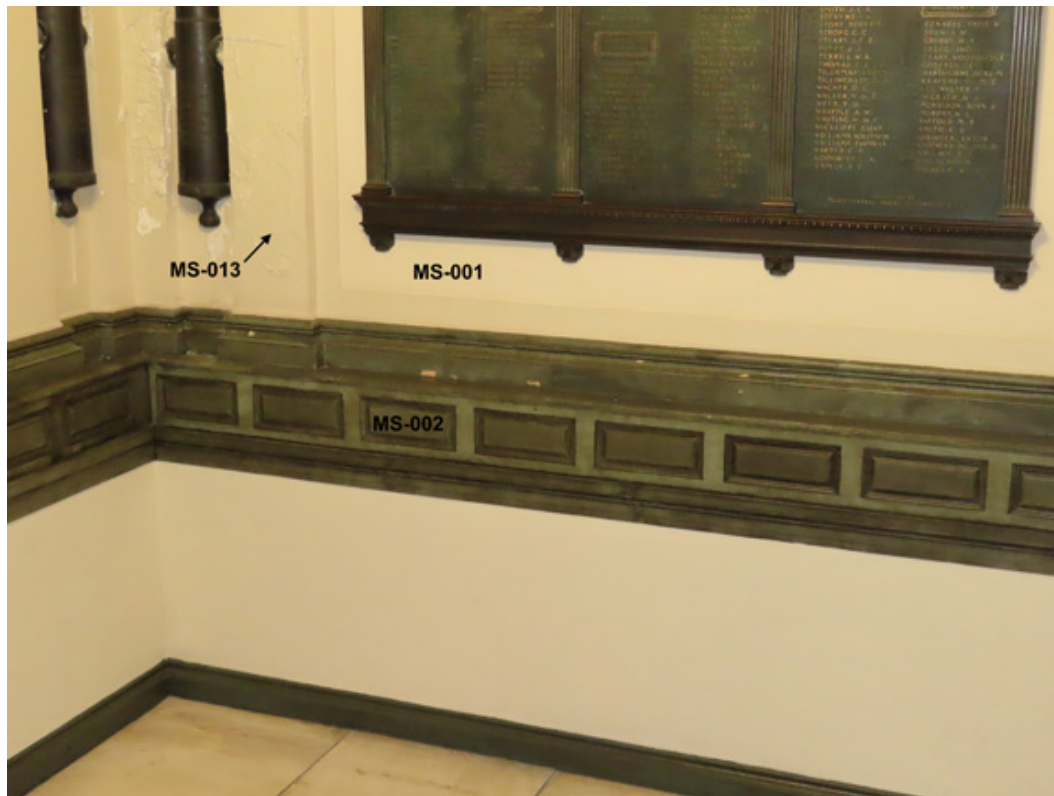
Sherwin Williams
Color #6069
French Roast

This is not a paint. A transparent varnish should be matched to this color.

A p p e n d i x A **P a i n t S a m p l e L o c a t i o n s**

C u l l u m H a l l
U S M i l i t a r y A c a d e m y a t W e s t P o i n t

Main Stair Paint Locations



Main Stair Paint Locations (cont.)



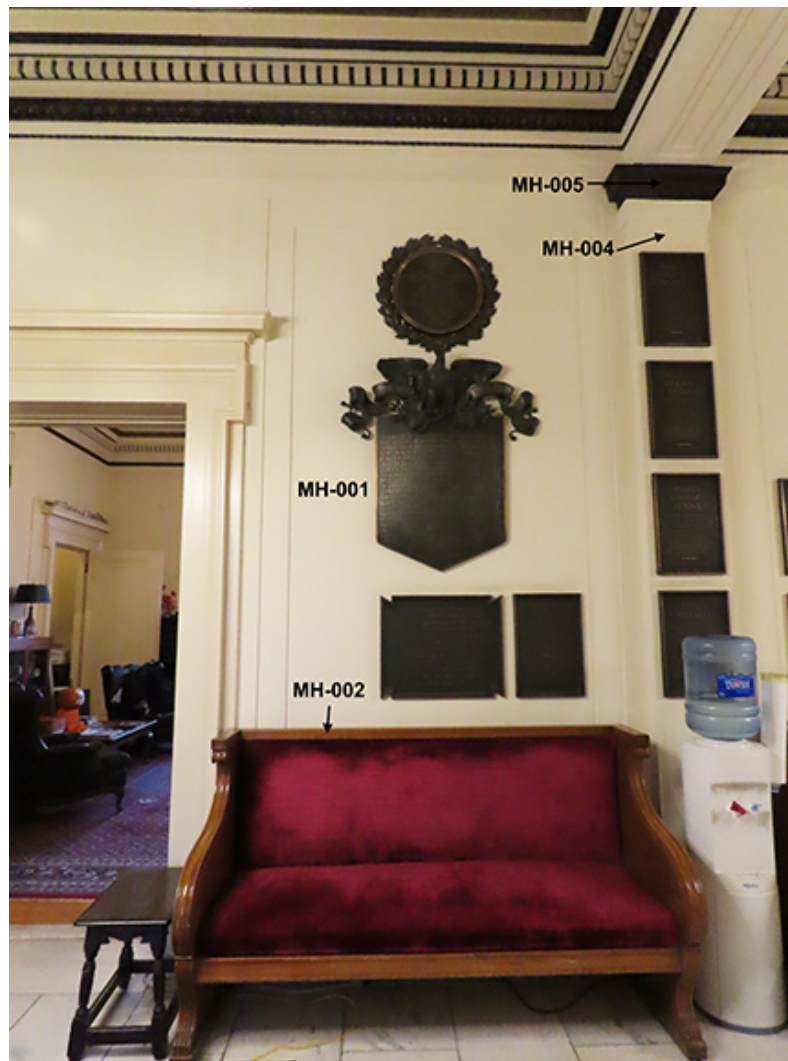
East Stair Paint Locations



East Stair Paint Locations (cont.)



Main Hall Paint Locations



Main Hall Paint Locations (cont.)

Reception Room Paint Locations

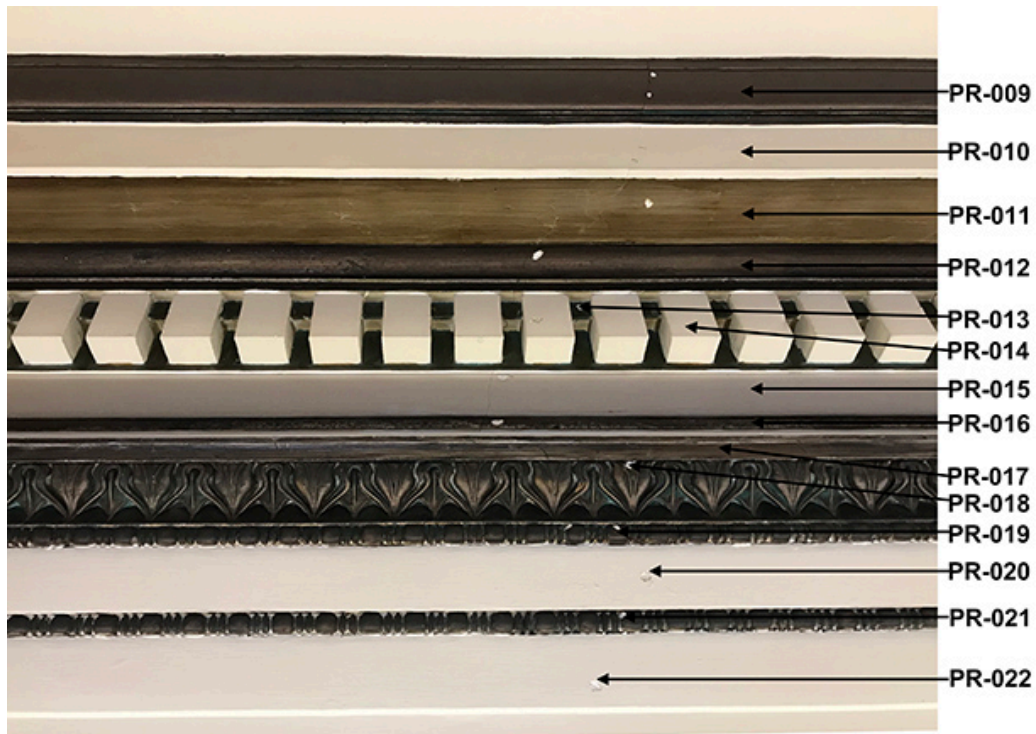


Reception Rooms Paint Locations (cont.)



Pershing Room Paint Locations



Pershing Room Paint Locations (cont.)

Memorial Hall/Ballroom Paint Locations



Memorial Hall/Ballroom Paint Locations (cont.)



Memorial Hall/Ballroom Paint Locations (cont.)



Mezzanine/Balcony Paint Locations



A p p e n d i x B
P a i n t C h r o m o c h r o n o l o g i e s

C u l l u m H a l l
U S M i l i t a r y A c a d e m y a t W e s t P o i n t

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS MS-001 Wall
AND LOCATIONS MS-013 Pilaster

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Grayish yellow	Finish		
2. Grayish yellow	Finish		
3. Orange yellow	Primer		
4. Orange yellow	Finish		
5. Pinkish yellow	Primer		
6. Pinkish yellow	Finish		
7. Yellow	Primer		
8. Yellow	Finish		
9. Pale brown	Primer		
10. Pale brown	Finish		
11. Pinkish yellow	Primer		
12. Pinkish yellow	Finish		
13. Pale yellowish white	Finish		
14. Pale yellowish white	Finish		
15. White	Primer		
16. White	Finish		
17. Yellow	Primer		
18. Yellow	Finish		
19. Yellow	Primer		
20. Yellow	Finish		

Notes:

First finish does not appear to be original. It matches the second and third finishes on the cornice samples.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS MS-002 Band between First and Second Floors

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Yellow	Primer		
2. Pale yellow	Base	BM 192	bet.2.5Y 9/2 & 9/4
3. Blackish green	Dec. layer	SW 6994	10G 2/1
4. Dark grayish brown	Dec. layer	SW 2735	5YR 2/1
5. Dark green	Primer		
6. Dark green	Finish		
7. Grayish green	Primer		
8. Bluish green	Finish		
9. Grayish green	Primer		
10. Grayish green	Finish		
11. Dark green	Finish		
12. Dark green	Finish		
13. Light blue green	Primer		
14. Light blue green	Base		
15. Brown varnish	Finish		

Notes:

The greenish black and dark grayish brown layers are thin.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS MS-003 Cornice, Top Acanthus Leaf Molding
 MS-009 Cornice, Calf's Tongue Molding
 MS-014 Pilaster, Corinthian Capital
 MS-016 Underside of Stairs, Bead Molding

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" colored leaf	Leaf		
6. Dark brown varnish	Varnish	SW 6069	7.5YR 2/2
7. Black	Dec. layer	SW 6991	N1.5/
8. Dark green	Dec. layer	BM 644	7.5G 3/4

Notes:

MS-003 contains a later bronze flake paint.

MS-016 contains a later bronze flake paint, followed by size, silver-colored leaf, and brown varnish.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS	MS-004 Cornice, Flat Molding under Acanthus Leaf Molding
	MS-006 Cornice, Dentil
	MS-008 Cornice, Cyma under Dentil
	MS-010 Cornice, Flat Molding under Calf's Tongue Molding
	MS-012 Cornice, Architrave
	MS-015 Underside of Stairs

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer		
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
5. Yellowish gray	Finish		
6. Yellowish gray	Finish		
7. Orange yellow	Primer		
8. Orange yellow	Finish		
9. Pinkish yellow	Primer		
10. Pinkish yellow	Finish		
11. Yellow	Primer		
12. Yellow	Finish		
13. Pale brown	Primer		
14. Pale brown	Finish		
15. Pinkish yellow	Primer		
16. Pinkish yellow	Finish		
17. White	Primer		
18. White	Finish		
19. Yellow	Primer		
20. Yellow	Finish		
21. Plaster skim coat			
22. Yellow	Primer		
23. Yellow	Finish		

Notes:

MS-012 contains two additional yellow finishes after the first finish.

Third and fourth finishes (layers 5 and 6) appear to be attempts to copy the effect of the original finishes in a paint coating.

Layer 14 on Sample MS-015 is extremely thin.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS MS-005 Cornice, Soffit at Dentils
 MS-007 Cornice, Molding under Dentils
 MS-011 Cornice, Bottom "Metallic" Molding

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Pale yellow	Primer		
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Light bluish green	Base	PPG 1142-5	~2.5BG 6/4
5. Dark grayish brown	Glaze	SW 2735	5YR 2/1
6. Dark green	Glaze	BM 644	7.5G 3/4

Notes:

MS-005 contains an additional olive green and colorless varnish over the original finish

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS MS-017 Stair Railing
AND LOCATIONS

SUBSTRATE: Cast Iron

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Red	Primer		
2. Light bluish green	Primer	PPG 1146-5	bet. 7.5BG 6/4 & 5/4
3. Light bluish green	Base	PPG 1146-5	bet. 7.5BG 6/4 & 5/4
4. Dark grayish brown	Varnish	SW 2735	5YR 2/1
5. Green	Primer		
6. Green	Finish		
7. Dark green	Primer		
8. Dark green	Finish		
9. Grayish green	Primer		
10. Grayish green	Finish		
11. Gray	Finish		
12. Gray	Finish		
13. Pale green	Primer		
14. Brown varnish	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS ES-001 Wall at B1
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Shellac	Primer		
2. Pale yellow	Primer		
3. Yellow	Base		
4. Orange yellow	Finish		
5. Orange yellow	Primer		
6. Yellow	Finish		
7. Orange yellow	Primer		
8. Orange yellow	Finish		
9. White	Primer		
10. Pinkish white	Base		
11. Pale yellowish white	Finish		
12. Grayish yellow	Primer		
13. Grayish yellow	Finish		
14. Pinkish yellow	Primer		
15. Pinkish yellow	Finish		
16. Grayish yellow	Finish		
17. Pale yellowish white	Finish		
18. Pinkish yellow	Finish		
19. Pale yellowish white	Finish		
20. Grayish yellow	Finish		
21. Yellow	Finish		
22. White	Finish		
23. Yellow	Primer		
24. Yellow	Finish		
25. White	Finish		
26. Plaster skim coat			
27. Yellow	Finish		

Notes:

Possible that this sample does not contain the original finish. The earliest finish appears to line up with the second finish on the trim and the second finish from the Main Hall wall samples.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS ES-002 Chair Rail (trim)
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Strong yellowish brown	Varnish	PPG 1080-7	10YR 4/6
5. Yellow	Primer		
6. Yellow	Finish		
7. Yellow	Primer		
8. Yellow	Finish		
9. Orange yellow	Primer		
10. Orange yellow	Finish		
11. White	Finish		
12. Grayish white	Primer		
13. Grayish white	Finish		
14. White	Primer		
15. Grayish yellow	Primer		
16. Grayish yellow	Finish		
17. Pale yellowish white	Finish		
18. Pale yellowish white	Finish		
19. Pale pinkish white	Finish		
20. Pale yellowish white	Finish		
21. Grayish yellow	Finish		
22. White	Finish		
23. White	Finish		
24. Pale yellowish white	Finish		
25. Yellow	Finish		
26. Light yellow	Finish		
27. White	Primer		
28. Pale yellowish white	Primer		
29. Pale yellowish white	Finish		
30. Light blue green	Primer		
31. Light blue green	Finish		
32. Light blue green	Primer		
33. Light blue green	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS ES-003 Ceiling under the Stairs
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Pale yellowish white	Primer		
2. Pale yellowish white	Finish		
3. Yellow	Primer		
4. Yellow	Finish		
5. Yellow	Primer		
6. Yellow	Finish		
7. Orange yellow	Primer		
8. Yellow	Finish		
9. Pale pinkish yellow	Primer		
10. Pale pinkish yellow	Finish		
11. White	Primer		
12. Pale pink	Finish		
13. Pale yellowish white	Primer		
14. Pinkish yellow	Finish		
15. Grayish yellow	Finish		
16. Pinkish yellow	Finish		
17. White	Primer		
18. White	Finish		
19. Pale yellowish white	Primer		
20. Pale yellowish white	Finish		
21. White	Primer		
22. White	Finish		
23. Plaster skim coat			
24. Yellow	Finish		
25. White	Finish		
26. Plaster skim coat			
27. Yellow	Primer		
28. Yellow	Finish		

Notes:

Like sample ES-001, the earliest finish on the ceiling lines up with the second finish on the trim and the second finish from the Main Hall samples.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS ES-004 Molded Band between Floors
AND LOCATIONS

SUBSTRATE: Cast iron

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Red	Primer		
2. Light bluish green	Primer	PPG 1142-5	2.5BG 6/4
3. Light bluish green	Base	PPG 1142-5	2.5BG 6/4
4. Dark grayish reddish brown	Glaze	SW 6006	~2.5YR 2/2
5. Blackish green	Glaze	SW 6994	10G 2/1
6. Dark green	Finish		
7. Blue green	Primer		
8. Blue green	Base		
9. Grayish brownish green	Finish		
10. Green	Finish		
11. Dark green	Primer		
12. Dark green	Finish		
13. Dark green	Primer		
14. Dark green	Finish		
15. Light blue green	Finish		
16. Light blue green	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS ES-005 Metal Railing
AND LOCATIONS

SUBSTRATE: Cast Iron

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Red	Primer		
2. Light bluish green	Primer	PPG 1146-5	bet. 7.5BG 6/4 & 5/4
3. Light bluish green	Base	PPG 1146-5	bet. 7.5BG 6/4 & 5/4
4. Dark grayish brown	Varnish	SW 2735	5YR 2/1
5. Green	Primer		
6. Green	Finish		
7. Dark green	Primer		
8. Dark green	Finish		
9. Grayish green	Primer		
10. Grayish green	Finish		
11. Gray	Finish		
12. Gray	Finish		
13. Pale green	Primer		
14. Brown varnish	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS	MH-001 Wall Field
	MH-003 Ceiling
	MH-004 Pilaster
	MH-014 Cornice, Top Flat Molding
	MH-017 Cornice, Dentil
	MH-018 Cornice, Molding below Dentils
	MH-020 Corner, Lower Flat Molding

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
5. Yellow	Primer		
6. Yellow	Finish		
7. Yellow	Primer		
8. Yellow	Finish		
9. Orange yellow	Primer		
10. Orange yellow	Finish		
11. Pinkish yellow	Primer		
12. Pinkish yellow	Finish		
13. Pinkish yellow	Primer		
14. Pinkish yellow	Finish		
15. Pinkish white	Primer		
16. Pinkish white	Finish		
17. Pale yellowish white	Primer		
18. Pale yellowish white	Finish		
19. Pale yellow	Primer		
20. Pale yellow	Finish		
21. Pinkish white	Primer		
22. Pinkish white	Finish		
23. White	Finish		
24. Yellow	Finish		
25. Plaster skim coat			
26. Yellow	Finish		

Notes:

Sample MH-001 is typical.

Finish glaze is very thinly applied.

MS-012 contains two additional yellow finishes after the first finish.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS MH-002 Wall Base
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Very pale green	Primer	BM 639	~5G 8/2
3. Very pale green	Base	BM 639	~5G 8/2
4. Dark grayish reddish brown	Glaze	SW 6006	~2.5YR 2/2
5. Brown	Finish		
6. Dark green	Finish		
7. Grayish green	Primer		
8. Grayish green	Finish		
9. Grayish green	Finish		
10. Gray	Finish		
11. Blue gray	Primer		
12. Blue gray	Finish		
13. Green	Finish		
14. Green	Finish		
15. Green	Primer		
16. Green	Finish		
17. Gray	Primer		
18. Gray	Finish		
19. Light gray	Finish		
20. Light blue green	Primer		
21. Light blue green	Base		
22. Green	Finish		
23. Grayish green	Primer		
24. Brown varnish	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS MH-005 Pilaster Capital
 AND LOCATIONS MH-015 Cornice, Corona Soffit
 MH-019 Cornice, Egg & Dart and Bead Molding

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer		
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" leaf	Leaf		
6. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
7. Black	Dec. layer	SW 6991	N1.5/
8. Yellow brown varnish	Finish		

Notes:

The original finish may contain a green decorative layer, like other elements, to simulate verdigris, but the appearance of the original surface is obscured by the current layer of varnish.

The current exposed varnish has changed the appearance of the gilded elements. The last varnish layer was most likely applied as a means to refresh the finish.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS MH-006 Door to West Vestibule
 AND LOCATIONS MH-007 Door Frame to West Vestibule
 MH-008 Door Frame to West Vestibule, Bracket
 MH-010 Door Frame to West Vestibule, White Moldings

SUBSTRATE: Wood

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Pale pinkish white	Primer		
2. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Strong yellowish brown	Varnish	PPG 1080-7	10YR 4/6
5. Pale yellowish white	Primer		
6. Pale yellowish white	Base		
7. Gray	Base		
8. Brownish gray varnish	Finish		
9. Pale yellowish white	Finish		
10. Pale yellowish white	Finish		
11. Pale yellowish white	Finish		
12. Yellow	Primer		
13. Gray	Finish		
14. Pale yellowish white	Primer		
15. Gray	Finish		
16. Pale yellowish white	Primer		
17. Pale gray	Finish		
18. Yellow	Primer		
19. Grayish yellow	Finish		
20. Pinish white	Primer		
21. Pinkish white	Finish		
22. White	Finish		
23. Pinkish white	Primer		
24. Pinkish white	Finish		
25. Yellow	Finish		

Notes:

MH-008 is typical

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS MH-009 Door Frame to West Vestibule, Top Bronze Molding
AND LOCATIONS MH-012 Door Frame to West Vestibule, Lower Bronze Molding

SUBSTRATE: Wood

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Pale pinkish white	Primer		
2. Pale yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Pale yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" leaf	Leaf		
6. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
7. Black	Dec. layer	SW 6991	N1.5/
8. Dark green	Dec. layer	BM 644	7.5G 3/4

Notes:

MH-012 is typical. Black and green layers are in trace amounts on sample—simulated verdigris.

MH-009 contains an additional two layers of varnish as the current finish.



Surface of sample MH-012 at top; MH-009 on bottom.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS MH-011 Door Frame to West Vestibule, Background to Dentils
AND LOCATIONS

SUBSTRATE: Wood

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Pale pinkish white	Primer		
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Light green	Base	BM 634	7.5G 7/4
4. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
5. Gray	Primer		
6. White	Base		
7. Green	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS MH-013 Cornice, Top Bronze Molding
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
2. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Dark grayish brown	Glaze	SW 6069	7.5YR 2/2
4. Yellow varnish	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS MH-016 Cornice, Dentil Background
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Light green	Base	BM 634	7.5G 7/4
5. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS RR-001 North Reception Room Wall
 RR-009 North Reception Room Cornice, White Moldings
 RR-010 North Reception Room Cornice above Grille

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Pale yellow	Primer		
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
5. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
6. Yellow	Primer		
7. Yellow	Finish		
8. Yellow	Primer		
9. Yellow	Finish		
10. Orange yellow	Primer		
11. Orange yellow	Finish		
12. Orange yellow	Primer		
13. Orange yellow	Finish		
14. Pinkish yellow	Primer		
15. Pinkish yellow	Finish		
16. Light pinkish brown	Primer		
17. Pinkish white	Finish		
18. Pinkish white	Finish		
19. Pinkish white	Finish		
20. Grayish white	Finish		
21. Yellow	Primer		
22. Yellow	Finish		
23. Plaster skim coat			
24. White	Finish		
25. Plaster skim coat			
26. Yellow	Finish		
27. Yellow	Finish		
28. Yellow	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS RR-002 South Reception Room Wall Base
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Blackish green	Base	SW 6994	10G 2/1
3. Very pale green	Dec. layer	BM 639	~5G8/2
4. Dark grayish reddish brown	Dec. layer	SW 6006	~2.5YR 2/2
5. Green	Finish		
6. Light blue green	Primer		
7. Grayish green	Finish		
8. Dark green	Primer		
9. Dark green	Finish		
10. Green	Primer		
11. Green	Finish		
12. Dark blue green	Finish		
13. Yellow	Primer		
14. Yellow	Finish		
15. Yellow	Primer		
16. Yellow	Finish		
17. White	Primer		
18. Grayish blue	Primer		
19. Grayish blue	Base		
20. Black glaze	Finish		

Notes:

Current finish appears to be a recreation of the original finish.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS RR-003 North Reception Room Ceiling
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Pale yellow	Primer		
3. Yellowish white	Finish	BM OC-36	bet. 7.5Y 9/2 & 8.5
4. Pale pinkish yellow	Primer		
5. Pale pinkish yellow	Finish		
6. Orange yellow	Primer		
7. Orange yellow	Finish		
8. Pinkish yellow	Primer		
9. Pinkish yellow	Finish		
10. Pinkish yellow	Primer		
11. Light pinkish brown	Primer		
12. Light pinkish brown	Finish		
13. Pale yellowish white	Finish		
14. Pale yellowish white	Finish		
15. Pale yellowish white	Primer		
16. Pale yellowish white	Finish		
17. Pinkish white	Primer		
18. Pinkish white	Finish		
19. White	Finish		
20. Yellow	Primer		
21. Yellow	Base		
22. Yellow	Finish		
23. Yellow	Primer		
24. Yellow	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS RR-004 South Reception Room, West Closet Door Frame
 RR-005 Pocket Door Frame
 RR-006 Pocket Door

SUBSTRATE: Wood

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Strong yellowish brown	Varnish	PPG 1080-7	10YR 4/6
5. Pale yellowish white	Finish		
6. Yellow	Finish		
7. Pale yellowish white	Finish		
8. Grayish yellow	Finish		
9. Pale yellowish white	Primer		
10. Grayish yellow	Finish		
11. White	Primer		
12. Grayish white	Finish		
13. Pinkish white	Primer		
14. Pale yellowish white	Finish		
15. White	Primer		
16. White	Finish		
17. Yellow	Primer		
18. Yellow	Finish		
19. Greenish yellow	Primer		
20. Greenish yellow	Finish		
21. Pale yellowish white	Finish		
22. Pinkish yellow	Finish		
23. Pale yellowish white	Finish		

Notes:

The overall effect of the brownish yellow varnish on the base coat is light yellow.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS RR-007 North Reception Room Picture Rail

SUBSTRATE: Wood

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Pale yellow	Primer		
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Yellowish white	base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
5. Pale yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
6. Dark yellow size	Size	BM 266	5Y 6/6
7. "Silver" leaf	Leaf		
8. Dark brown varnish	Finish	BM 6069	7.5YR 2/2
9. Black	Dec. layer	SW 6991	N1.5/
10. Dark green	Dec. layer	BM 644	7.5G 3/4
11. Yellow varnish	Finish		

Notes:

It appears that this molding was first painted like the walls, then leafed.

The yellow varnish, which is the final layer, is later attempt to refresh the finish.

Original
finish



TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS RR-008 North Reception Room, Corona Soffit

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Pale yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Pale yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" leaf	Leaf		
6. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
7. Black	Dec. later	SW 6991	N1.5/
8. Dark green	Dec. layer	BM 644	7.5G 3/4

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS RR-011 North Reception Room Cornice, Dentil Background

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Light bluish green	Base	PPG 1142-5	~2.5BG 6/4
5. Dark grayish brown	Varnish	SW 2735	5YR 2/1
6. Pale yellowish white	Primer		
7. Light blue green	Base		
8. Brown varnish	Finish		

Notes:

The current (second) finish is an attempt to match the original finish. The blue green base paint and brown varnish are applied in a striated texture which allows the earlier layers to show through. Original finish is much more dynamic than the replication.



TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS RR-012 North Reception Room Cornice, Top “Bronze” Molding

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Light bluish green	Dec. layer	PPG 1142-5	~2.5BG 6/4
5. Dark green	Dec. layer	BM 644	7.5G 3/4
6. Dark grayish brown	Varnish	SW 6069	7.5 YR 2/2

Notes:



Surface of sample showing complex finish.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS

PR-001 Wall, Outer Frame
 PR-002 Wall Grille, Cornice
 PR-004 Ceiling
 PR-005 Ceiling Beam Soffit, Center
 PR-006 Pilaster

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet 7.5Y 9/2 & 8.5/2
4. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
5. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
6. Light yellow	Primer		
7. Light yellow	Finish		
8. Light brownish gray	Primer		
9. Light brownish gray	Finish		
10. Light yellowish brown	Primer		
11. Light yellowish brown	Base		
12. Light yellowish brown	Finish		
13. Light brownish gray	Primer		
14. Light brownish gray	Finish		
15. Pinkish white	Primer		
16. Pinkish white	Finish		
17. White	Finish		
18. Light pinkish gray	Primer		
19. Light pinkish gray	Finish		
20. Light blue green	Primer		
21. Light blue green	Finish		
22. White	Primer		
23. White	Finish		
24. Yellow	Primer		
25. Yellow	Finish		
26. Yellow	Primer		
27. Yellow	Finish		
28. Plaster skim coat			
29. White	Primer		
30. Light yellow	Finish		

Notes:

Samples PR-001, PR-002, PR-006 are identical to typical.

PR-004 contains no green layers (19 & 20) and has slightly fewer layers

PR-006: Layers 16, 17, and 18 are pure white.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS PR-003 Wall Grille
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Grayish yellow	Primer	BM OC-36	bet. 7.5YR 9/2 & 8.5/2
2. Grayish yellow	Finish	BM OC-36	bet. 7.5YR 9/2 & 8.5/2
3. Grayish yellow	Primer		
4. Yellow	Finish		
5. Moderate gray	Primer		
6. Pinkish yellow	Base		
7. Pinkish yellow	Finis		
8. Light gray	Primer		
9. Yellow	base		
10. Pinkish yellow	Base		
11. Pinkish yellow	finish		
12. Grayish white	Primer		
13. Pinkish white	Finish		
14. Gray	Primer		
15. Pinkish white	finish		
16. Gray	Primer		
17. Yellow white	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

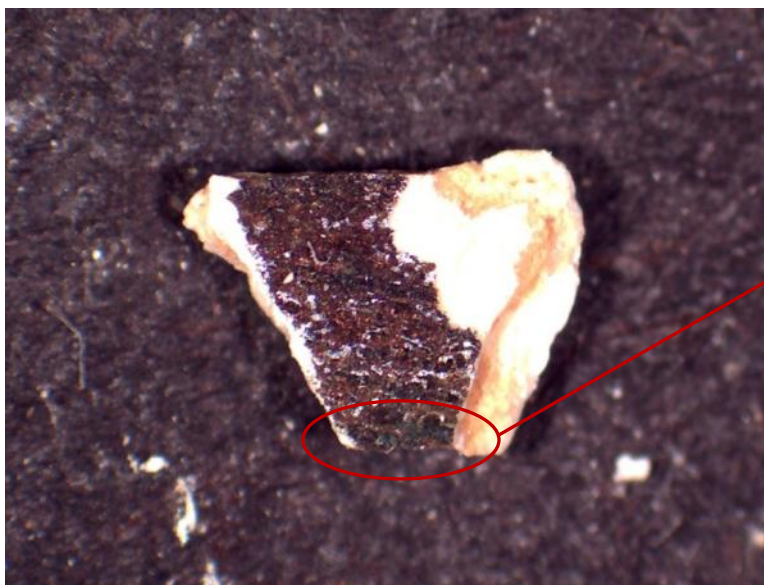
SAMPLE NUMBERS AND LOCATIONS PR-007 Pilaster, Molding under Capital
 PR-016 Cornice, Bronze Molding under Dentil
 PR-019 Cornice, Bronze Flat Molding under Calf's Tongue Molding
 PR-021 Cornice, Bottom Bead Molding

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" leaf	Leaf		
6. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
7. Black	Dec. Layer	SW 6991	N1.5/
8. Dark green	Dec. Layer	BM 644	7.5G 3/4

Notes:

Black and green glazes are found in the recesses of the moldings to simulate verdigris.



Black and
green glazes

Sample PR-016 with original finish exposed.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

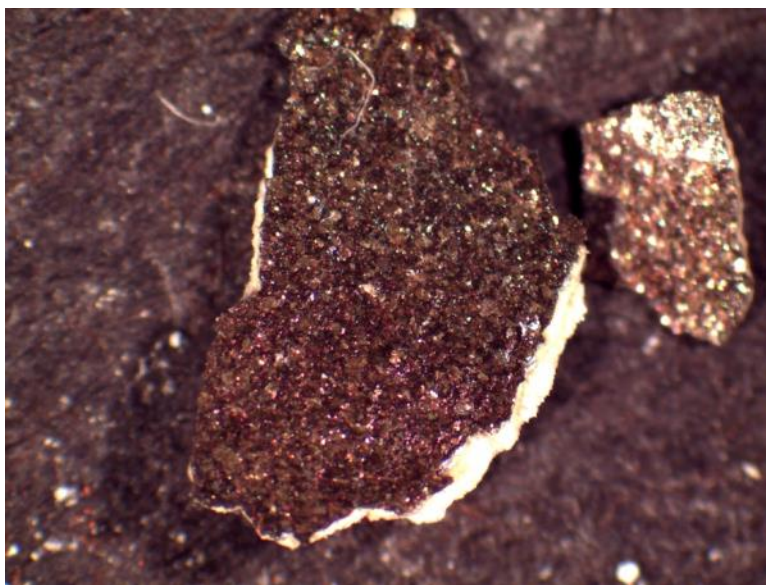
SAMPLE NUMBERS PR-008 Pilaster Capital
AND LOCATIONS PR-009 Cornice, Top Molding

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" leaf	Leaf		
6. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
7. Black	Dec. Layer	SW 6991	N1.5/
8. Dark green	Dec. Layer	BM 644	7.5G 3/4
9. Bronze flake paint	Finish		

Notes:

A bronze flake paint has been applied over the original complex finish, most likely to refresh the original finish or disguise repairs.



Surface of sample PR-008 showing the bronze flake paint.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS

PR-010 Cornice, Flat Molding under Top Molding
 PR-014 Cornice, Dentil
 PR-015 Cornice, Molding under Dentil
 PR-017 Cornice, Flat Molding above Calf's Tongue Molding
 PR-020 Cornice, Flat Molding below Calf's Tongue Molding
 PR-022 Cornice, Architrave

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Pale yellow	Primer		
3. Pale yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Pale yellow	Finish	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
5. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
6. Yellow	Base		
7. Yellow	Finish		
8. Orange yellow	Primer		
9. Orange yellow	Finish		
10. Pinkish yellow	Primer		
11. Pinkish yellow	Finish		
12. Gray	Finish		
13. Pinkish white	Finish		
14. White	Primer		
15. White	Finish		
16. Yellow	Primer		
17. Yellow	Finish		

Notes:

The color of layer 4 is affected by the glaze above it which has been absorbed into the paint.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS PR-011 Cornice, Corona Soffit
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" leaf	Leaf		
6. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
7. Black	Dec. Layer	SW 6991	N1.5/
8. Dark green	Dec. Layer	BM 644	7.5G 3/4
9. Pale yellowish white	Primer		
10. Yellow	Base		
11. Yellow	Finish		
12. Orange yellow	Primer		
13. Orange yellow	Finish		
14. Yellow	Finish		
15. Yellow	Finish		
16. Pale yellowish white	primer		
17. Pale yellowish white	Base		
18. Greenish size	Size		
19. Silver colored leaf	Leaf		
20. Brown varnish	Finish		

Notes:

The current finish is a replication of the original finish.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS PR-012 Cornice, Bronze Molding above Dentil

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" leaf	Leaf		
6. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
7. Dark grayish brown	Dec. Layer	SW 6069	7.5YR 2/2

Notes:

The brown glaze and the brown varnish are the same color. However, the glaze is more opaque than the varnish.



Sample PR-012 showing original finish

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS PR-013 Cornice, Dentil Background
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Light green	Base	BM 641	7.5G 7/4
5. Dark grayish brown	Finish	SW 6069	7.5YR 2/2

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

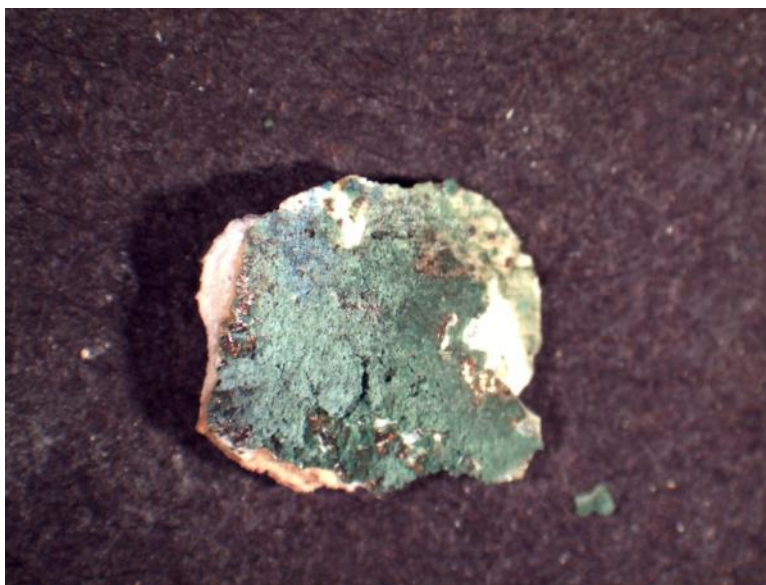
SAMPLE NUMBERS AND LOCATIONS PR-018 Cornice, Background to Calf's Tongue Molding

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. Silver colored leaf	Leaf		
6. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
7. Black	Dec. Layer	SW 6991	N1.5/
8. Dark green	Dec. Layer	BM 644	7.5G 3/4
9. Pale blue	Dec. Layer	BM 1670	~10B 6/4

Notes:

The black, green, and blue glazes are found in the recesses of the molding and are used to simulate verdigris.



Surface of Sample PR-018

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS PR-023 Door Surround, Bronze Molding above Dentil

SUBSTRATE: Wood

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" leaf	Leaf		
6. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
7. Black	Dec. layer	SW 6991	N1.5/
8. Dark green	Dec. layer	BM 644	7.5G 3/4
9. Yellow	Primer		
10. Yellow	Finish		
11. Silver leaf	Leaf		
12. Brown	Varnish		

Notes:



Original finish on Sample PR-023

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS PR-024 Door Surround, Dentil
AND LOCATIONS PR-025 Door Surround, Flat Area above Door

SUBSTRATE: Wood

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Strong yellowish brown	Varnish	PPG 1080-7	10YR 4/6
5. Light yellow	Primer		
6. Light yellow	Finish		
7. Orange yellow	Primer		
8. Orange yellow	Finish		
9. Pinkish yellow	Primer		
10. Pinkish yellow	Finish		
11. Pinkish yellow	Primer		
12. Pinkish yellow	Finish		
13. White	Primer		
14. White	Finish		
15. Blue green	Primer		
16. Blue green	Finish		
17. Yellow	Primer		
18. Yellow	Finish		
19. Yellow	Primer		
20. Yellow	Finish		
21. Light yellow	Finish		

Notes:

PR-024 is typical.

PR-025 does not contain layers 8 and 9.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS PR-026 Door Surround Bracket
AND LOCATIONS PR-027 Door

SUBSTRATE: Wood

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Strong yellowish brown	Varnish	PPG 1080-7	10YR 4/6
5. Light yellow	Primer		
6. Light yellow	Base		
7. Light brown varnish	Finish		
8. Light pinkish yellow	Primer		
9. Light pinkish yellow	Finish		
10. White	Primer		
11. White	Finish		
12. White	Primer		
13. White	Finish		
14. Blue green	Primer		
15. Blue green	Finish		
16. Light yellow	Primer		
17. Light yellow	Finish		
18. Yellow	Primer		
19. Yellow	Finish		
20. Light yellow	Finish		

Notes:

PR-026 is typical.

PR-027 contains a pinkish white and white finish after layer 16.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS	Ball-001 Coffe Molding
	Ball-004 Rosette in Coffe
	Ball-005 Cornice Modillion
	Ball-009 Cornice, Egg & Dart Molding
	Ball-012 Cornice, Egg & Dart Molding below Dentils
	Ball-017 Top Bronze Band in Architrave
	Ball-018 Second Bronze band in Architrave
	Ball-021 3 rd Bronze Molding in Architrave, Swag
	Ball-023 Lowest Bead Molding in Architrave
	Ball-026 South Doorway, Acanthus Leaf Molding in Cornice
	Ball-028 South Doorway, Calf's Tongue Molding
	Ball-029 South Doorway, Cornice, Coin Molding
	Ball-030 South Doorway, Cornice, Egg & Dart above Caryatid
	Ball-032 Caryatid Base
	Ball-036 Proscenium
	Ball-039 Column Capital

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1068-7	7.5YR 4/8
2. Silver colored leaf	Leaf		
3. Dark grayish brown	Vanish	SW 6069	7.5YR 2/2
4. Black	Dec. layer	SW 6991	N1.5/
5. Dark green	Dec. layer	BM 644	7.5G 3/4
6. Grayish blue	Dec. layer	BM 1664	bet. 10B 6/4 & 5/4

Notes:

Black, green, and blue glaze paints are found in the recesses of the moldings to simulate verdigris.
 Samples Ball-004, Ball-030 and Ball-032 have bronze flake paint over the original leaf finish.
 Sample Ball-036 has a later greenish size, silver leaf, and brown varnish over the original finish.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Ball-002 Frame around Coffered
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
5. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
6. Yellow	Primer		
7. Yellow	Finish		
8. Light yellow	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Ball-003 Coffe Background to Rosette
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
2. Yellowish white	Finish	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Pale greenish yellow	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Ball-006 Cornice, Outer Frame between Modillions
AND LOCATIONS Ball-008 Cornice, Center Panel between Modillions

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Pale yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Pale yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
5. Orange yellow	Primer		
6. Orange yellow	Finish		
7. Yellow	Primer		
8. Yellow	Finish		
9. Brown	Finish		
10. Light yellow	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS Ball-007 Cornice, Bronze Frame between Modillions

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Gold flake paint	Finish		

Notes:

The gold flake paint is not the original finish, as it occurs in later layers in other samples. Also, cornice and ceiling elements in the ballroom that are leafed do not contain yellowish white base layers. It is possible that this element originally had glaze layers to achieve a bronze appearance.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS Ball-010 Bronze Strip between Dentils

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Dark grayish reddish brown	Base	SW 6006	~2.5YR 2/2
2. Dark green	Finish	BM 644	7.5G 3/4

Notes:

The dark brown paint is unevenly applied and is very thin in areas where the plaster can be seen through. There are small areas of green paint over the brown to simulate verdigris.



Surface of Sample Ball-010

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Ball-011 Cornice, Dentil
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
5. Yellow	Primer		
6. Yellow	Finish		
7. Orange yellow	Primer		
8. Orange yellow	Finish		
9. Pinkish yellow	Finish		
10. Yellow	Primer		
11. Yellow	Finish		
12. Light yellow	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS Ball-013 Frieze, Background to Letters

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
5. Yellow	Primer		
6. Yellow	Finish		
7. Orange yellow	Primer		
8. Orange yellow	Finish		
9. Orange yellow	Primer		
10. Orange yellow	Finish		
11. Pinkish yellow	Finish		
12. Dark grayish brown	Finish		
13. Yellow	Primer		
14. Yellow	Finish		
15. Light yellow	Primer		
16. Light yellow	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS Ball-014 Frieze, Lettering, "U" in "PUERTO RICO"

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. "Silver" leaf	Leaf		
3. Dark grayish reddish brown	Varnish	SW 6006	~2.5YR 2/2
4. Dark green	Dec. layer	BM 644	7.5G 3/4

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS

Ball-015 Top of Architrave
 Ball-016 Top Flat Band in Architrave
 Ball-019 Band in Architrave between 2nd and 3rd Bronze Moldings
 Ball-022 White Molding between 3rd and Bottom Bronze Moldings
 Ball-024 Lowest White Band in the Architrave

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
5. Orange yellow	Primer		
6. Orange yellow	Finish		
7. Pinkish yellow	Finish		
8. Dark brownish gray	Finish		
9. Yellow	Primer		
10. Yellow	Finish		
11. Light yellow	Primer		
12. Light yellow	Finish		
13. Yellow	Finish		

Notes:

Ball-022 contains another orangey yellow finish after layer 7.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS Ball-020 3rd Bronze Molding in Architrave, Background

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Light green	Dec. layer	BM 634	7.5G 7/4
4. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2

Notes:

There is no leaf on this sample. Only the high points of the molding are leafed.
The yellow green layer is very thin and difficult to match.



TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS Ball-025 Greek Key Motif

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Yellow	Primer		
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Light green	Base	BM 634	7.5G 7/4
5. Yellowish white	Dec. layer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
6. Dark grayish brown	Dec. layer	SW 6069	7.5YR 2/2
7. Black	Dec. layer	SW 6991	N1.5/

Notes:

The pale yellowish white decorative layer (7) is not apparent in every sample fragment. It must have been applied sporadically to achieve a variegated surface.



Surface of Sample Ball-025

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS AND LOCATIONS Ball-027 South Doorway, Cornice Dentil

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
5. Orange yellow	Primer		
6. Orange yellow	Finish		
7. Orange yellow	Primer		
8. Orange yellow	Finish		
9. Pinkish yellow	Finish		
10. Gray	Primer		
11. Gray	Finish		
12. Yellow	Primer		
13. Yellow	Finish		
14. Light yellow	Primer		
15. Light yellow	Finish		

Notes:

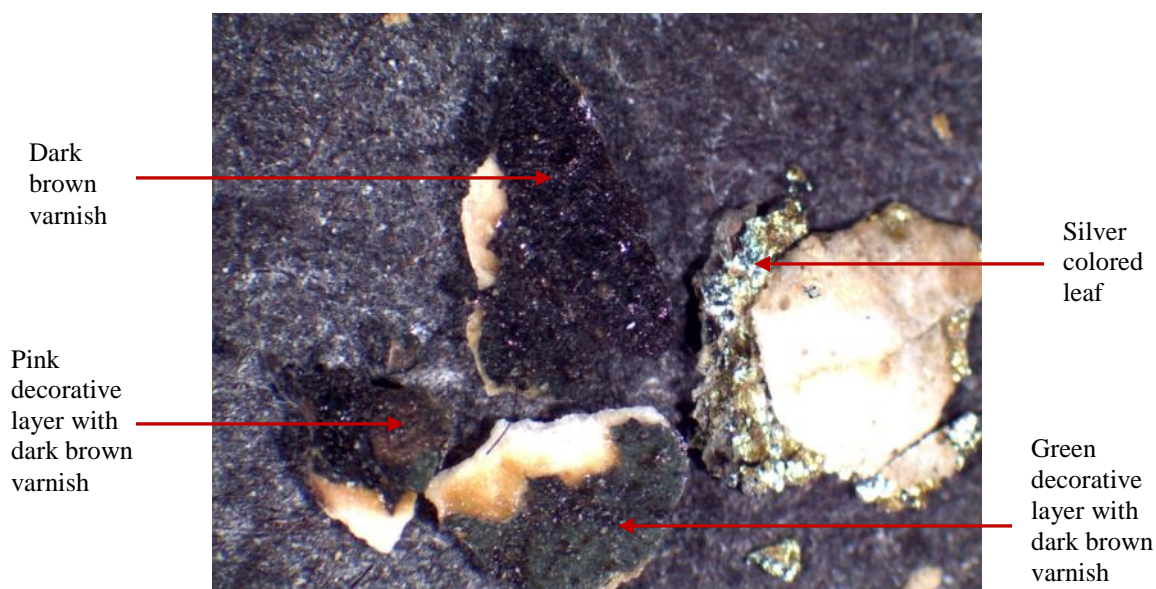
TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Ball-031 Caryatid
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Dark yellow size	Size	BM 266	5Y 6/6
3. "Silver" leaf	Leaf		
4. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
5. Dark green	Dec. Layer	BM 644	7.5G 3/4
6. Light brown	Dec. Layer	BM 1161	5YR 5/4
7. Dark grayish reddish brown	Varnish	SW 6006	~2.5YR 2/2

Notes:



Sample Ball-031 showing the different layers of the finish.

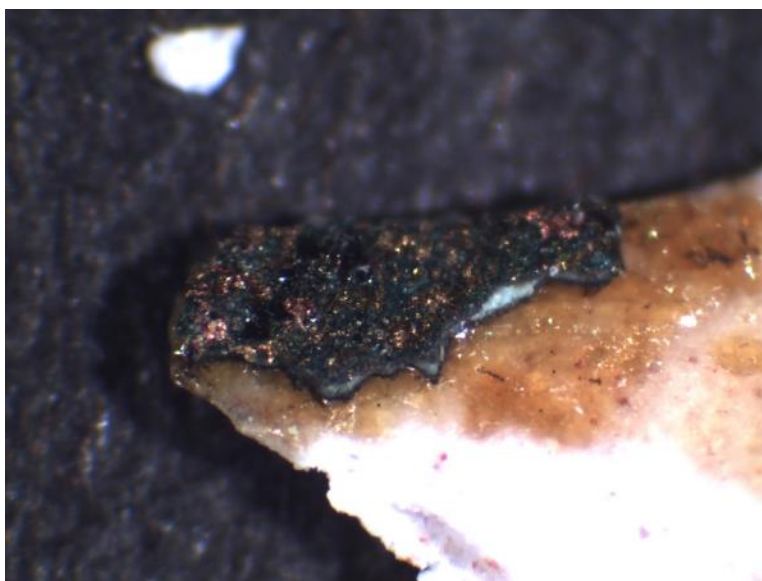
TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Ball-033 Caryatid Plinth Base
AND LOCATIONS Ball-041 Wall Base

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Blackish green	Dec. layer	SW 6994	10G 2/1
3. Light bluish gray	Dec. layer	BM 674	10BG 8/2
4. Dark brownish gray	Dec. layer	SW 2735	5YR 2/1
5. Dark green	Primer		
6. Gold flake paint	Base		
7. Brown	Varnish		
8. Copper flake paint	Base		
9. Brown	Varnish		
10. Dark green	Finish		
11. Dark gray	Finish		
12. Gray	Primer		
13. Dark Gray	Finish		
14. Black	Finish		
15. Green	Primer		
16. Dark brown varnish	Finish		
17. Green	Primer		
18. Dark brown varnish	Finish		

Notes:



TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Ball-034 South Door
AND LOCATIONS Ball-035 South Door Frame

SUBSTRATE: Wood

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" leaf	Leaf		
6. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
7. Light green	Primer		
8. Gold flake paint	Finish		
9. Light green	Primer		
10. Copper flake paint	Finish		
11. Blue green	Finish		
12. Blue green	Primer		
13. Blue green	Finish		
14. Blue green	Primer		
15. Blue green	Finish		
16. Blue green	Primer		
17. Blue green	Finish		
18. Pinkish gray	Primer		
19. Pinkish gray	Finish		
20. White	Primer		
21. Greenish size	Size		
22. Silver colored leaf	Leaf		
23. Brown varnish	Finish		
24. Bronze flake paint	Finish		

Notes:

Ball-035 is Typical

Ball-034 starts at layer 20.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Ball-037 Stage Front Cornice
AND LOCATIONS

SUBSTRATE: Wood

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Light yellow	Primer		
3. Pale yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" leaf	Leaf		
6. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
7. Light green	Primer		
8. Gold flake paint	Finish		
9. Dark brown			
10. Green	Primer		
11. Green	Primer		
12. Copper flake paint	Finish		
13. Green	Primer		
14. Copper flake paint	Base		
15. Brown varnish	Finish		
16. Plaster skim coat			
17. Greenish size	Size		
18. Silver colored leaf	Leaf		
19. Brown varnish	Finish		
20. Bronze flake paint	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Ball-038 Stage Front
AND LOCATIONS Ball-040 Column Shaft

SUBSTRATE: Ball-038 Wood; Ball-040 Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Dark reddish brown	Dec. layer	SW 7594	bet. 10R 2/4 & 3/4
3. Light brown	Dec. layer	BM 1228	bet. 5YR & 2.5YR 6/4
4. Dark reddish brown	Dec. varnish	SW 9182	2.5YR 2/4
5. Dark grayish reddish brown	Dec. layer	SW 2838	10R 2/2
6. Dark reddish brown	Dec. varnish	SW 9182	2.5YR 2/4
7. Dark grayish reddish brown	Dec. layer	SW 2838	10R2/2
8. Pale yellow	Dec. layer	BM 192	bet. 2.5Y 9/2 & 9/4
9. Dark reddish brown	Finish	SW 9182	2.5YR 2/4
10. Grayish red	Primer		
11. Grayish red	Finish		
12. Yellow	Finish		
13. Yellow	Finish		
14. Yellow	Finish		
15. White	Finish		
16. Plaster skim coat			
17. Red	Primer		
18. Red varnish	Dec. Layer		
19. Pink	Dec. Layer		
20. Red	Dec. Layer		
21. Red varnish	Finish		

Notes:

Very complex painted finish most likely intended to mimic the scagliola caryatid plinths. Current finish is a poor approximation.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Ball-042 Grille Cornice
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. White	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
2. White	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Greenish size	Size	BM 266	5Y 6/6
4. Silver colored leaf	Leaf		
5. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
6. Light brown	Dec. Layer	BM 1228	bet. 5YR & 2.5YR 6/4
7. Yellow	Primer		
8. Yellowish white	Base		
9. Greenish size	Size		
10. Silver colored leaf	Leaf		
11. Brown	Varnish		
12. Brown	Dec.Layer		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Ball-043 Grille
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. White	Primer	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
2. White	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
3. Greenish size	Size	BM 266	5Y 6/6
4. Silver colored leaf	Leaf		
5. Dark grayish brown	Varnish	SW 6069	7.5YR 2/2
6. White	Primer		
7. Yellowish white	Finish		
8. White	Primer		
9. Yellowish white	Base		
10. Greenish size	Size		
11. Silver colored leaf	Leaf		
12. Brown	Varnish		
13. Brown	Dec.Layer		

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Balc-001 Lower Wall
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Pale yellow	Primer		
3. Yellowish white	Base	BM OC-36	bet 7.5Y 9/2 & 8.5/2
4. Yellowish white	Base	BM OC-36	bet 7.5Y 9/2 & 8.5/2
5. Dark grayish brown	Varnish	SW 6069	7.5YR 4/8
6. Light yellow	Primer		
7. Light yellow	Finish		
8. Orange yellow	Primer		
9. Orange yellow	Finish		
10. Light yellow	Primer		
11. Light yellow	Finish		
12. Orange yellow	Primer		
13. Orange yellow	Finish		
14. Pinkish white	Primer		
15. Pinkish white	Finish		
16. Pale pinkish white	Primer		
17. Pale pinkish white	Finish		
18. Yellow	Primer		
19. Yellow	Finish		
20. Yellow	Primer		
21. Yellow	Finish		
22. Pale yellowish white	Finish		
23. Yellow	Finish		
24. Pinkish white	Finish		
25. Pale yellowish white	Primer		
26. Pale yellowish white	Finish		
27. Pale yellowish white	Finish		
28. Pinkish white	Primer		
29. Pinkish white	Finish		
30. White	Primer		
31. White	Base		
32. Light brown varnish	Finish		
33. Yellow	Finish		
34. Yellow	Finish		
35. Yellow	Finish		
36. Plaster skim coat			

37. Yellow

Primer

38. Yellow

Finish

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Balc-002 Ceiling
AND LOCATIONS

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet 7.5Y 9/2 & 8.5/2
4. Yellowish white	Finish	BM OC-36	bet 7.5Y 9/2 & 8.5/2
5. Pale yellowish white	Primer		
6. Pale yellowish white	Finish		
7. Orange yellow	Primer		
8. Orange yellow	Finish		
9. Pinkish yellow	Primer		
10. Pinkish yellow	Finish		
11. Brownish yellow	Primer		
12. Brownish yellow	Finish		
13. Pinkish yellow	Primer		
14. Pinkish yellow	Finish		
15. Yellow	Primer		
16. Yellow	Finish		
17. Pinkish white	Primer		
18. Pinkish white	Finish		
19. White	Primer		
20. White	Finish		
21. Yellow	Primer		
22. Yellow	Finish		
23. Plaster skim coat			
24. Yellow	Primer		
25. Yellow	Finish		
26. Yellow	Primer		
27. Yellow	Finish		
28. Yellow	Finish		

Notes:

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Balc-003 Pilaster
AND LOCATIONS Balc-007 Cornice, "White" Moldings

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Pale yellow	Primer		
3. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
4. Yellowish white	Base	BM OC-36	bet. 7.5Y 9/2 & 8.5/2
5. Yellowish gray	Glaze	PPG 1102-4	bet. 2.5Y 7/2 & 7/4
6. Grayish yellow	Primer		
7. Grayish yellow	Finish		
8. Grayish yellow	Primer		
9. Grayish yellow	Finish		
10. Grayish yellow	Primer		
11. Grayish yellow	Finish		
12. Yellow	Primer		
13. Yellow	Finish		
14. Grayish yellow	Primer		
15. Grayish yellow	Finish		
16. Orange yellow	Primer		
17. Orange yellow	Finish		
18. White	Primer		
19. White	Finish		
20. Grayish white	Finish		
21. Pale yellowish white	Finish		
22. Brownish yellow	Primer		
23. Brownish yellow	Finish		
24. Pinkish white	Primer		
25. Pinkish white	Finish		
26. White	Primer		
27. Pale yellowish white	Finish		
28. Pinkish white	Finish		
29. White	Finish		
30. Plaster skim coat			
31. Yellow	Primer		
32. Yellow	Finish		
33. Yellow	Primer		
34. Yellow	Finish		
35. Plaster skim coat			
36. Yellow	Finish		

37. Yellow

Finish

Notes:

Samples Balc-007: Layers 5 to 14 are only one finish consisting of two layers.

TYPICAL PAINT CHROMOCHRONOLOGY AND COLOR MATCH

SAMPLE NUMBERS Balc-004 Pilaster, Bronze Molding
AND LOCATIONS Balc-005 Pilaster Capital, Bronze Moldings
 Balc-006 Picture Rail
 Balc-008 Cornice, Bronze Moldings

SUBSTRATE: Plaster

CHROMOCHRONOLOGY	PRIMER/ FINISH	COMMERCIAL MATCH	MUNSELL MATCH
1. Strong brown shellac	Primer	PPG 1069-7	7.5YR 4/8
2. Yellowish white	Primer	BM OC-36	bet 7.5Y 9/2 & 8.5/2
3. Yellowish white	Base	BM OC-36	bet 7.5Y 9/2 & 8.5/2
4. Dark yellow size	Size	BM 266	5Y 6/6
5. "Silver" leaf	Leaf		
6. Dark grayish brown varnish	Varnish	SW 6069	7.5YR 2/2
7. Bronze flake paint	Finish		
8. Light green	Primer		
9. Green	Base		
10. Gold flake paint	Finish		
11. White	primer		
12. Green	Base		
13. Brown	Finish		
14. Dark Green	Primer		
15. Green	Finish		
16. White	Primer		
17. White	Base		
18. Silver leaf	Leaf		
19. Green	Primer		
20. Bronze flake paint	Finish		

Notes:

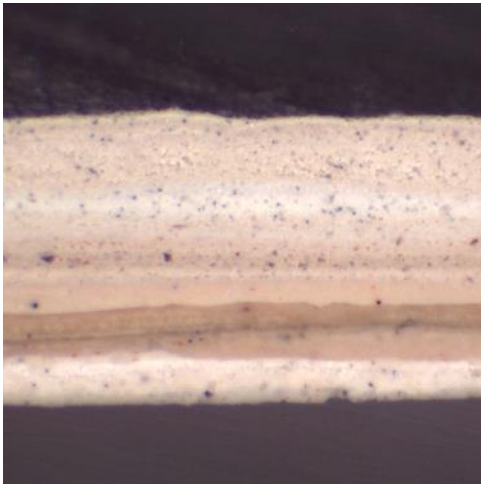
Balc-004 and 005 are typical and identical

Balc-006 and 008 are identical. Their chromochronologies end at layer 7.

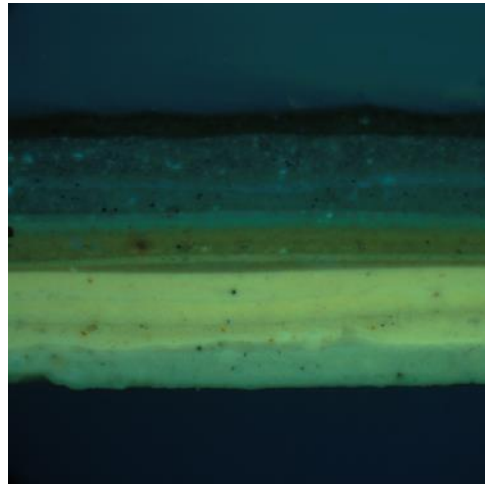
A p p e n d i x C **P h o t o m i c r o g r a p h s**

C u l l u m H a l l
U S M i l i t a r y A c a d e m y a t W e s t P o i n t

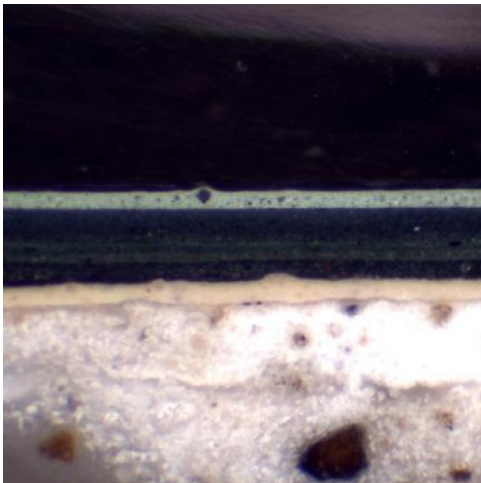
Main Stair



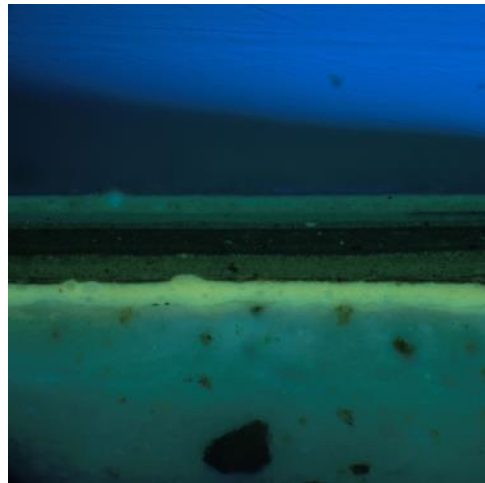
MS-001 Simulated Daylight



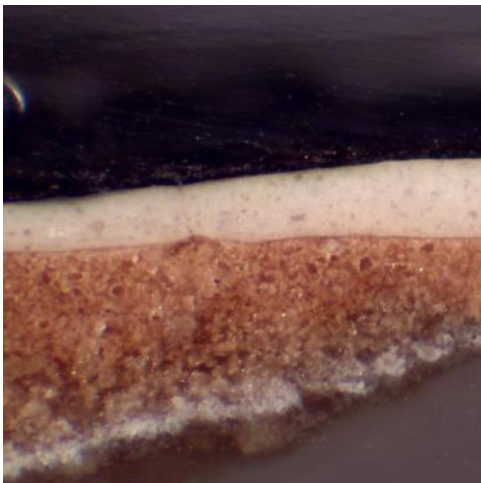
MS-001 Ultraviolet Light



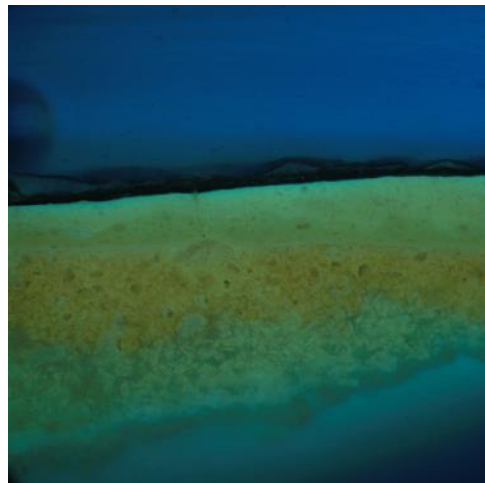
MS-002 Simulated Daylight



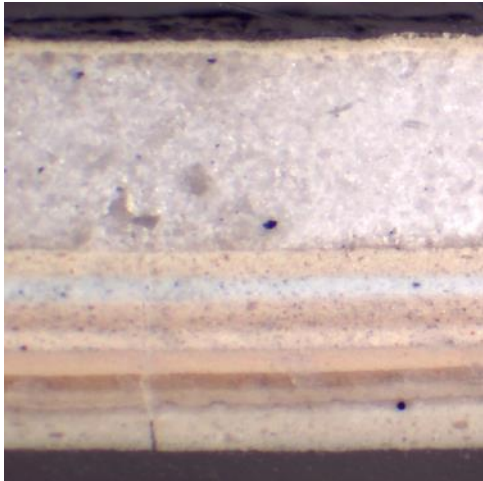
MS-002 Ultraviolet Light



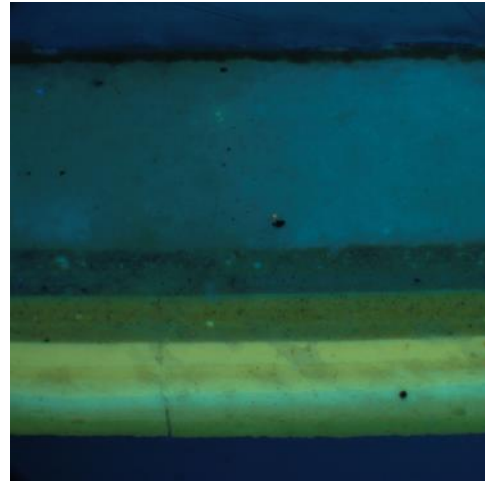
MS-003 Simulated Daylight



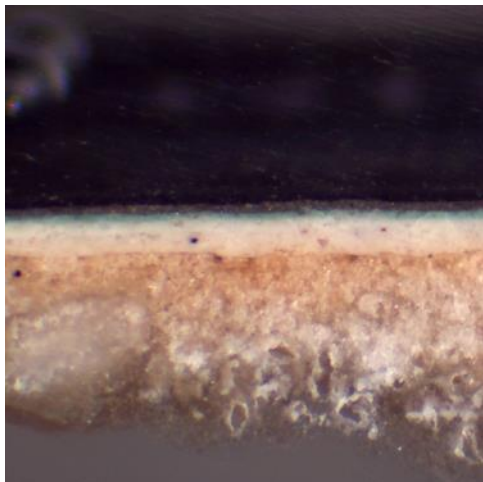
MS-003 Ultraviolet Light



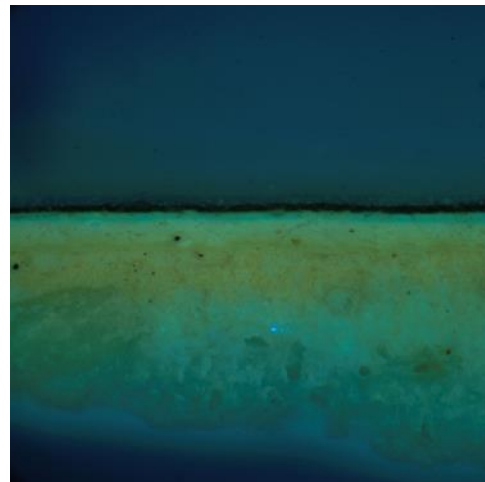
MS-004 Simulated Daylight



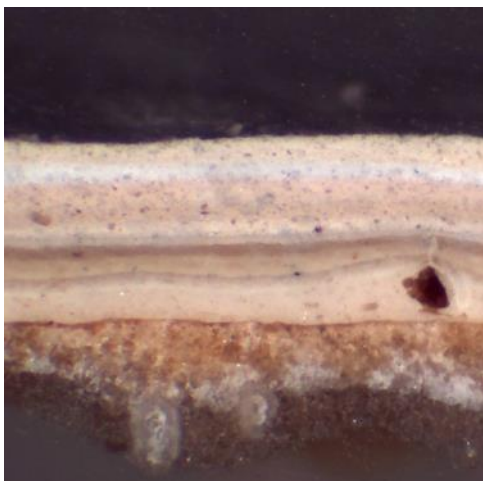
MS-004 Ultraviolet Light



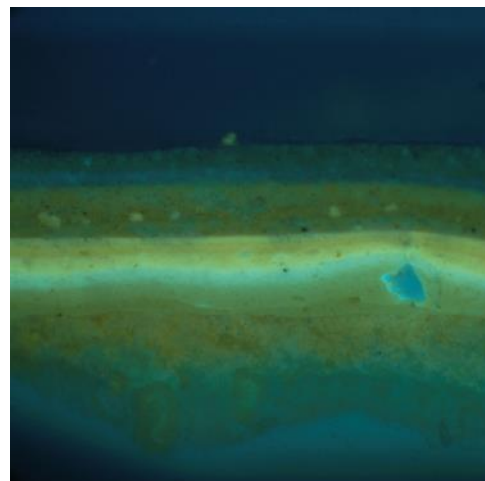
MS-005 Simulated Daylight



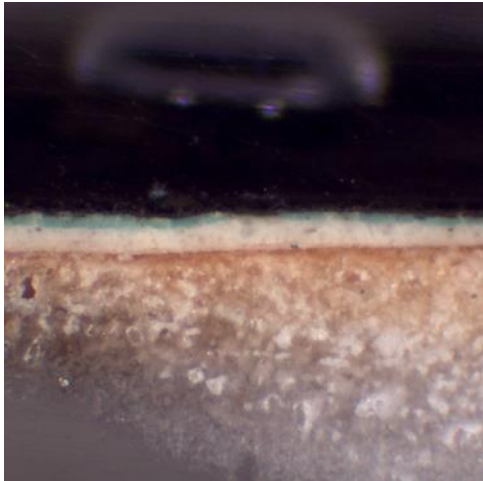
MS-005 Ultraviolet Light



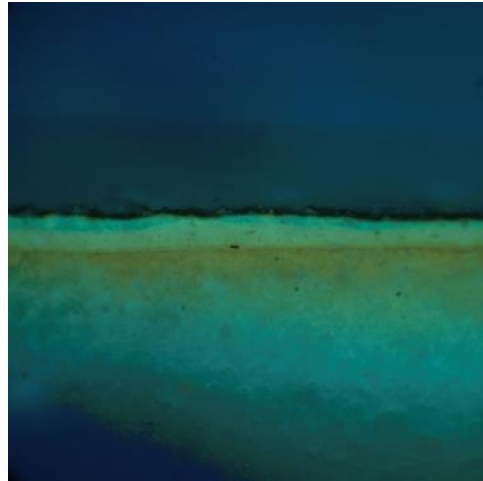
MS-006 Simulated Daylight



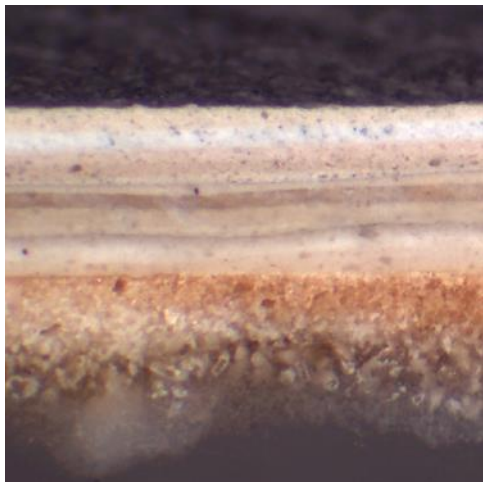
MS-006 Ultraviolet Light



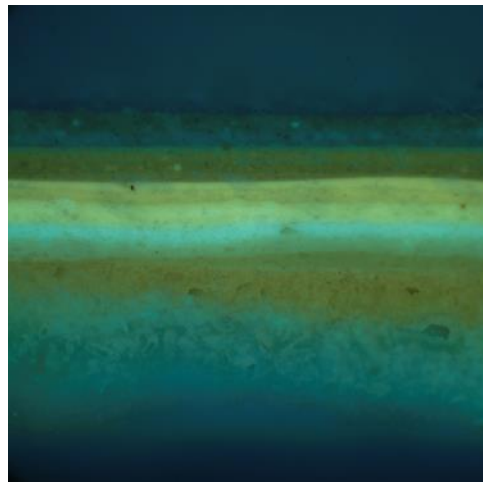
MS-007 Simulated Daylight



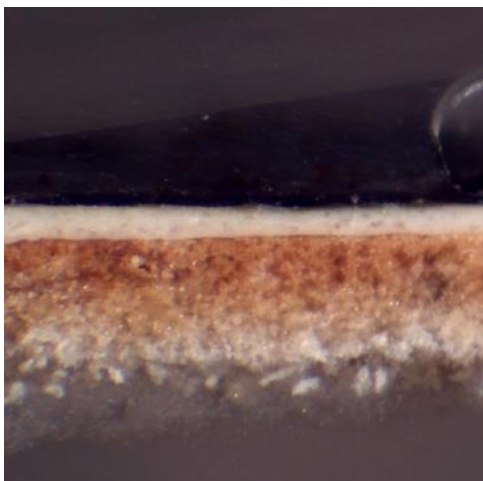
MS-007 Ultraviolet Light



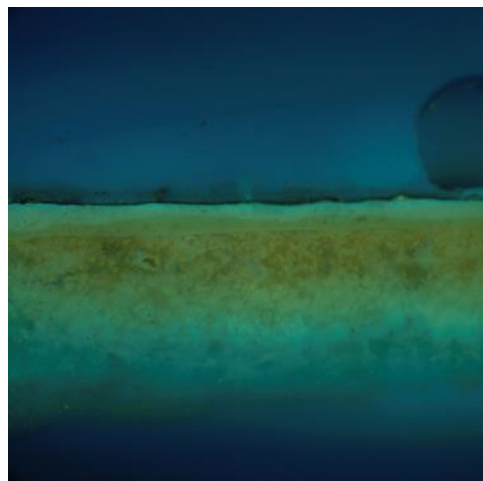
MS-008 Simulated Daylight



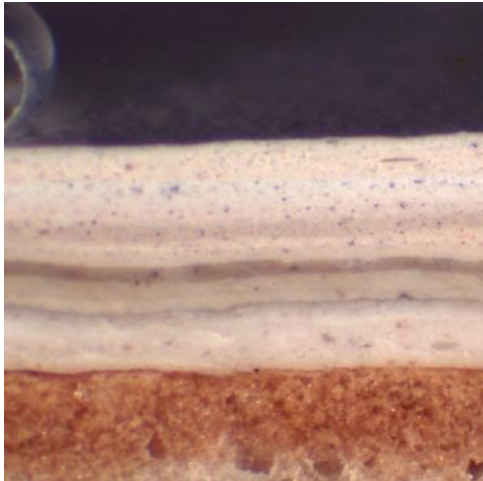
MS-008 Ultraviolet Light



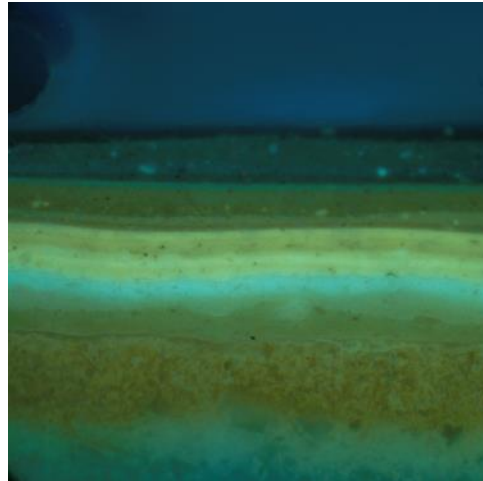
MS-009 Simulated Daylight



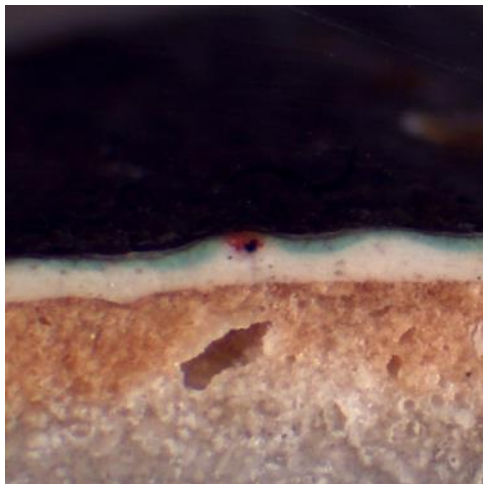
MS-009 Ultraviolet Light



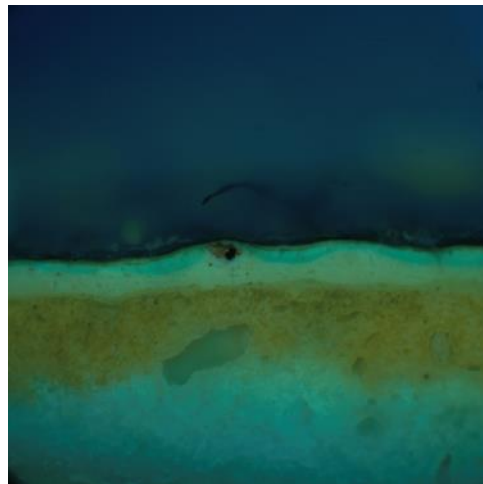
MS-010 Simulated Daylight



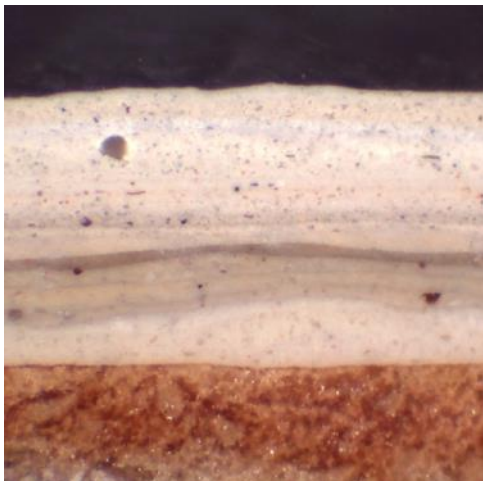
MS-010 Ultraviolet Light



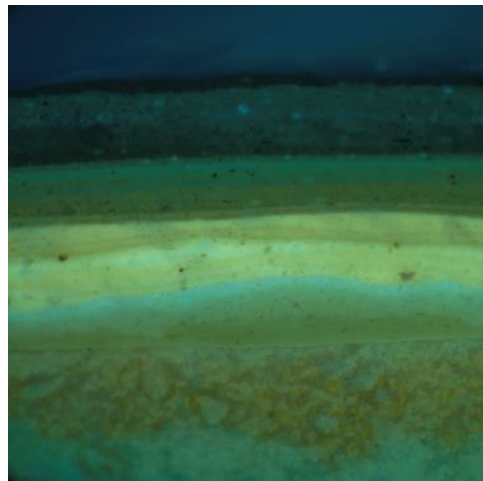
MS-011 Simulated Daylight



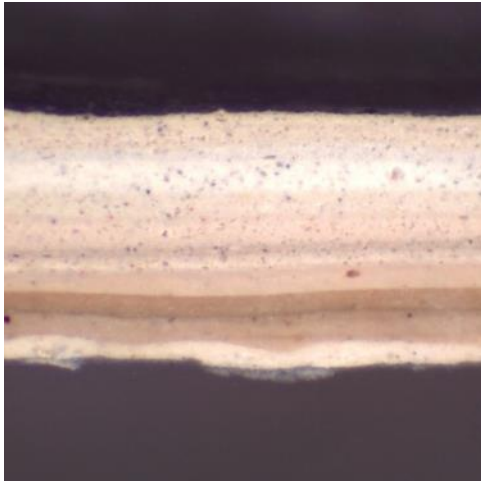
MS-011 Ultraviolet Light



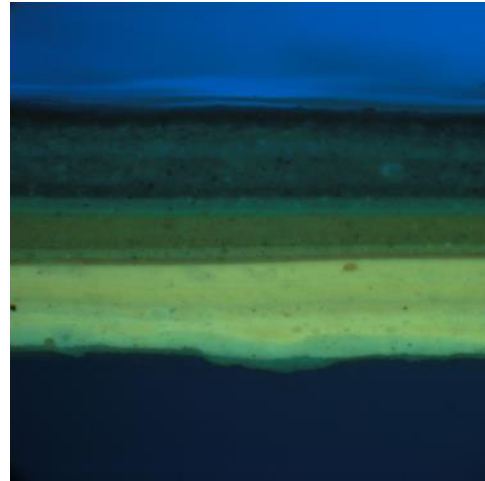
MS-012 Simulated Daylight



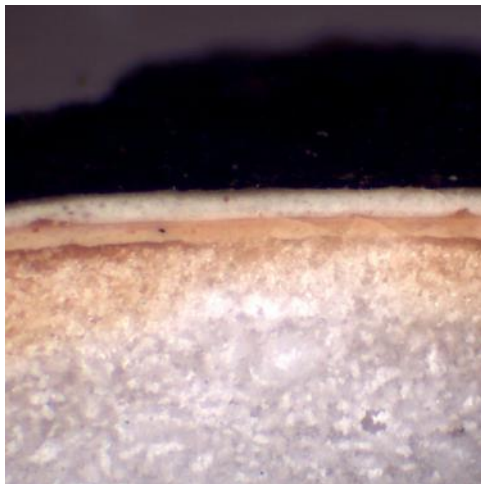
MS-012 Ultraviolet Light



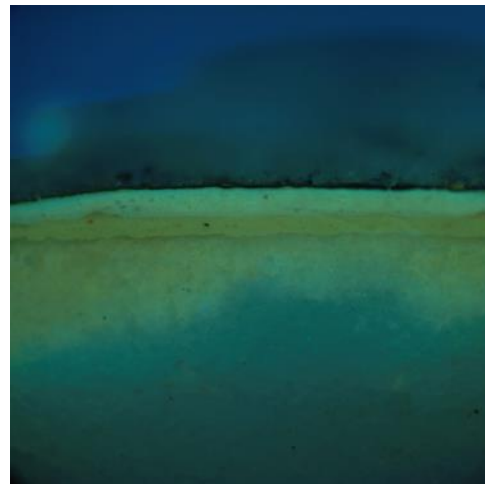
MS-013 Simulated Daylight



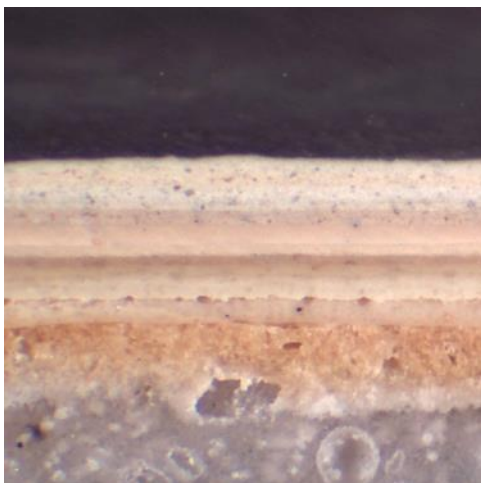
MS-013 Ultraviolet Light



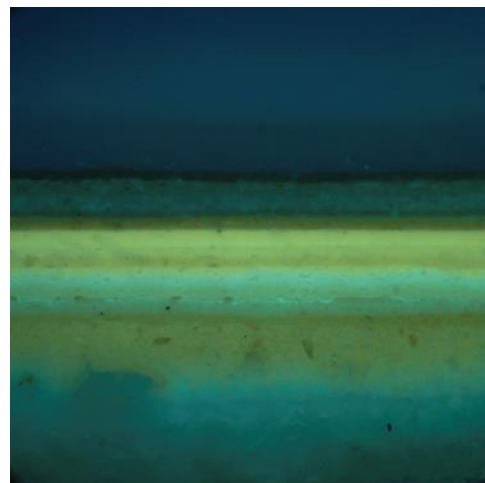
MS-014 Simulated Daylight



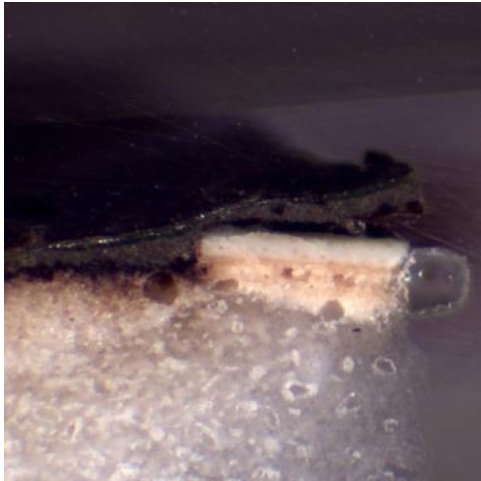
MS-014 Ultraviolet Light



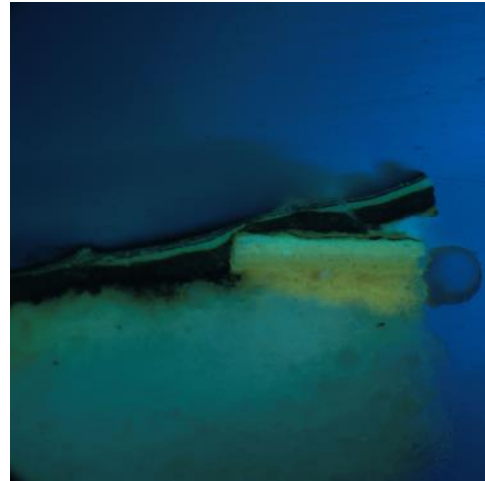
MS-015 Simulated Daylight



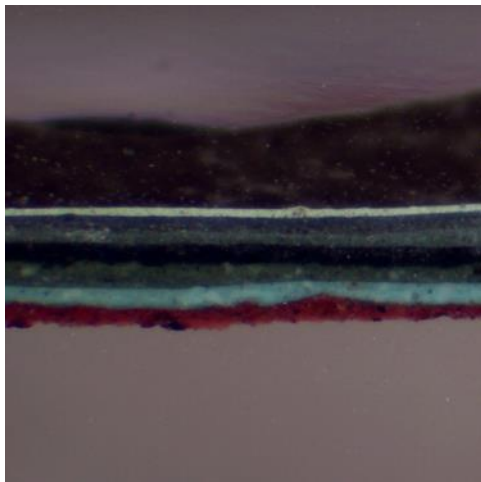
MS-015 Ultraviolet Light



MS-016 Simulated Daylight



MS-016 Ultraviolet Light

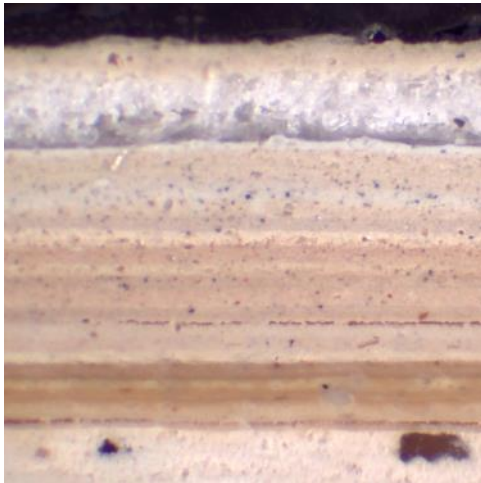


MS-017 Simulated Daylight

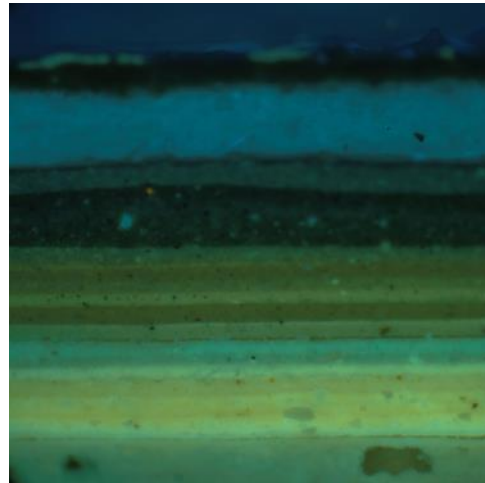


MS-017 Ultraviolet Light

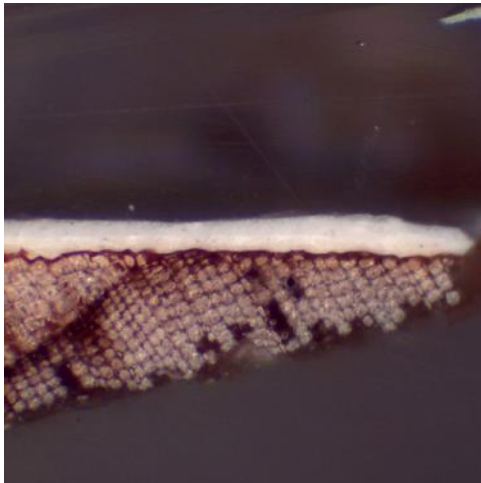
East Stair



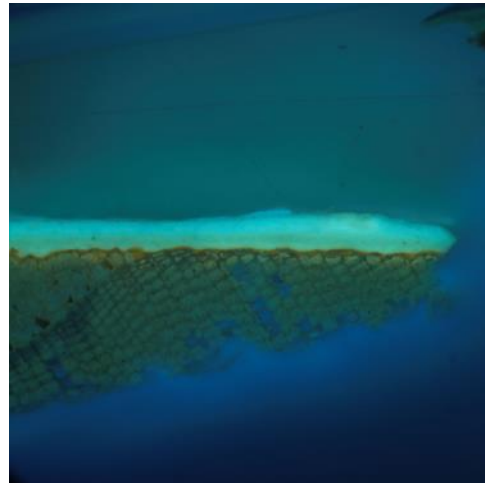
ES-001 Simulated Daylight



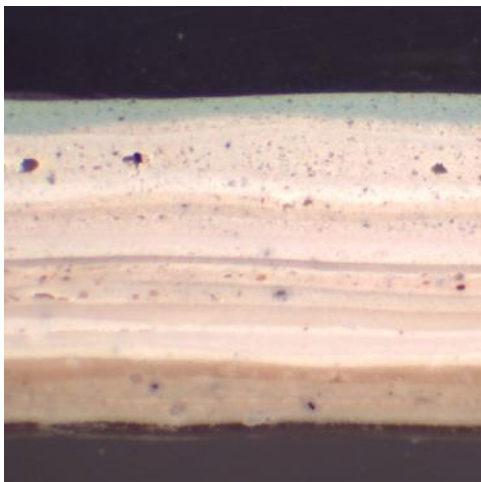
ES-001 Ultraviolet Light



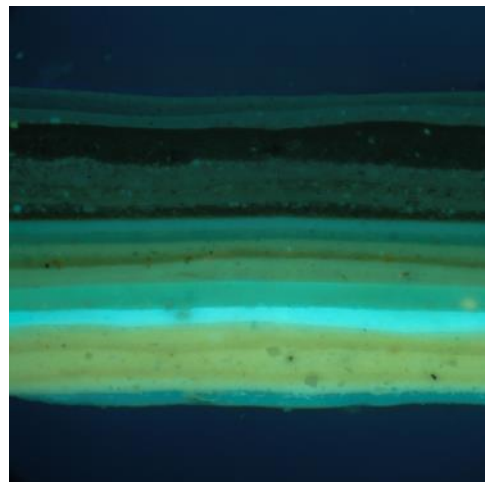
ES-002a Simulated Daylight



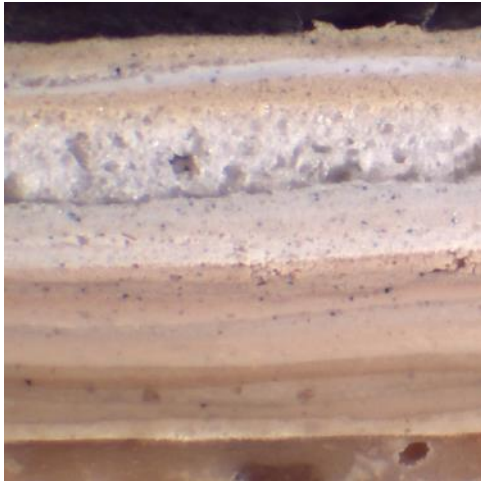
ES-002a Ultraviolet Light



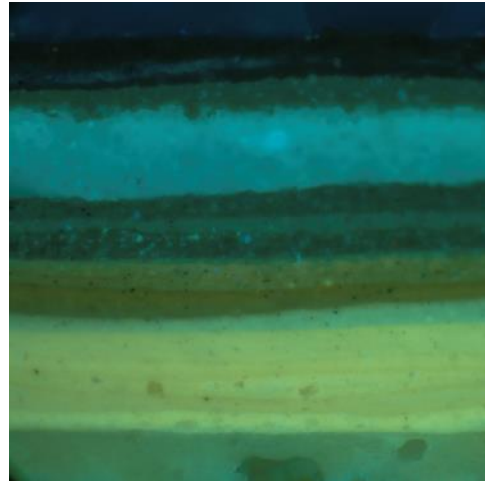
ES-002b Simulated Daylight



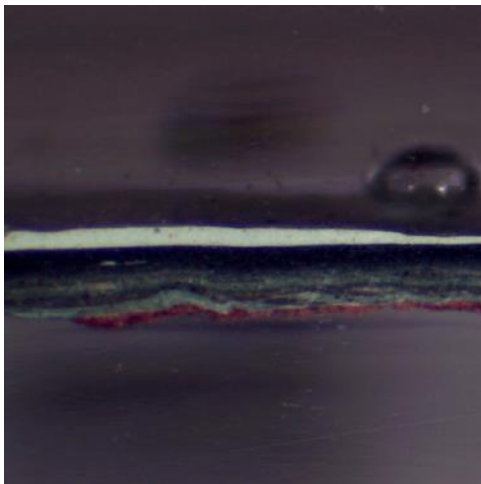
ES-002b Ultraviolet Light



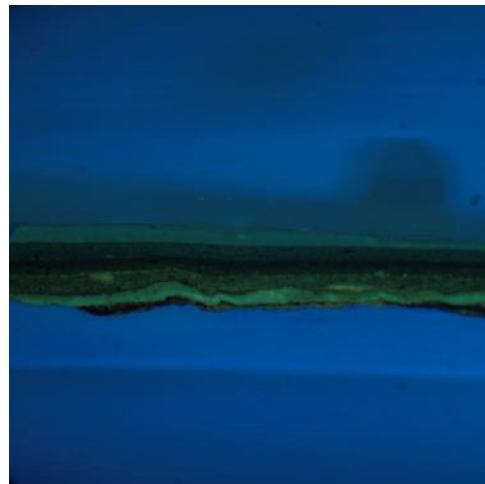
ES-003 Simulated Daylight



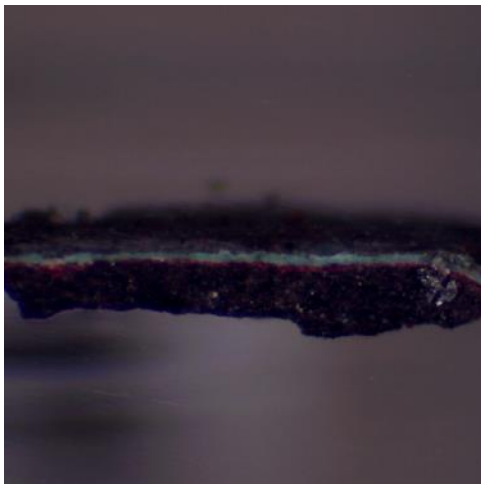
ES-003 Ultraviolet Light



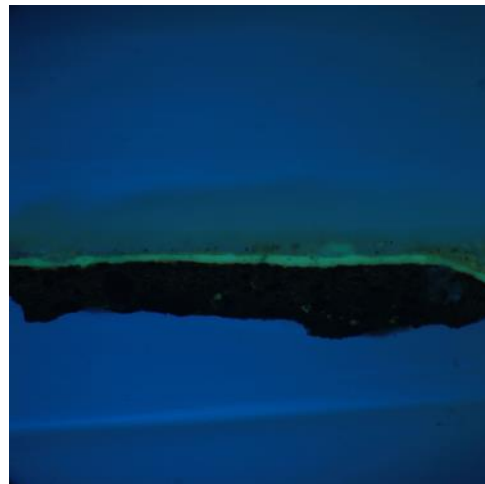
ES-004a Simulated Daylight



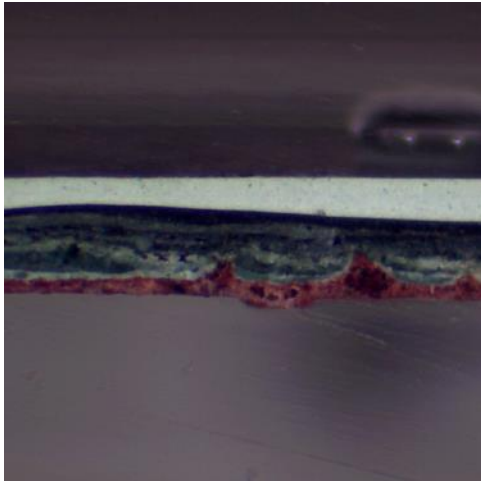
ES-004a Ultraviolet Light



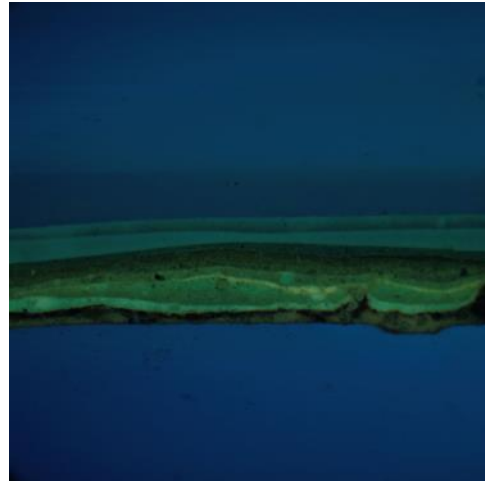
ES-004b Simulated Daylight



ES-004b Ultraviolet Light

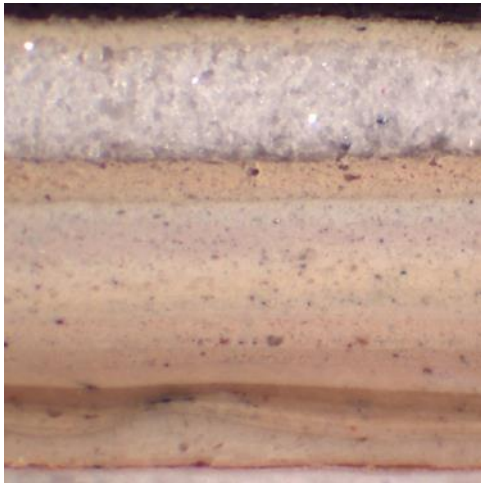


ES-005 Simulated Daylight

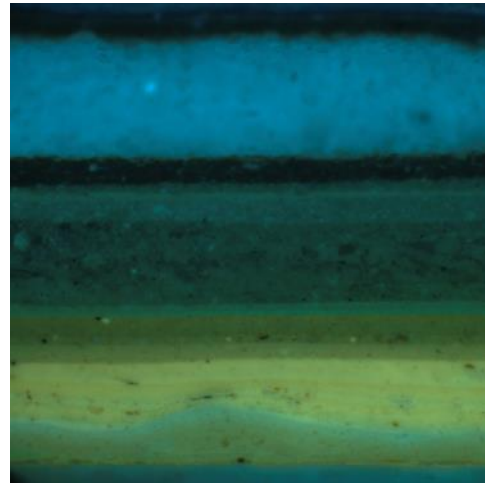


ES-005 Ultraviolet Light

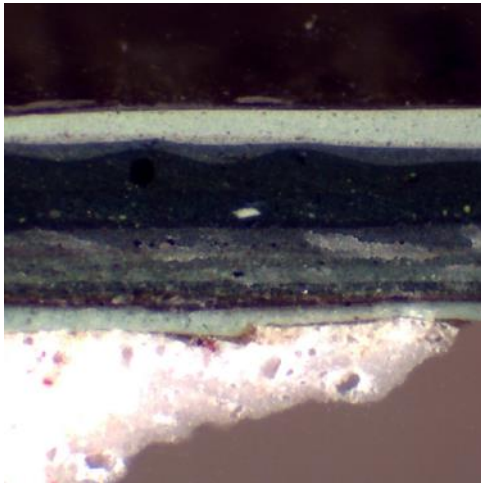
Main Hall



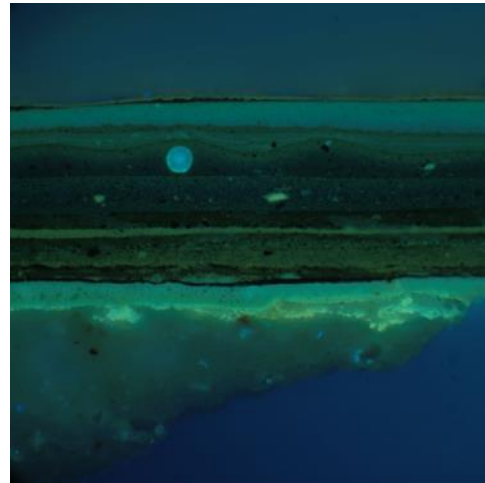
MH-001 Simulated Daylight



MH-001 Ultraviolet Light



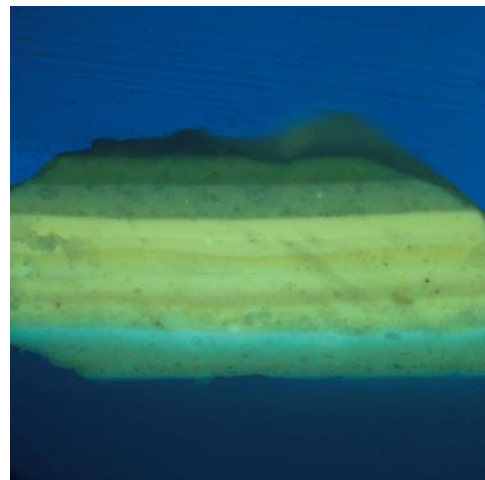
MH-002 Simulated Daylight



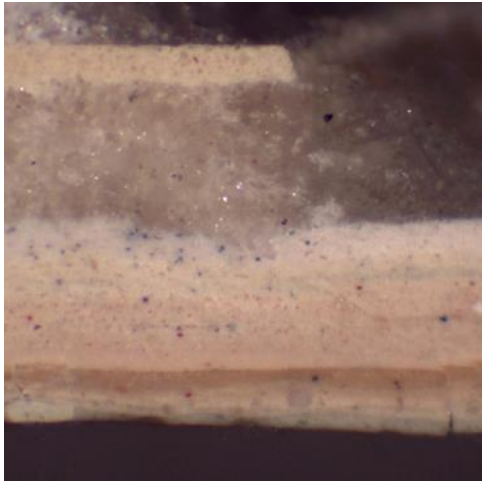
MH-002 Ultraviolet Light



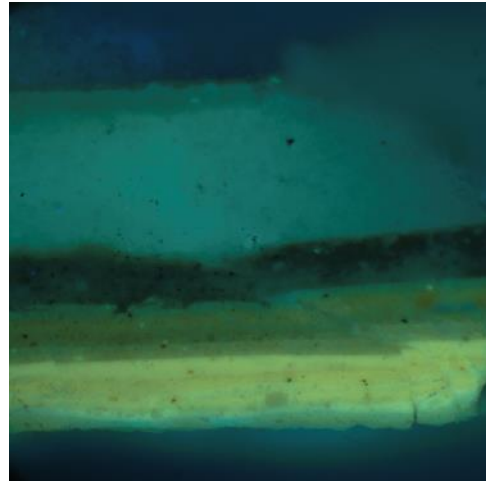
MH-003 Simulated Daylight



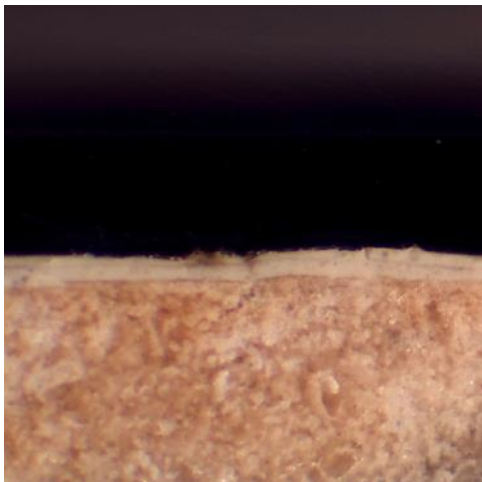
MH-003 Ultraviolet Light



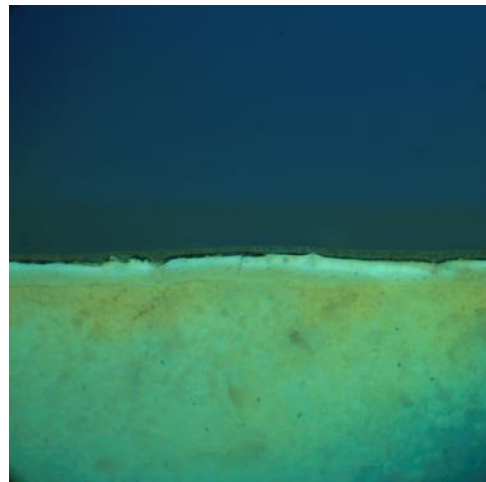
MH-004 Simulated Daylight



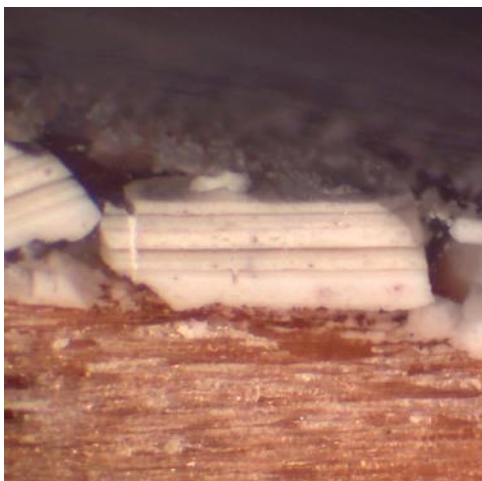
MH-004 Ultraviolet Light



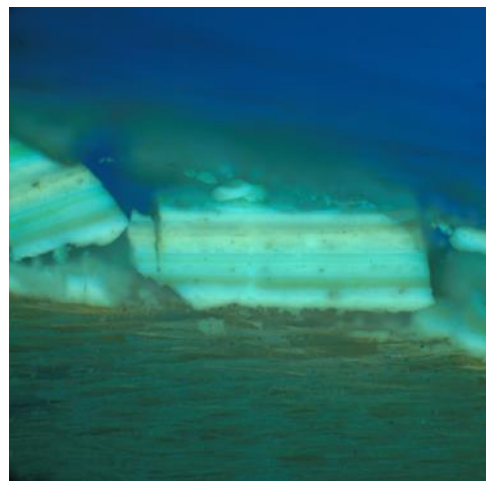
MH-005 Simulated Daylight



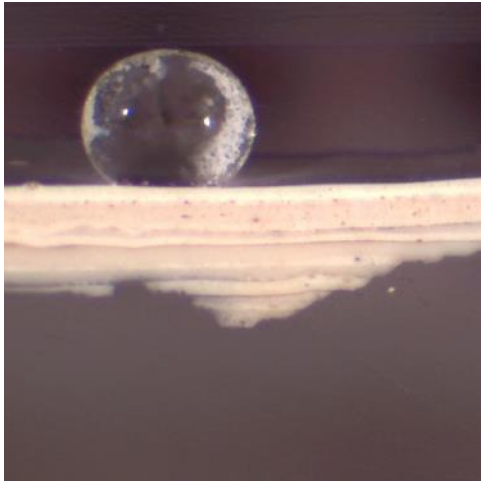
MH-005 Ultraviolet Light



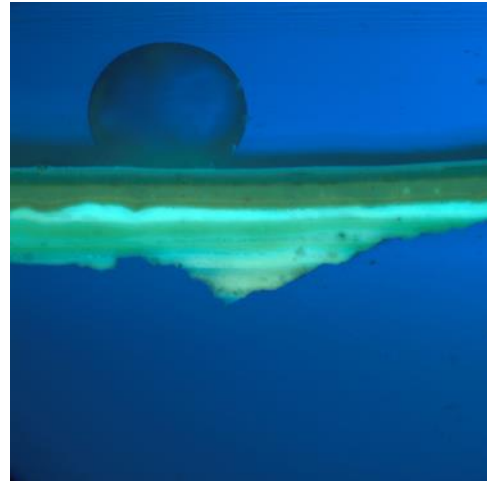
MH-006a Simulated Daylight



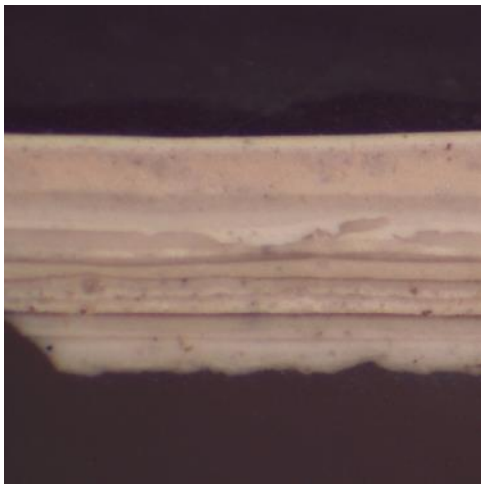
MH-006a Ultraviolet Light



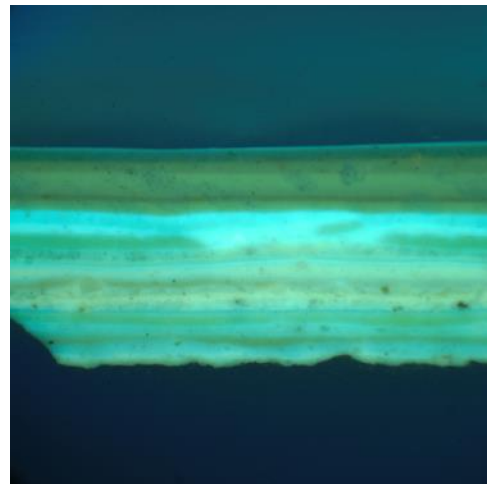
MH-006b Simulated Daylight



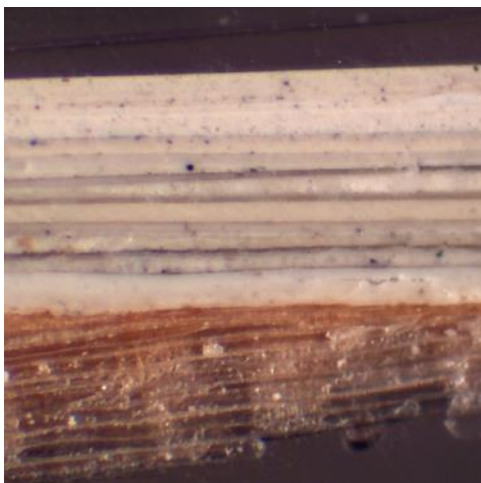
MH-006b Ultraviolet Light



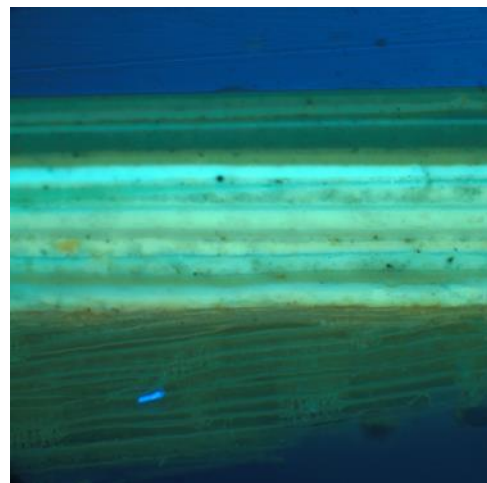
MH-007 Simulated Daylight



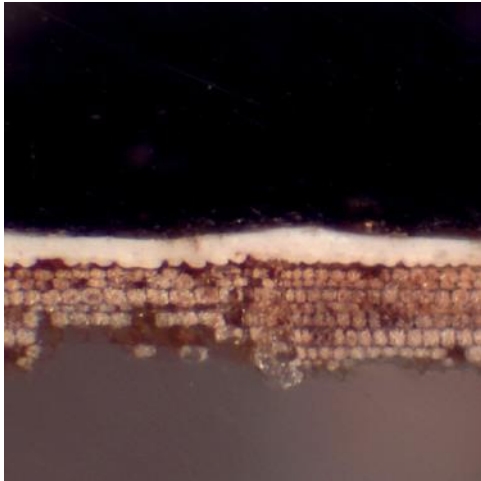
MH-007 Ultraviolet Light



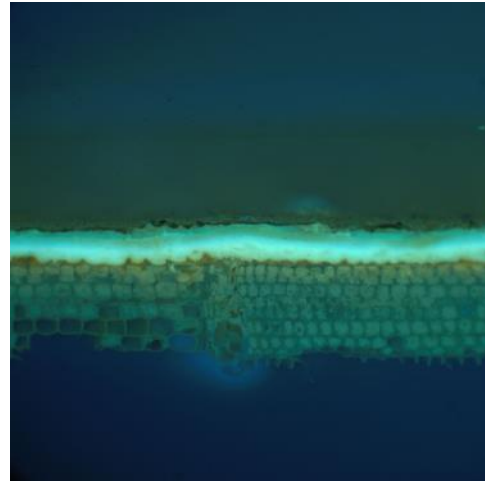
MH-008 Simulated Daylight



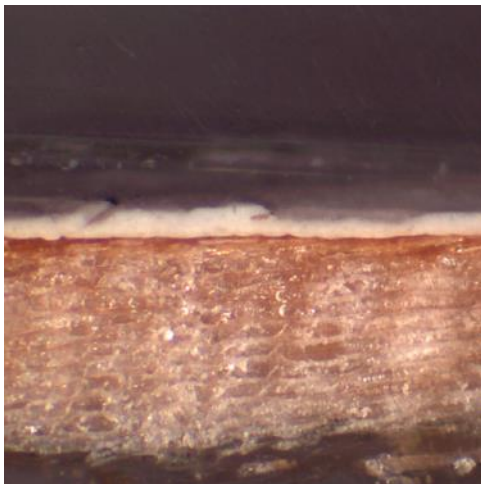
MH-008 Ultraviolet Light



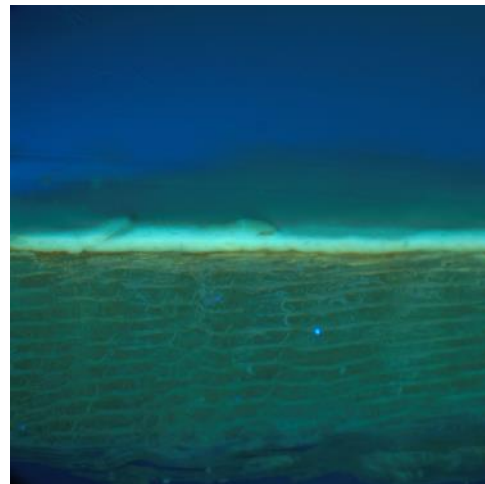
MH-009 Simulated Daylight



MH-009 Ultraviolet Light



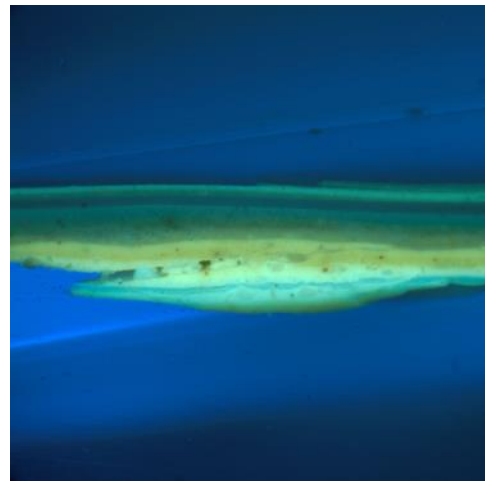
MH-010a Simulated Daylight



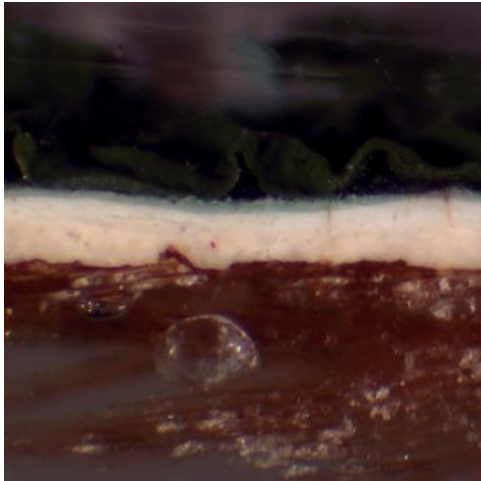
MH-010a Ultraviolet Light



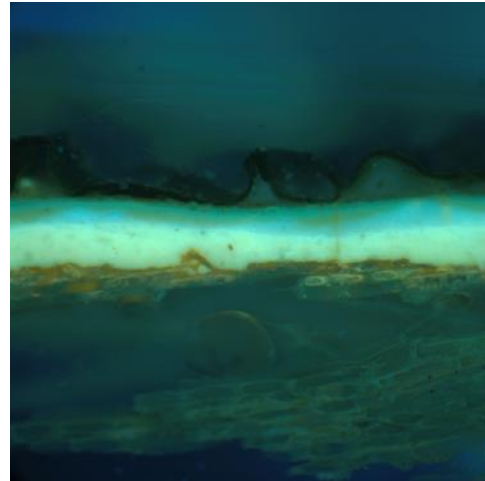
MH-010b Simulated Daylight



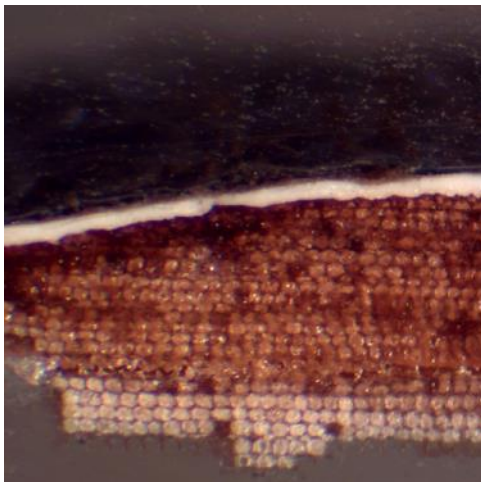
MH-010b Ultraviolet Light



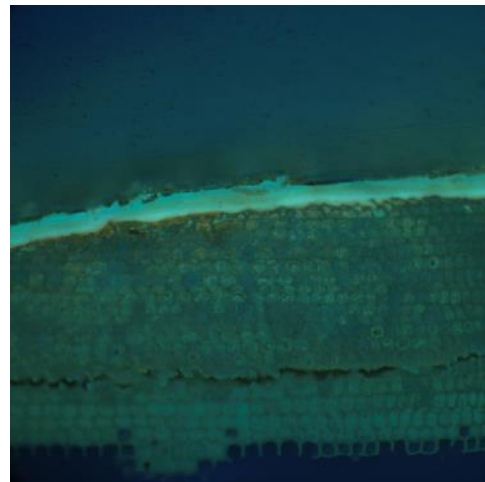
MH-011 Simulated Daylight



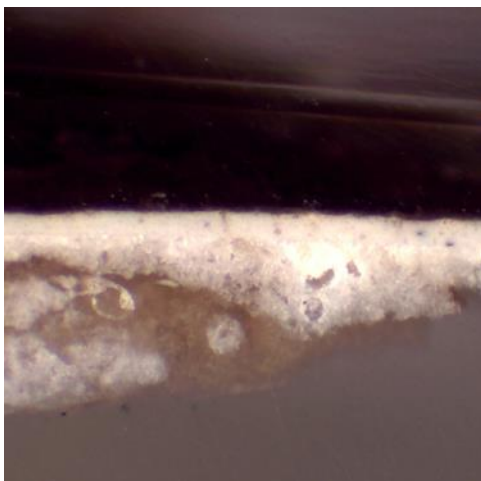
MH-011 Ultraviolet Light



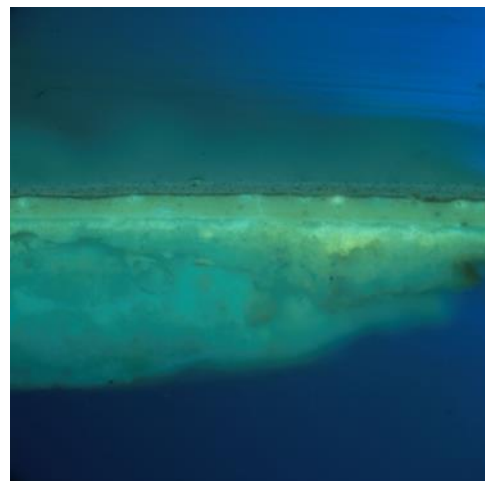
MH-012 Simulated Daylight



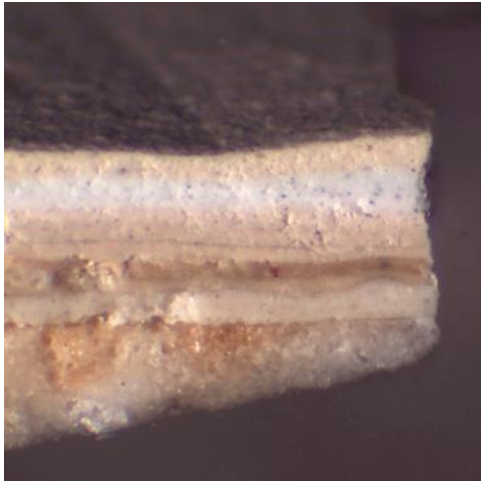
MH-012 Ultraviolet Light



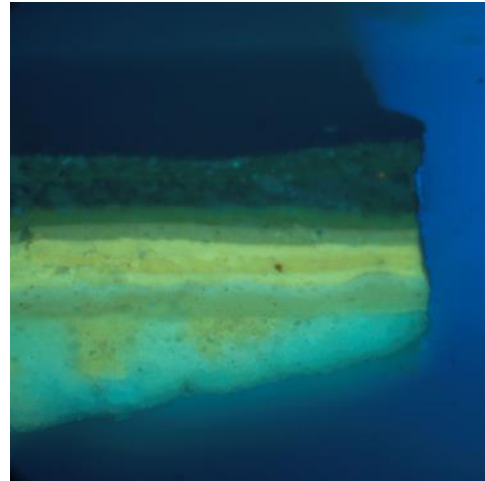
MH-013 Simulated Daylight



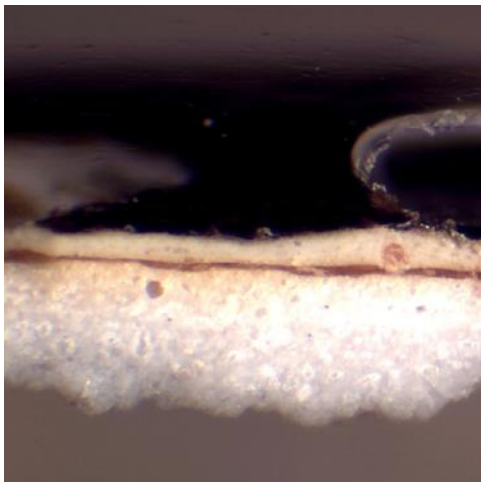
MH-013 Ultraviolet Light



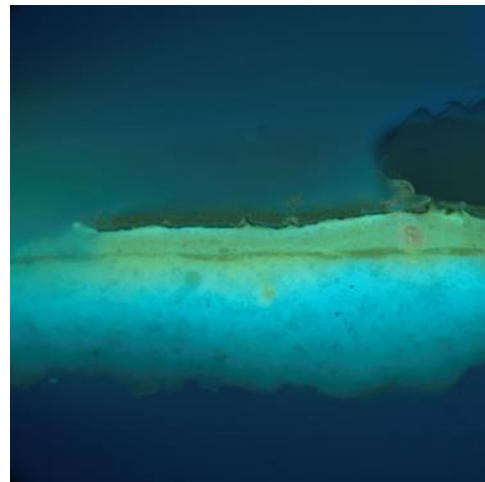
MH-014 Simulated Daylight



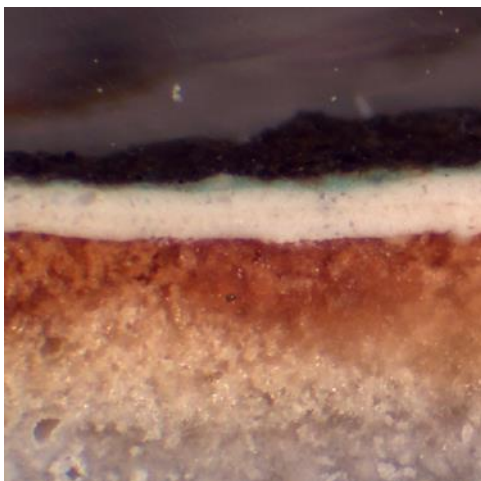
MH-014 Ultraviolet Light



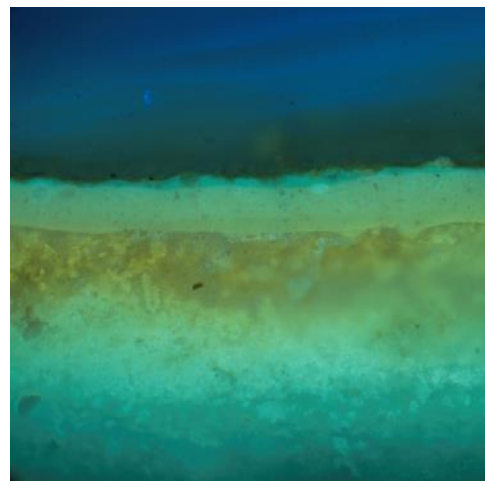
MH-015 Simulated Daylight



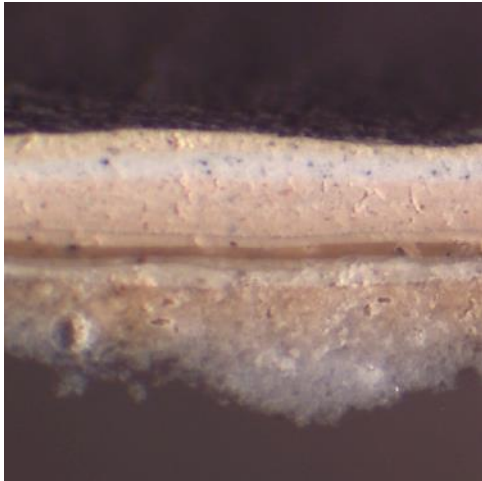
MH-015 Ultraviolet Light



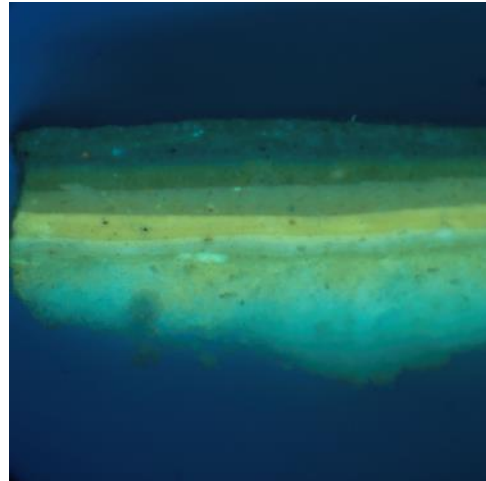
MH-016 Simulated Daylight



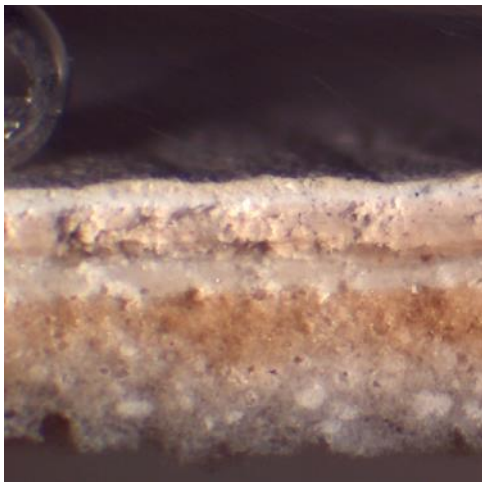
MH-016 Ultraviolet Light



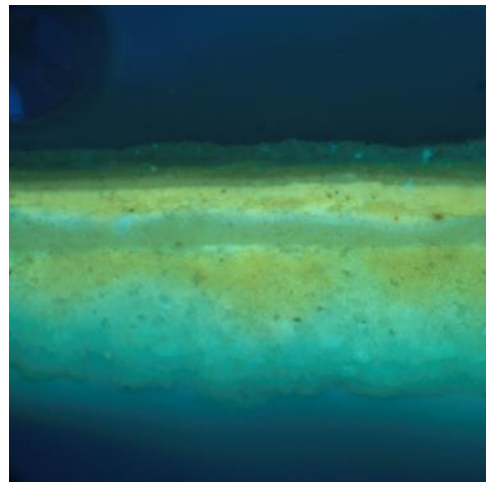
MH-017 Simulated Daylight



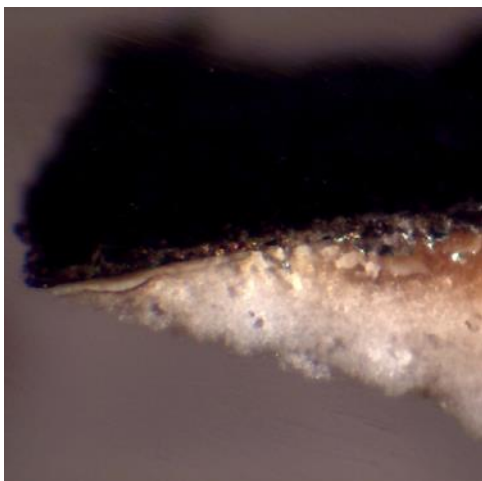
MH-017 Ultraviolet Light



MH-018 Simulated Daylight



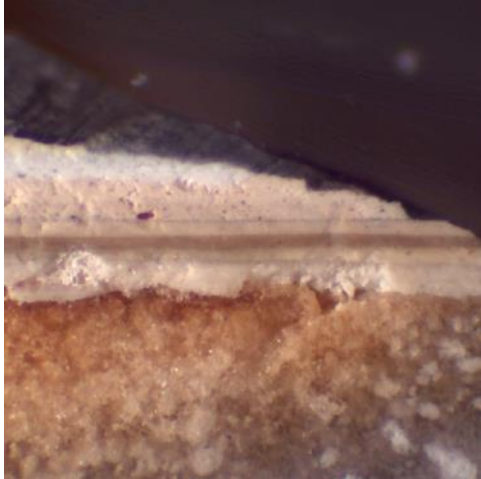
MH-018 Ultraviolet Light



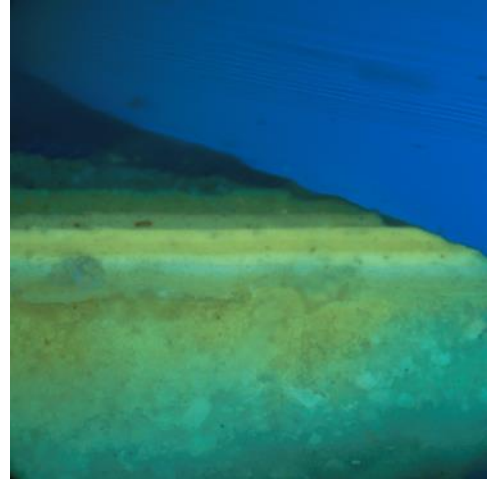
MH-019 Simulated Daylight



MH-019 Ultraviolet Light

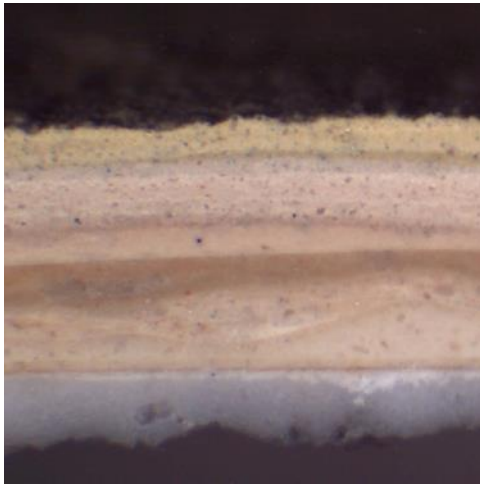


MH-020 Simulated Daylight

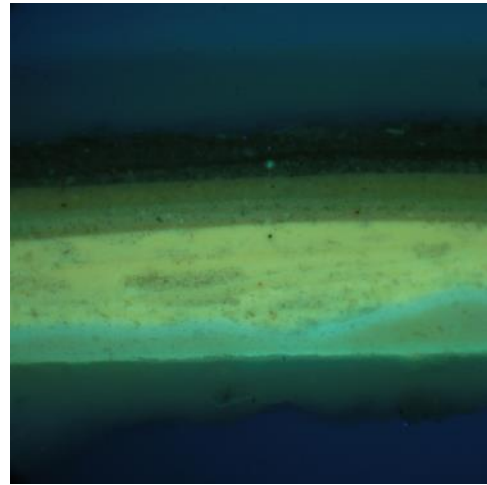


MH-020 Ultraviolet Light

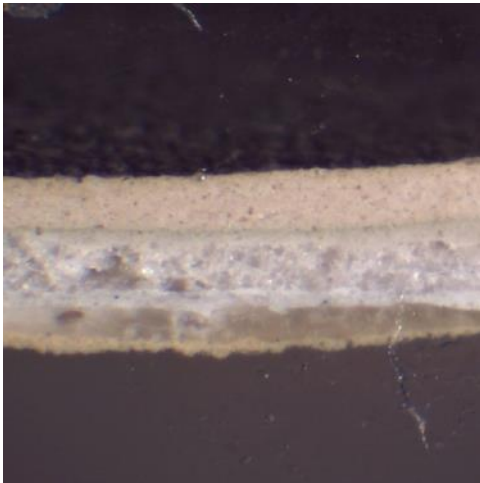
Reception Rooms



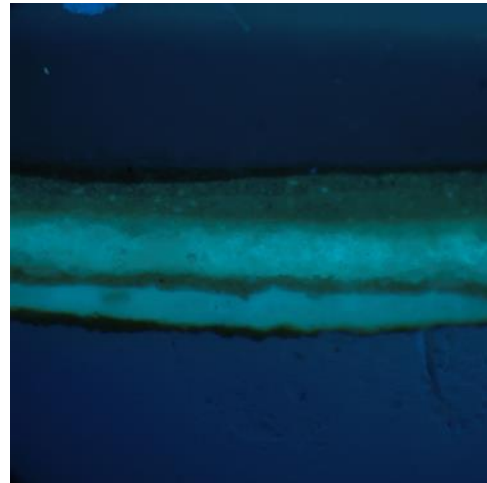
RR-001a Simulated Daylight



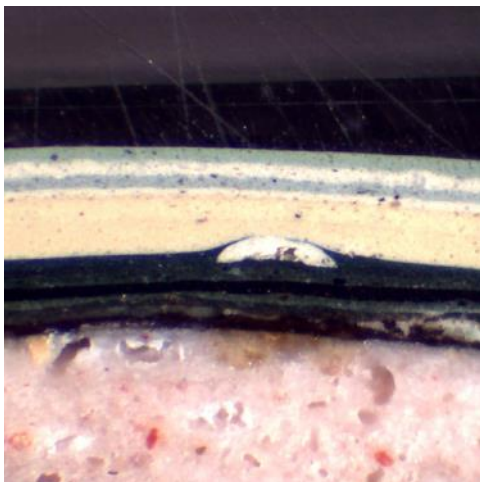
RR-001a Ultraviolet Light



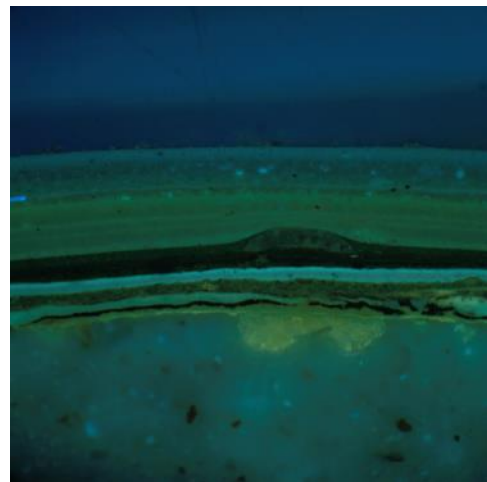
RR-001b Simulated Daylight



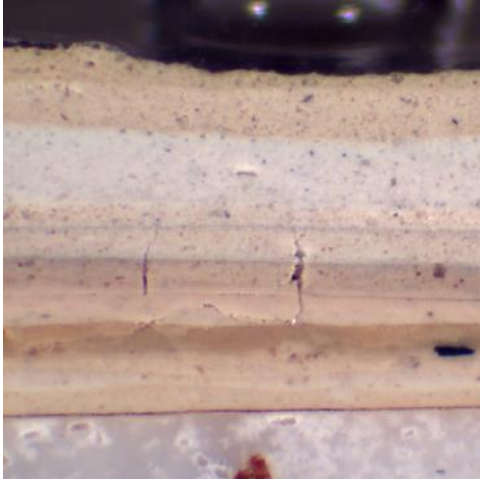
RR-001b Ultraviolet Light



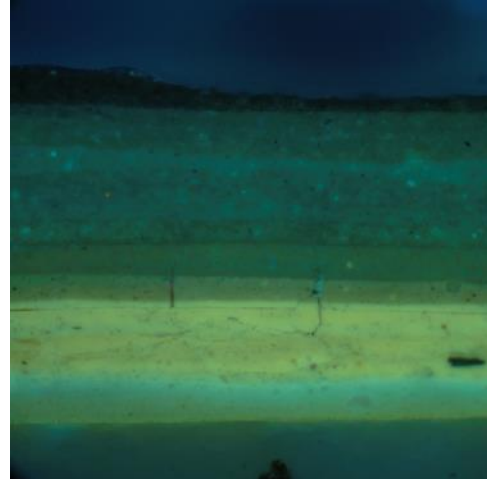
RR-002 Simulated Daylight



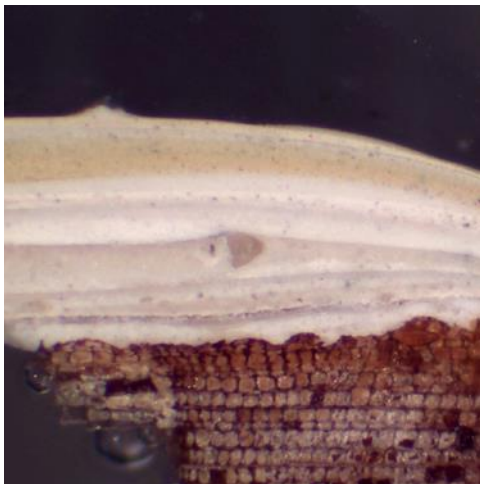
RR-002 Ultraviolet Light



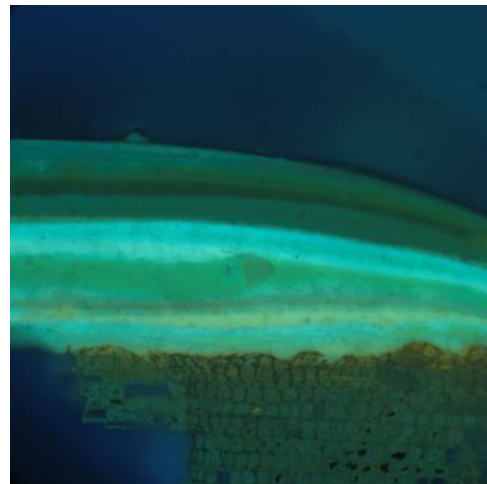
RR-003 Simulated Daylight



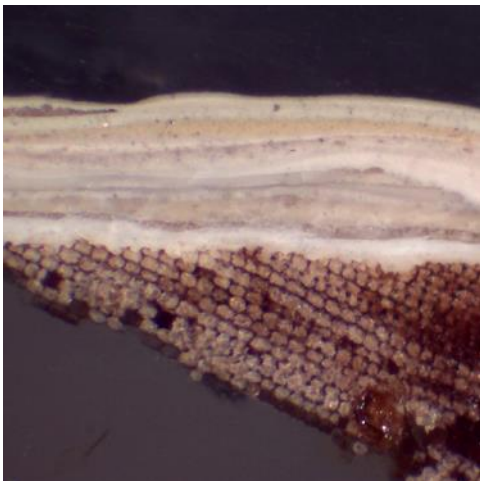
RR-003 Ultraviolet Light



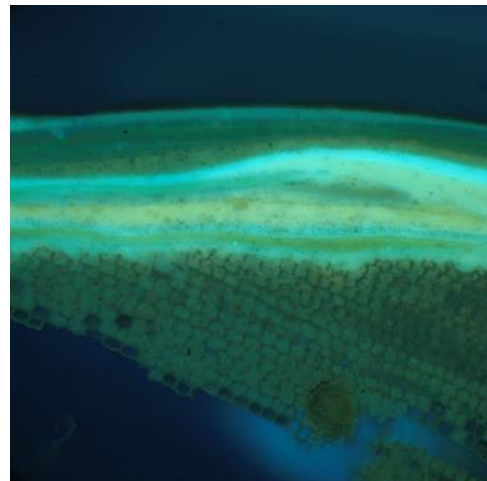
RR-004 Simulated Daylight



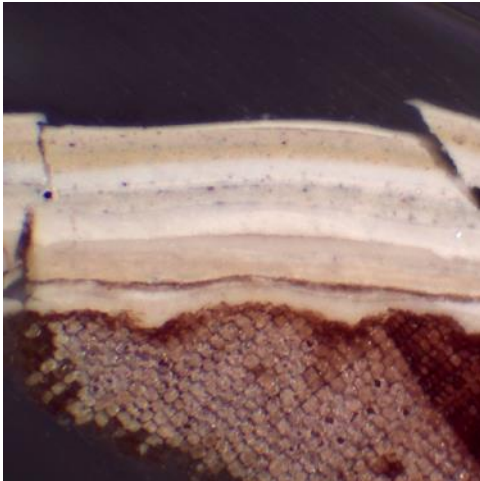
RR-004 Ultraviolet Light



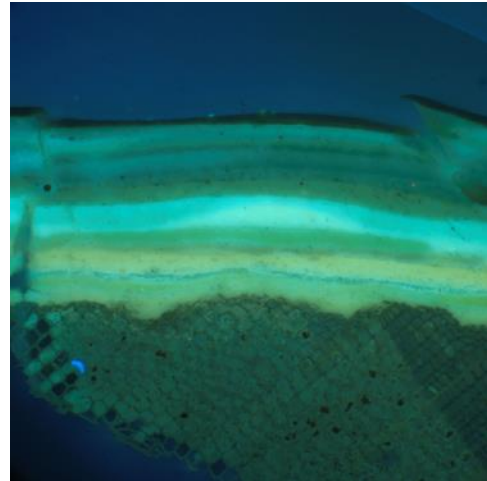
RR-005 Simulated Daylight



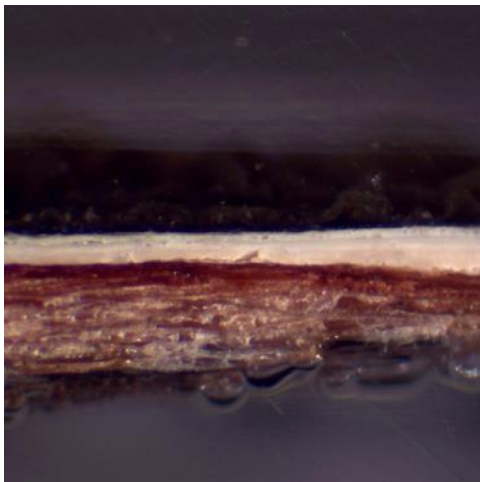
RR-005 Ultraviolet Light



RR-006 Simulated Daylight



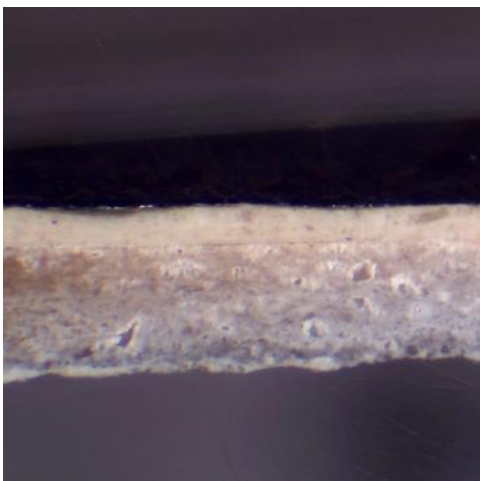
RR-006 Ultraviolet Light



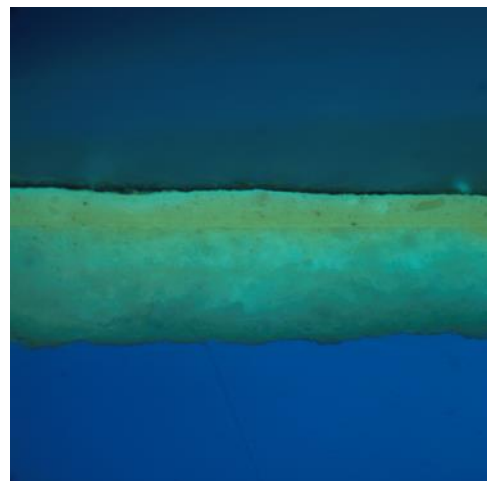
RR-007 Simulated Daylight



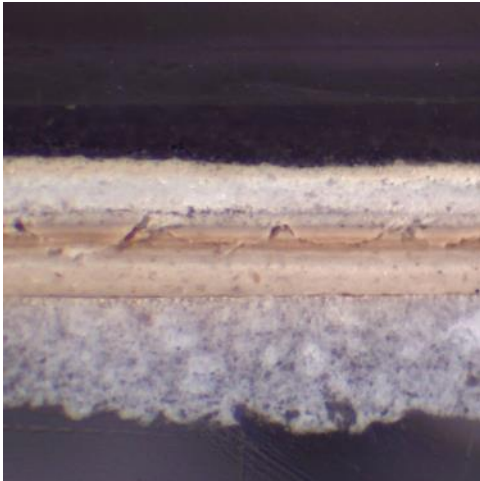
RR-007 Ultraviolet Light



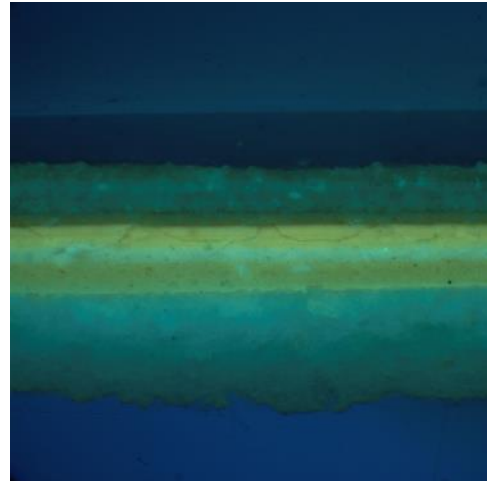
RR-008 Simulated Daylight



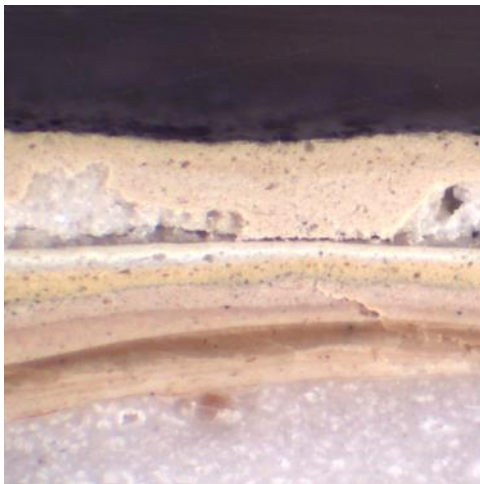
RR-008 Ultraviolet Light



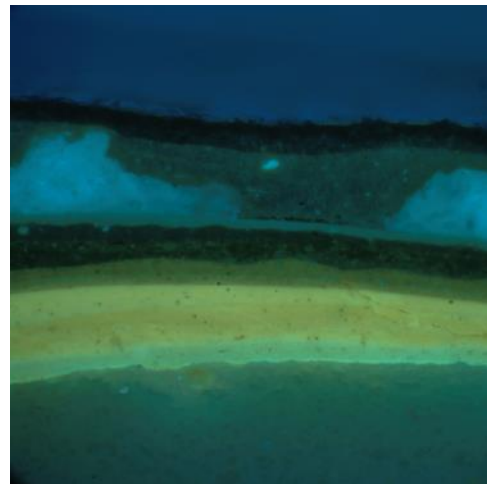
RR-009 Simulated Daylight



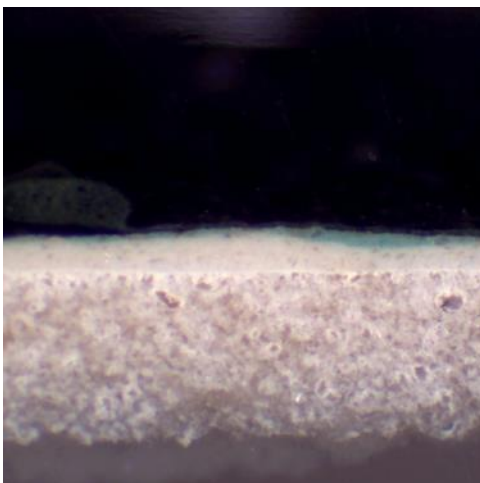
RR-009 Ultraviolet Light



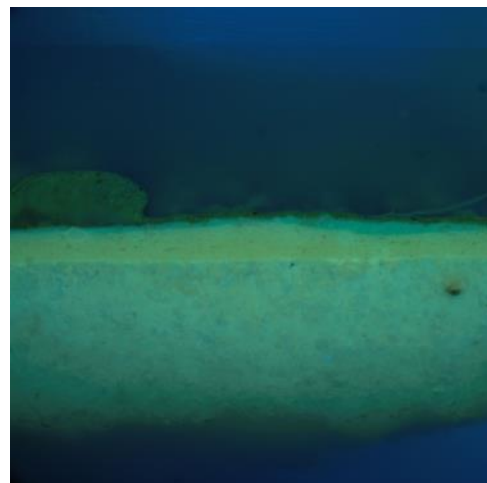
RR-010 Simulated Daylight



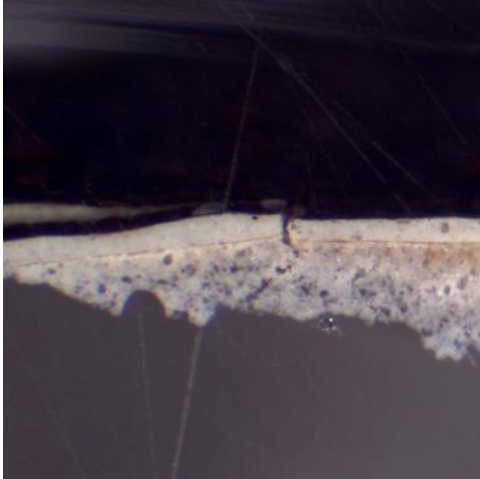
RR-010 Ultraviolet Light



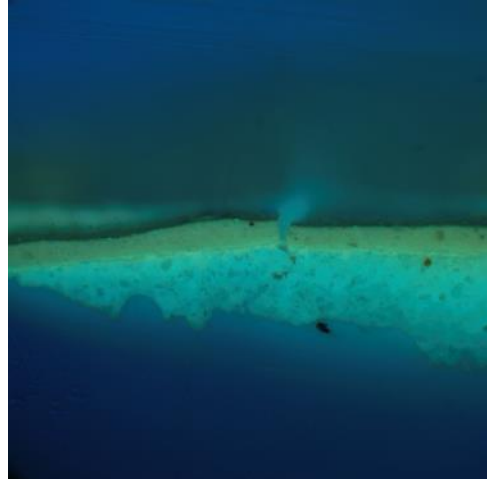
RR-011 Simulated Daylight



RR-011 Ultraviolet Light

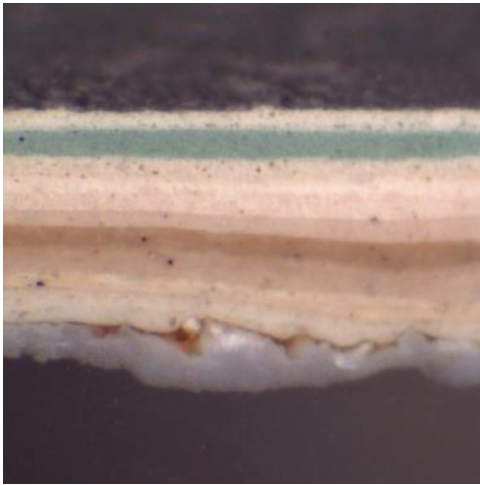


RR-012 Simulated Daylight

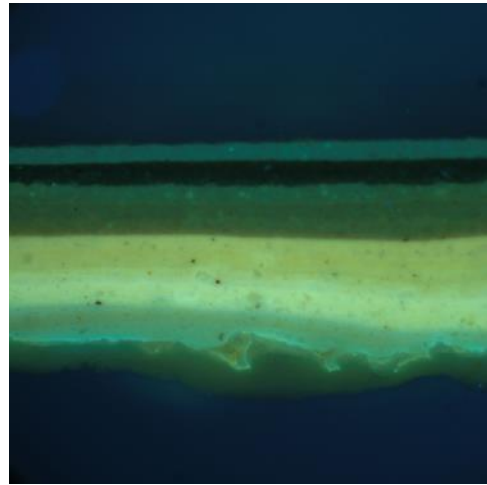


RR-012 Ultraviolet Light

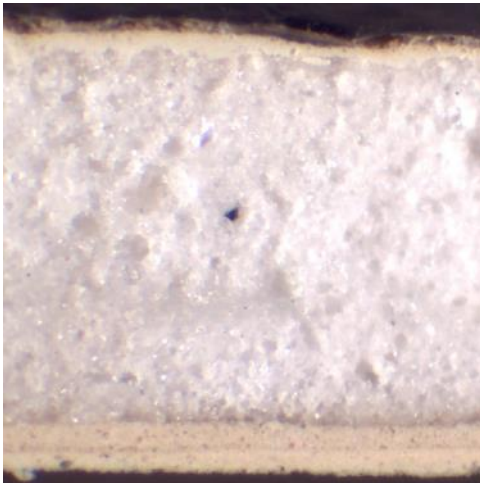
Pershing Room



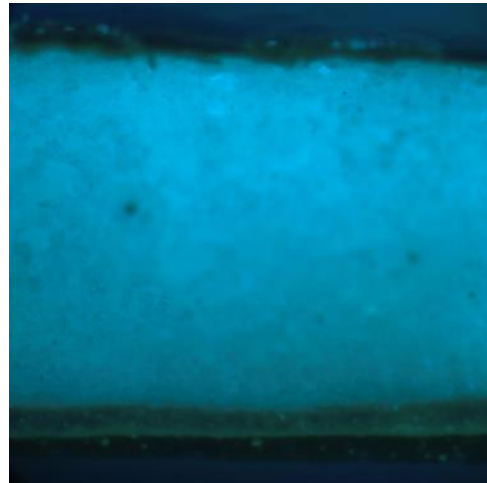
PR-001a Simulated Daylight



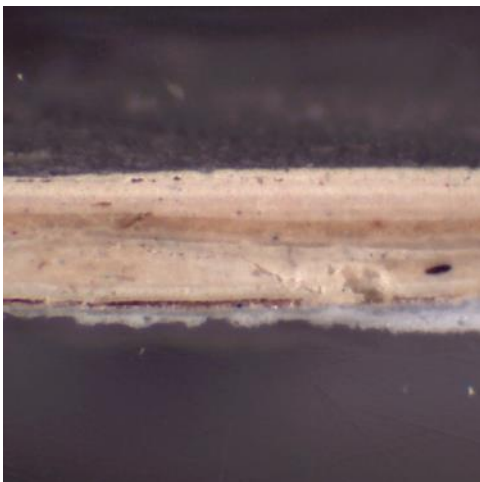
PR-001a Ultraviolet Light



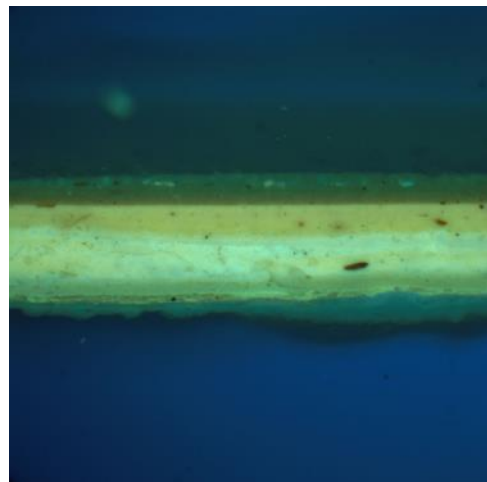
PR-001b Simulated Daylight



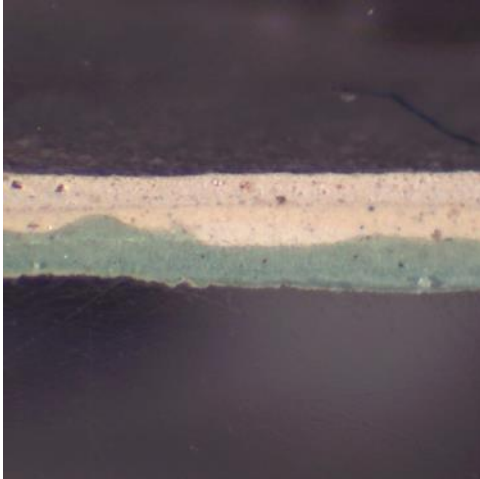
PR-001b Ultraviolet Light



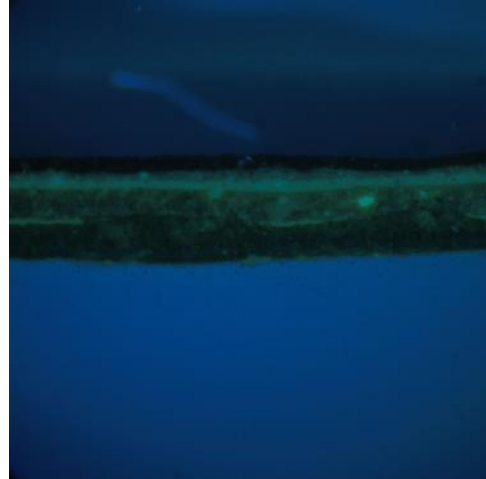
PR-002a Simulated Daylight



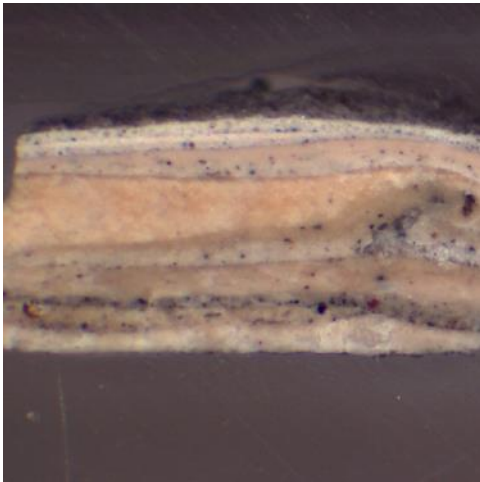
PR-002a Ultraviolet Light



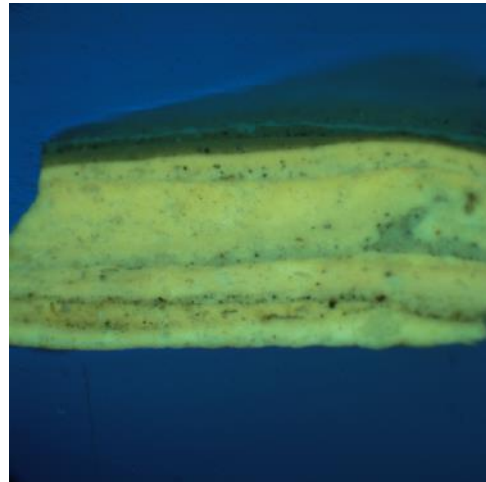
PR-002b Simulated Daylight



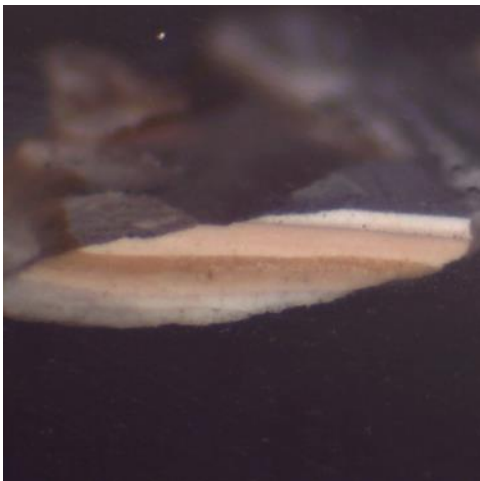
PR-002b Ultraviolet Light



PR-003 Simulated Daylight



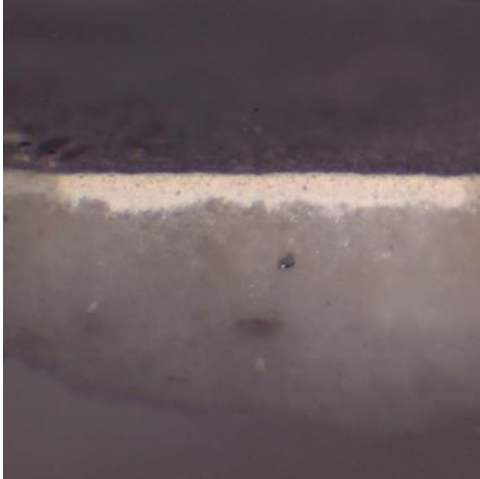
PR-003 Ultraviolet Light



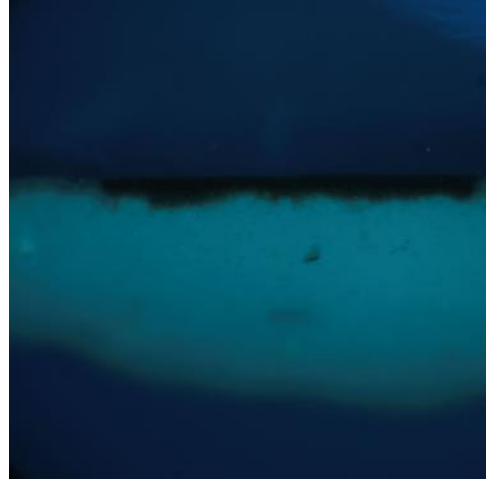
PR-004a Simulated Daylight



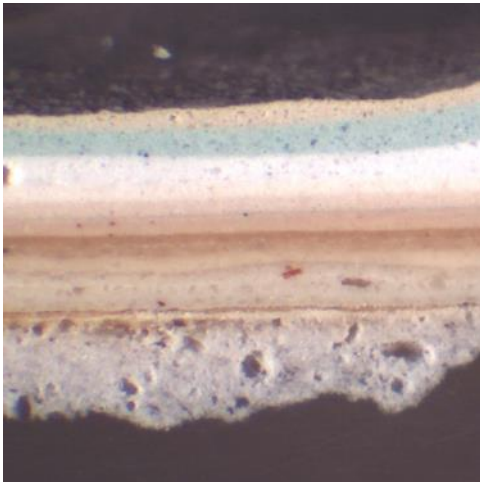
PR-004a Ultraviolet Light



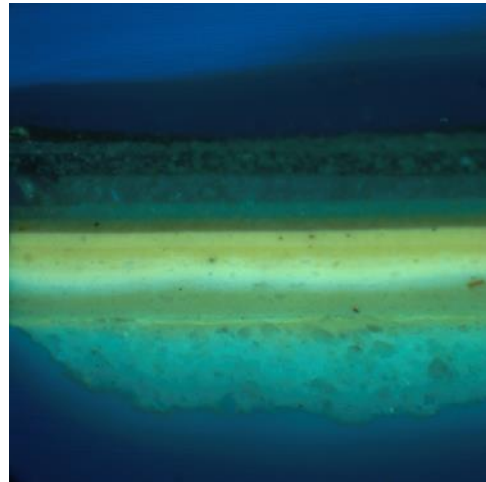
PR-004b Simulated Daylight



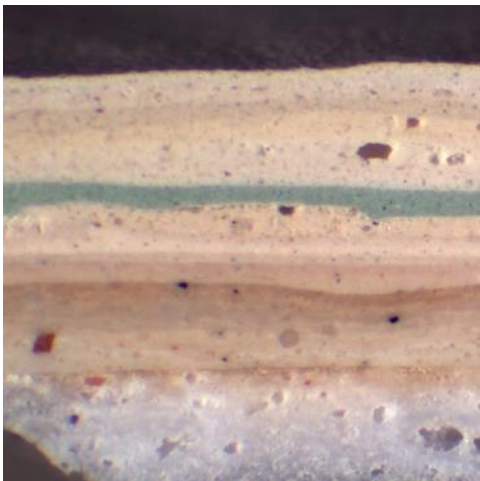
PR-004b Ultraviolet Light



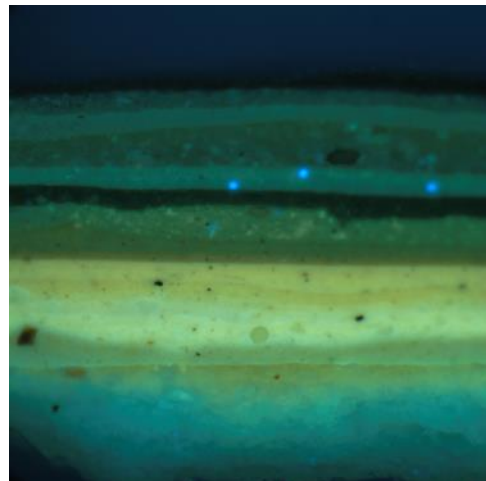
PR-005 Simulated Daylight



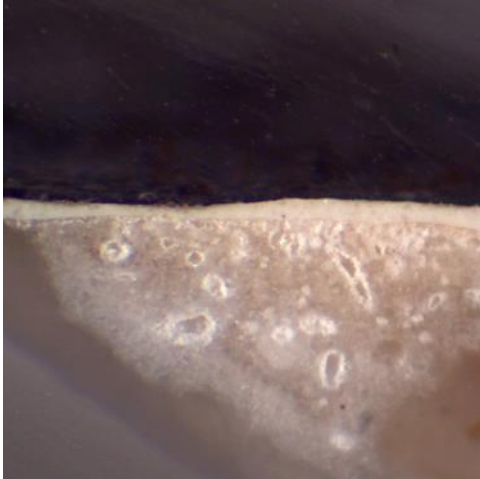
PR-005 Ultraviolet Light



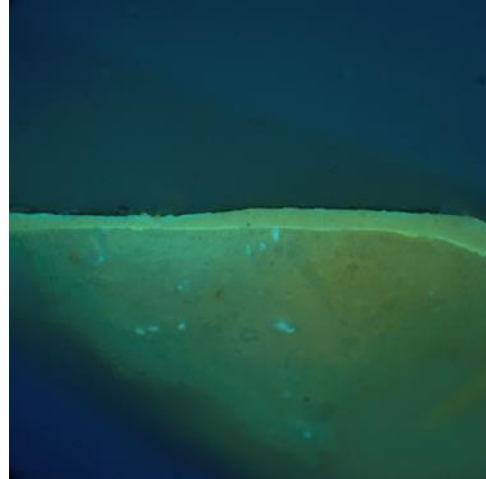
PR-006 Simulated Daylight



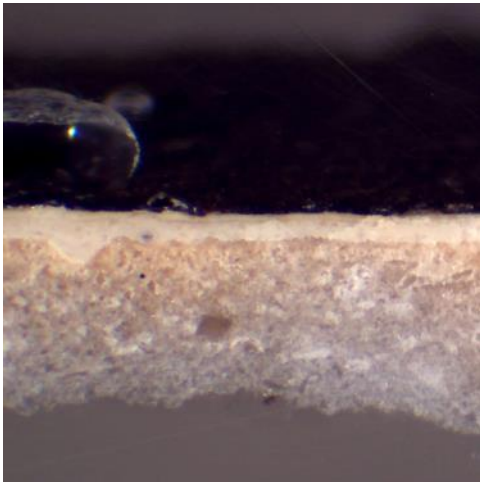
PR-006 Ultraviolet Light



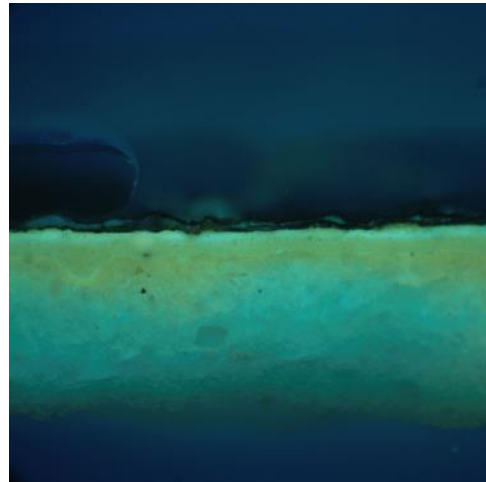
PR-007 Simulated Daylight



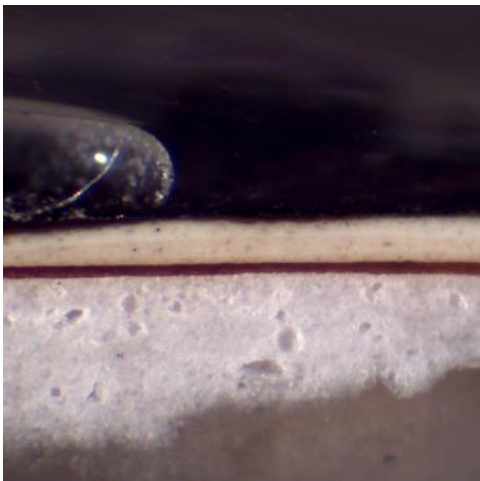
PR-007 Ultraviolet Light



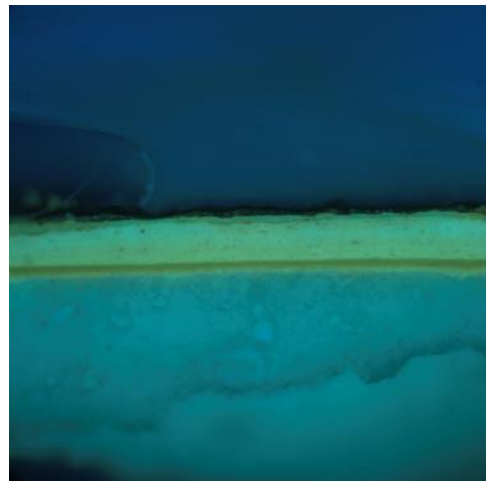
PR-008 Simulated Daylight



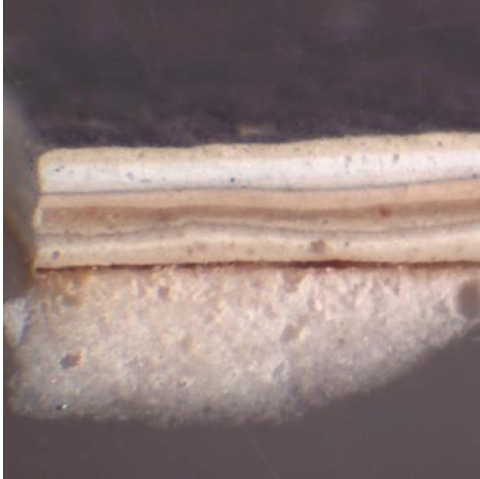
PR-008 Ultraviolet Light



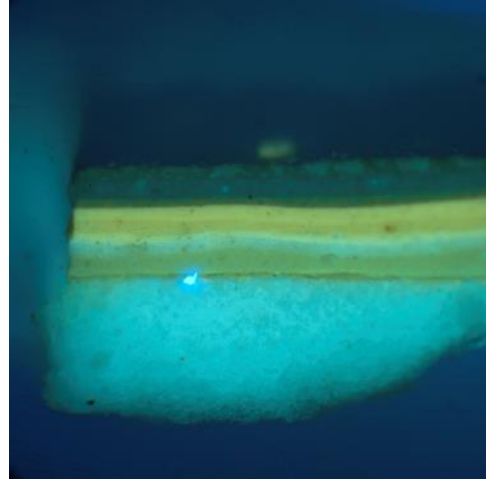
PR-009 Simulated Daylight



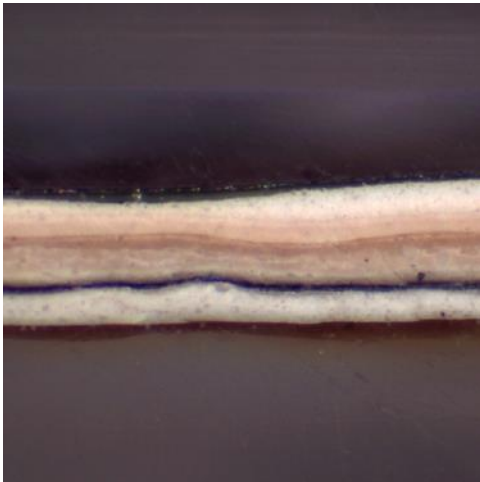
PR-009 Ultraviolet Light



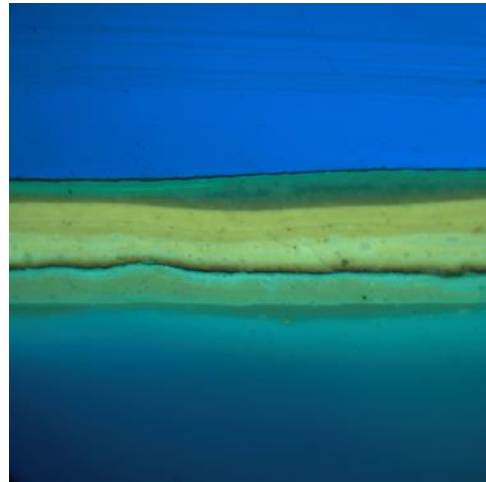
PR-010 Simulated Daylight



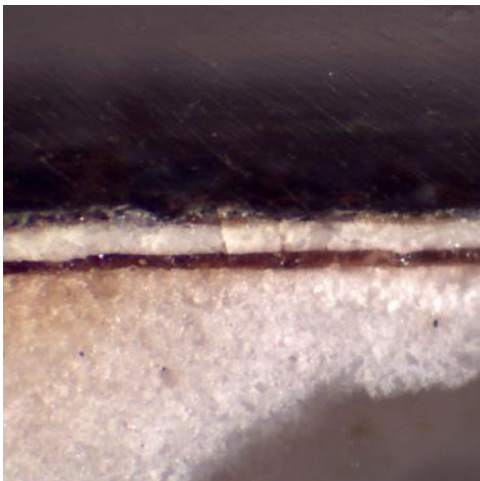
PR-010 Ultraviolet Light



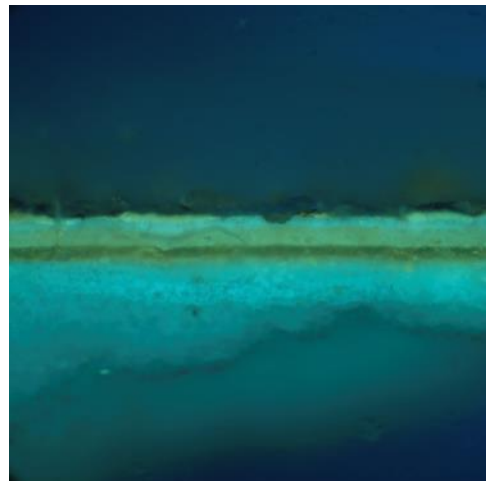
PR-011 Simulated Daylight



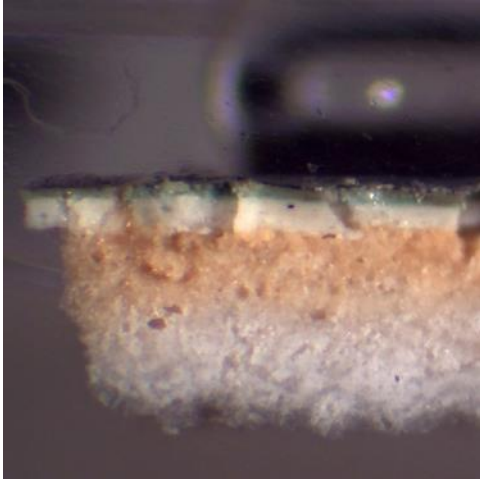
PR-011 Ultraviolet Light



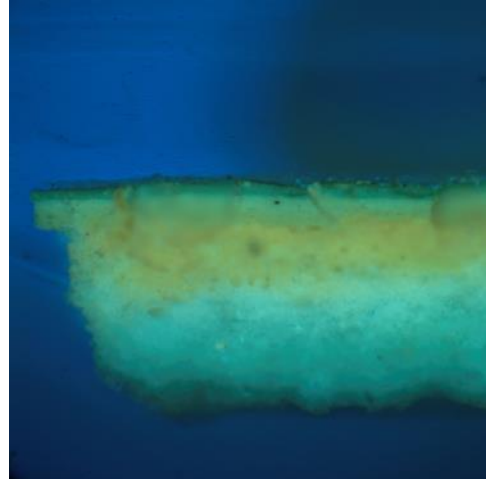
PR-012 Simulated Daylight



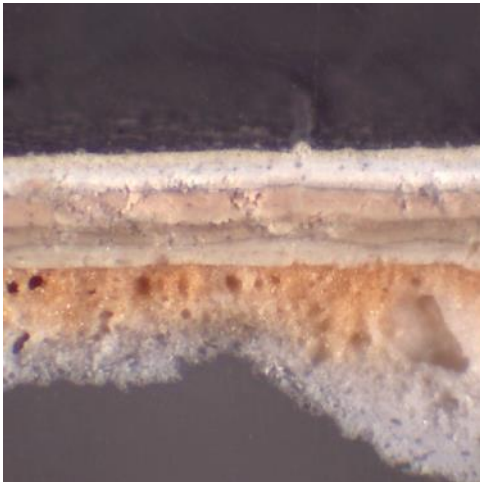
PR-012 Ultraviolet Light



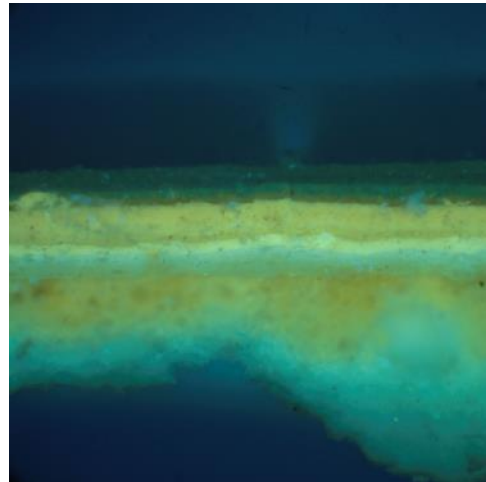
PR-013 Simulated Daylight



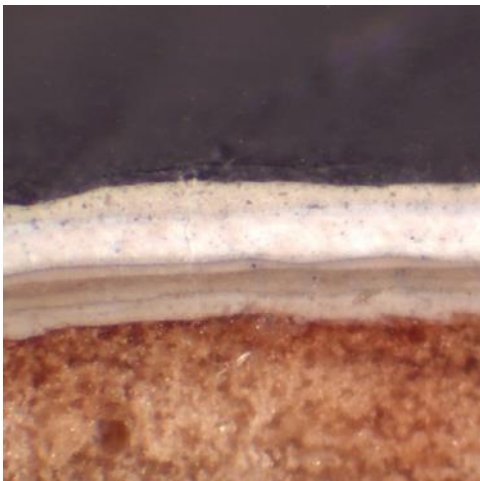
PR-013 Ultraviolet Light



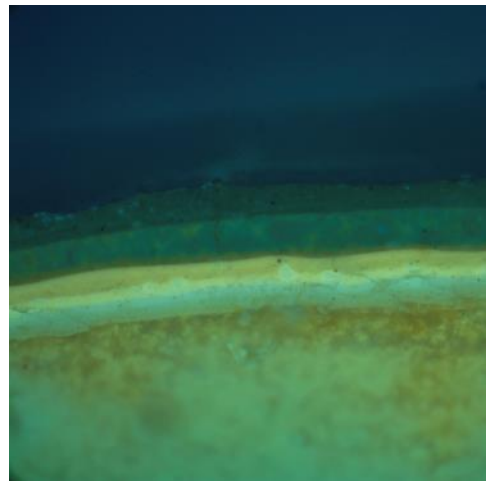
PR-014 Simulated Daylight



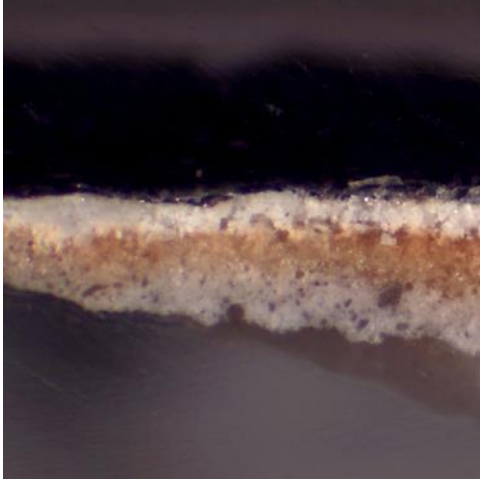
PR-014 Ultraviolet Light



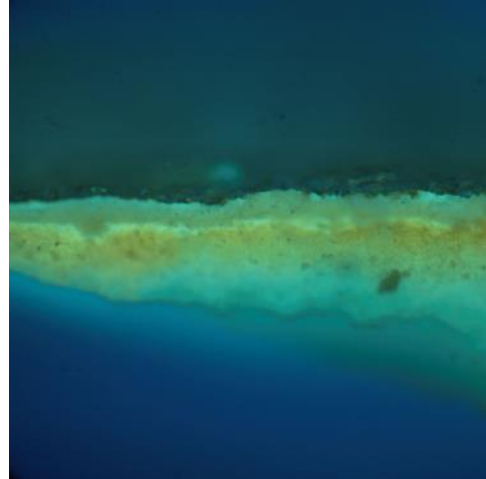
PR-015 Simulated Daylight



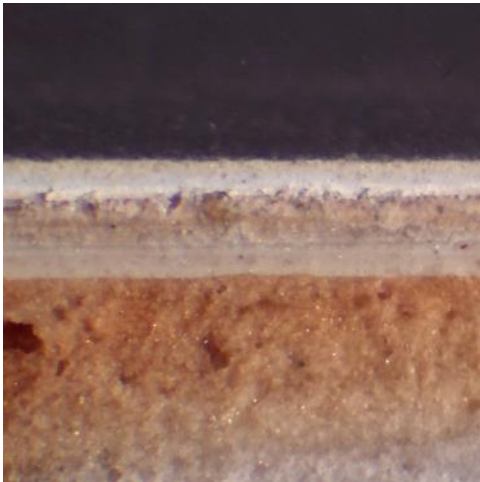
PR-015 Ultraviolet Light



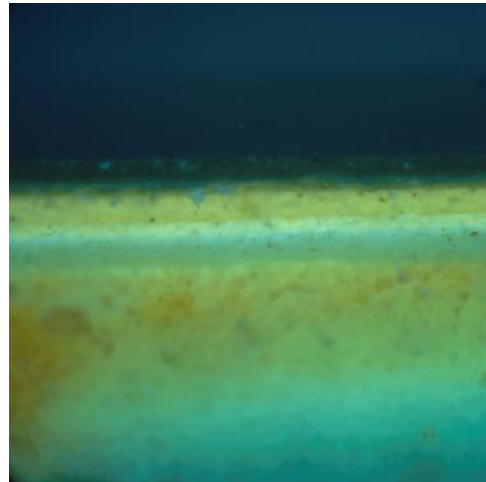
PR-016 Simulated Daylight



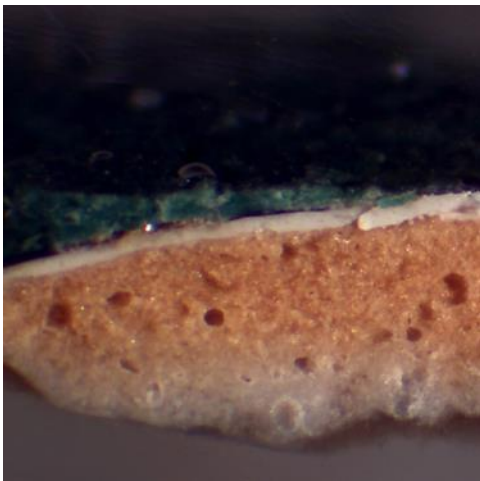
PR-016 Ultraviolet Light



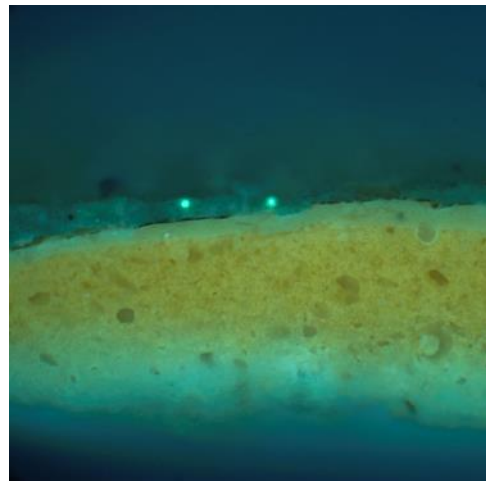
PR-017 Simulated Daylight



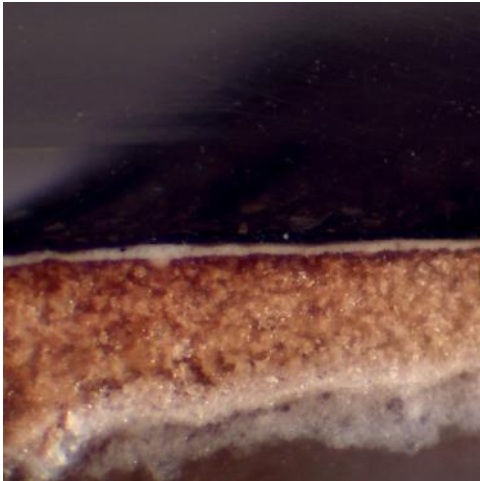
PR-017 Ultraviolet Light



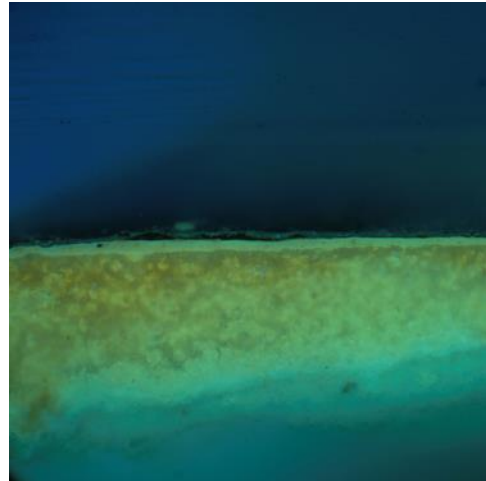
PR-018 Simulated Daylight



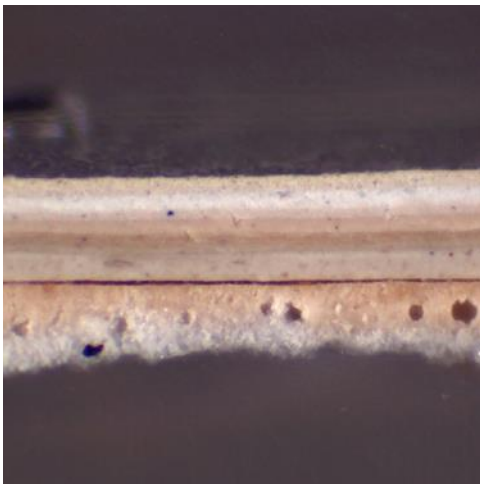
PR-018 Ultraviolet Light



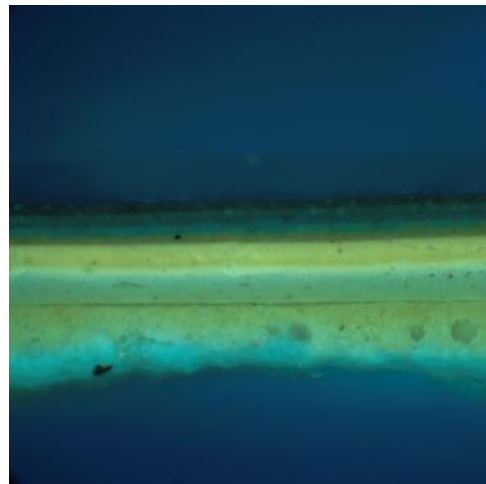
PR-019 Simulated Daylight



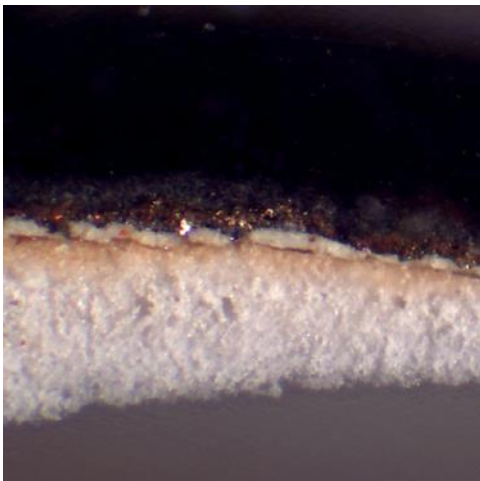
PR-019 Ultraviolet Light



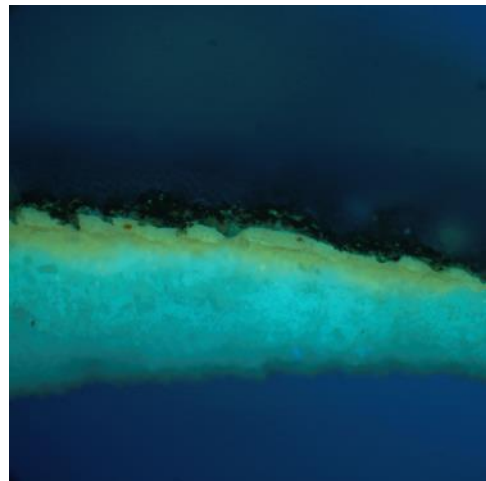
PR-020 Simulated Daylight



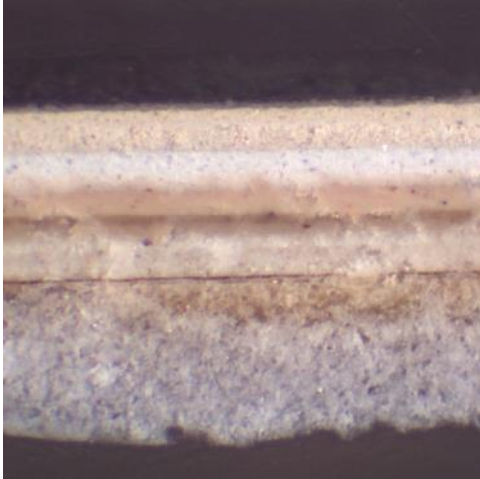
PR-020 Ultraviolet Light



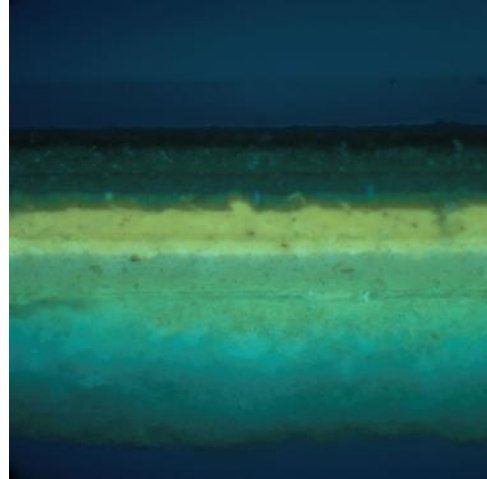
PR-021 Simulated Daylight



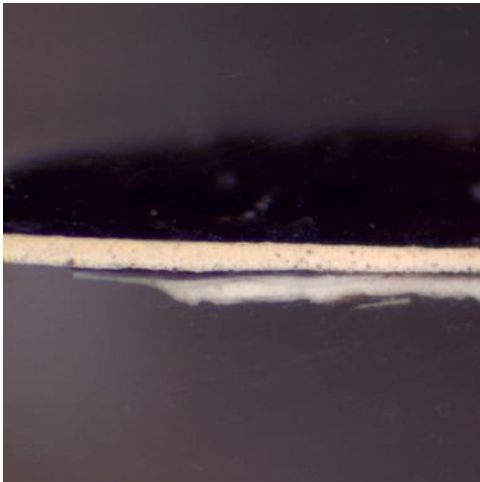
PR-021 Ultraviolet Light



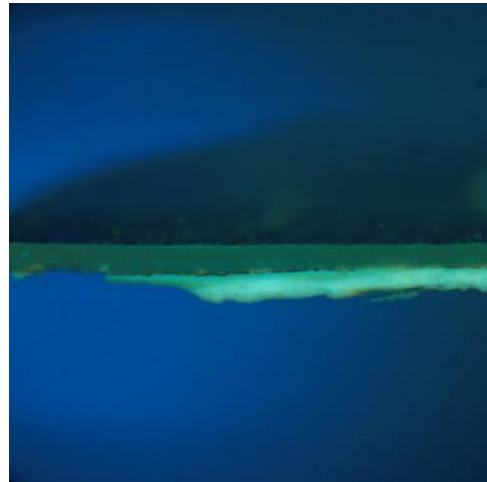
PR-022 Simulated Daylight



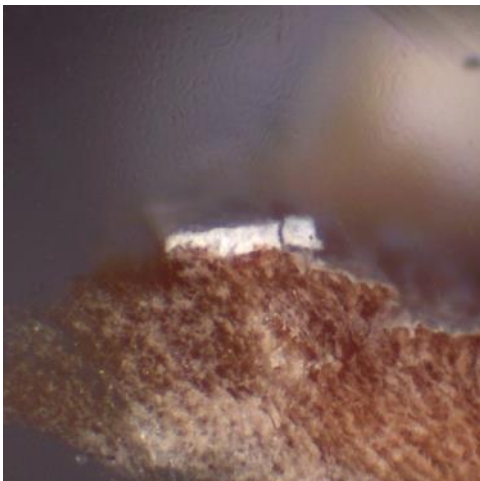
PR-022 Ultraviolet Light



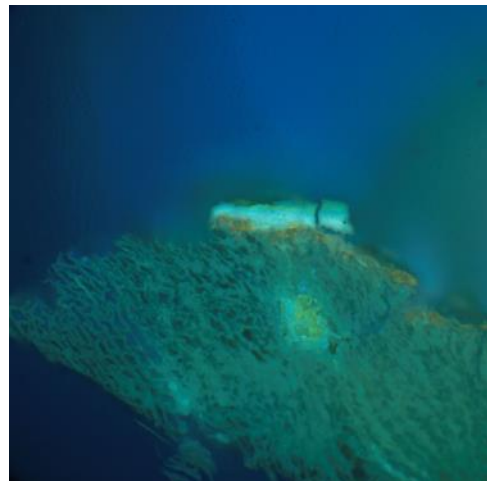
PR-023 Simulated Daylight



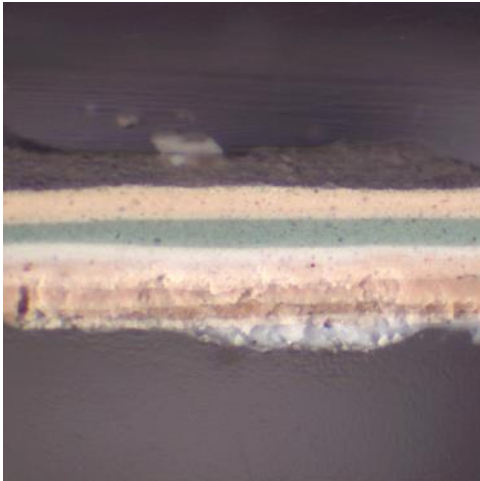
PR-023 Ultraviolet Light



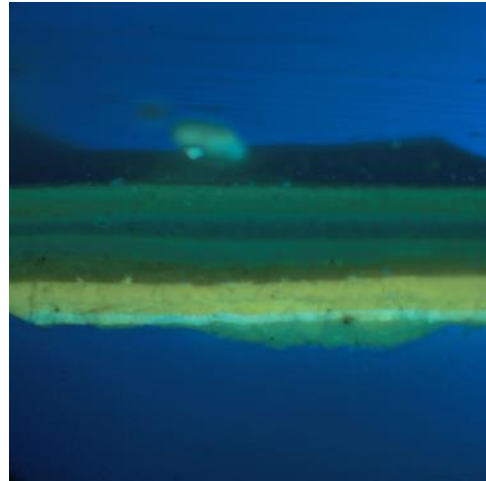
PR-024a Simulated Daylight



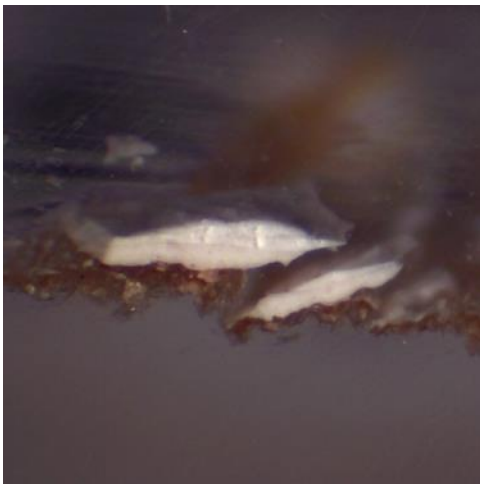
PR-024a Ultraviolet Light



PR-024b Simulated Daylight



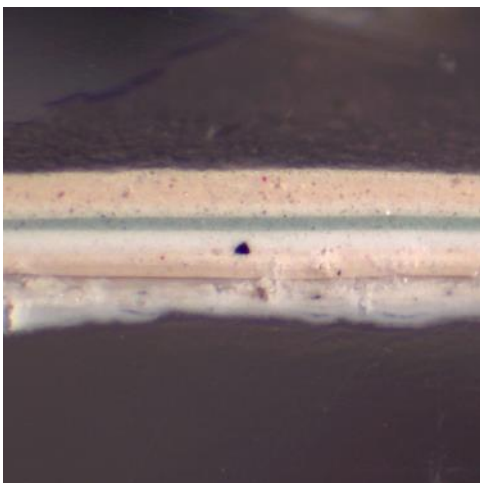
PR-024b Ultraviolet Light



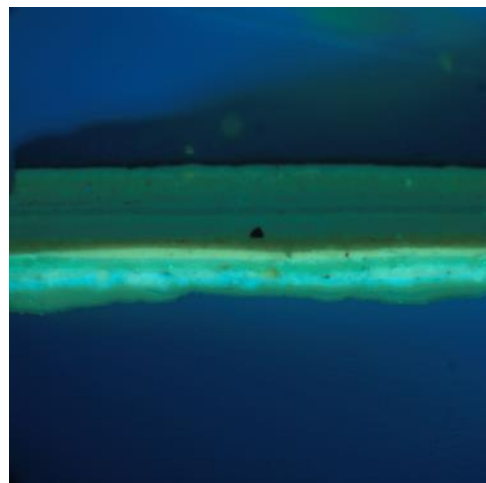
PR-025a Simulated Daylight



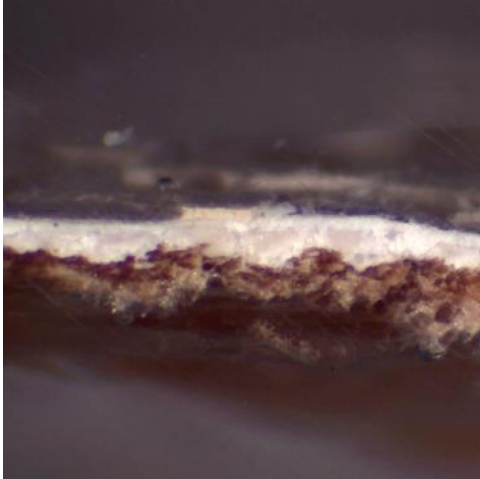
PR-025a Ultraviolet Light



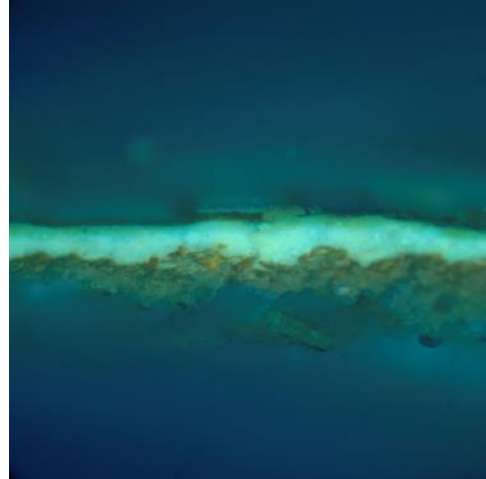
PR-025b Simulated Daylight



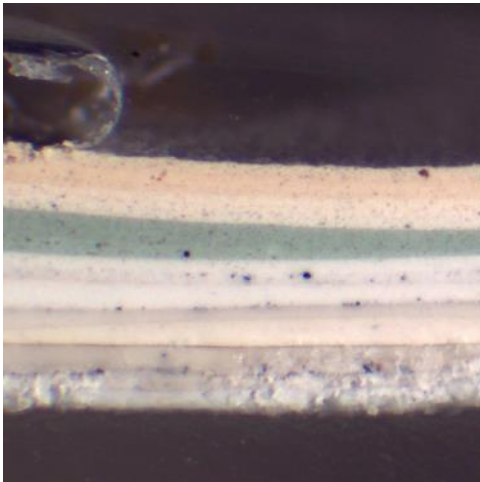
PR-025b Ultraviolet Light



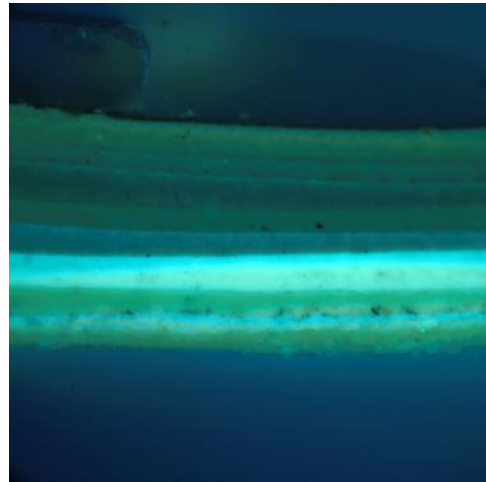
PR-026a Simulated Daylight



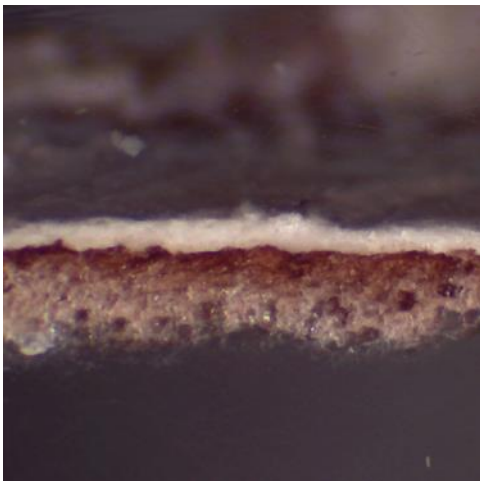
PR-026a Ultraviolet Light



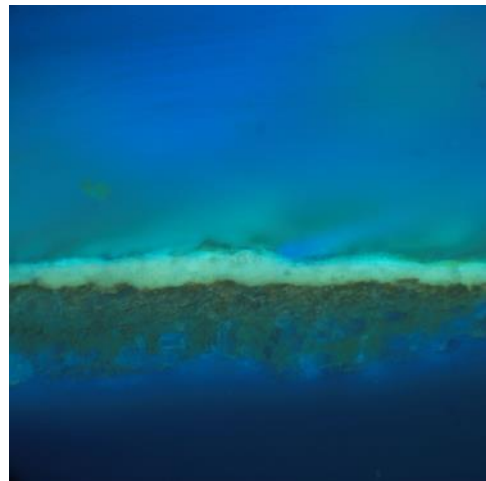
PR-026b Simulated Daylight



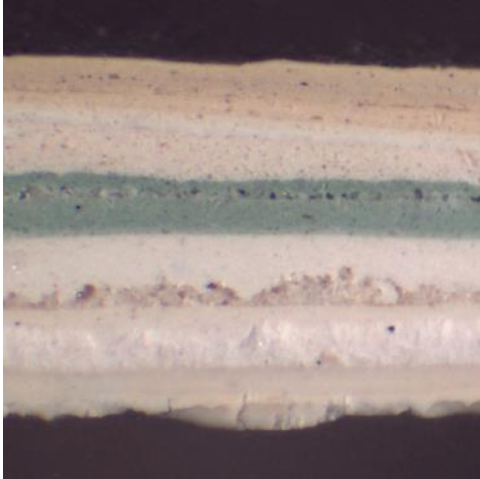
PR-026b Ultraviolet Light



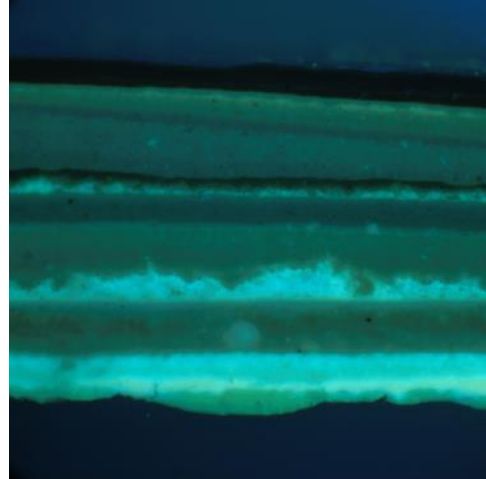
PR-027a Simulated Daylight



PR-027a Ultraviolet Light

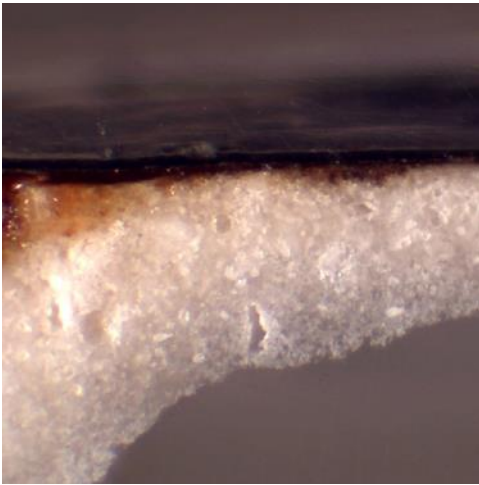


PR-027b Simulated Daylight

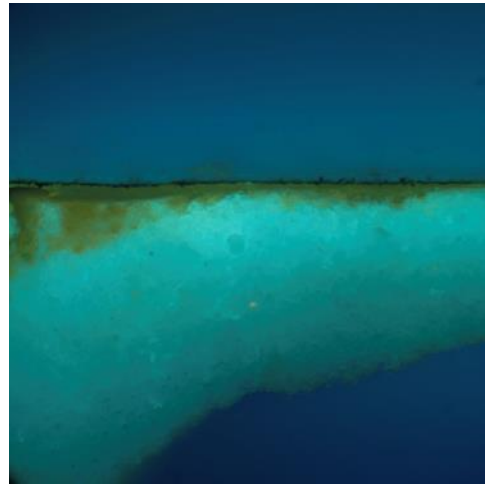


PR-027b Ultraviolet Light

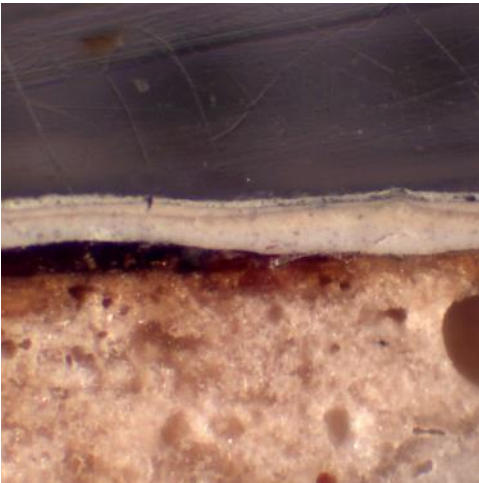
Memorial Hall/Ballroom



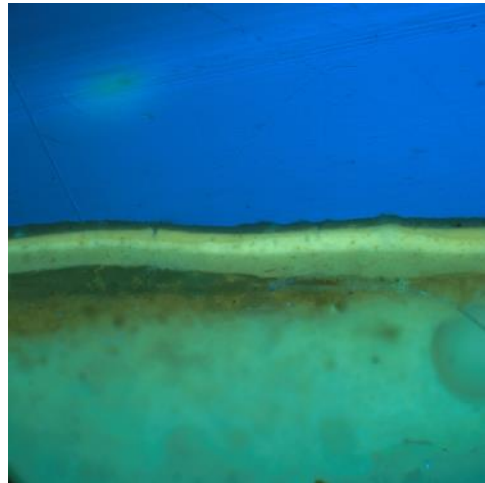
Ball-001 Simulated Daylight



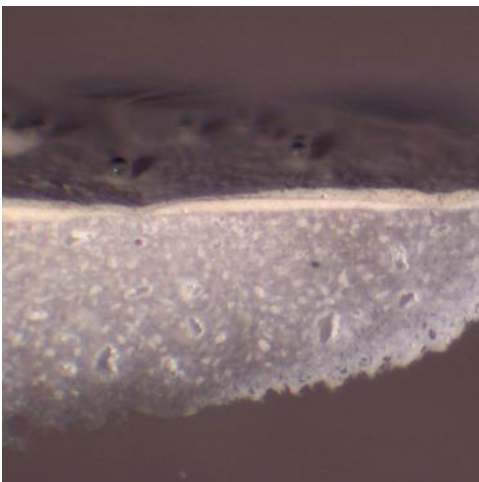
Ball-001 Ultraviolet Light



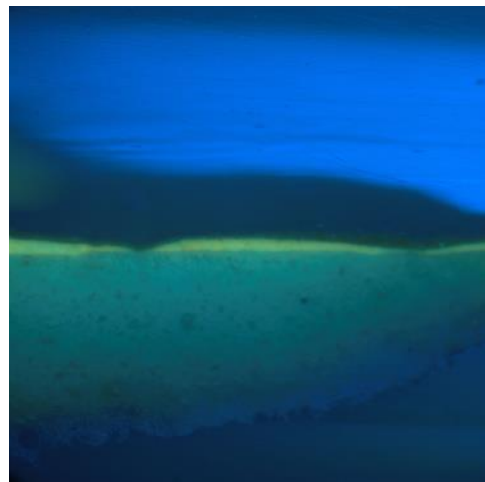
Ball-002 Simulated Daylight



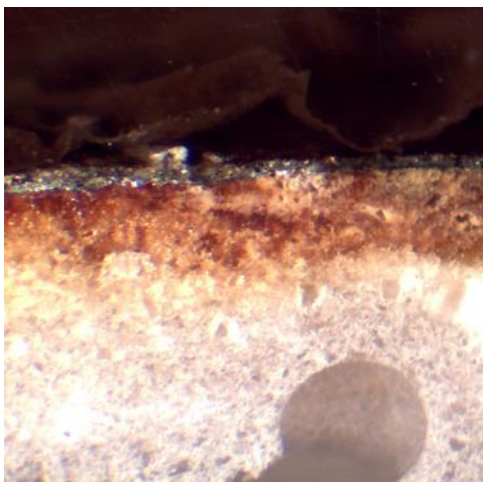
Ball-002 Ultraviolet Light



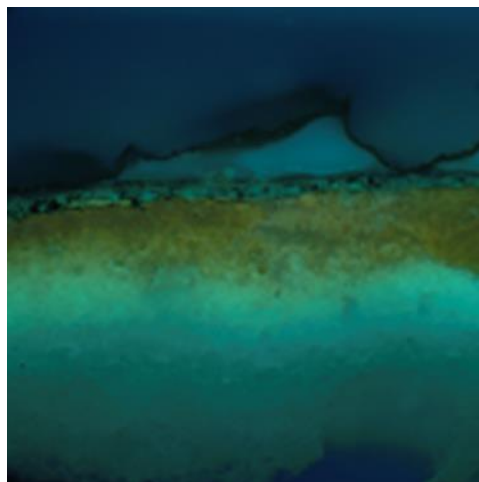
Ball-003 Simulated Daylight



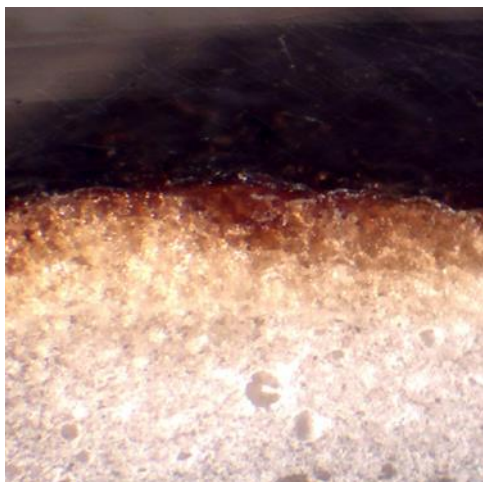
Ball-003 Ultraviolet Light



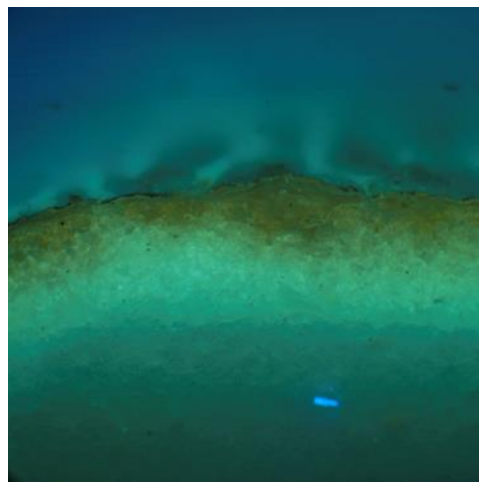
Ball-004 Simulated Daylight



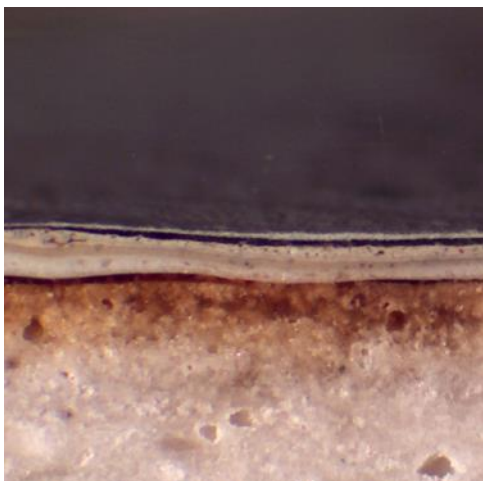
Ball-004 Ultraviolet Light



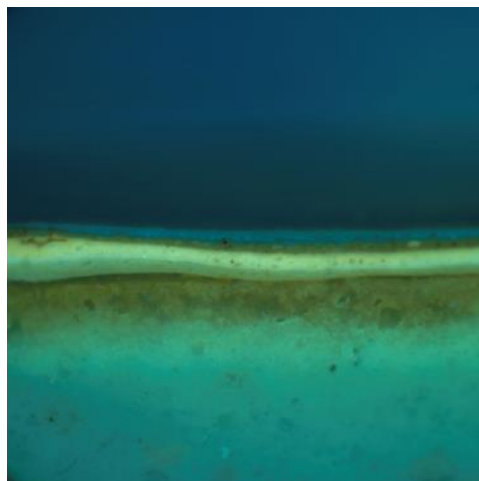
Ball-005 Simulated Daylight



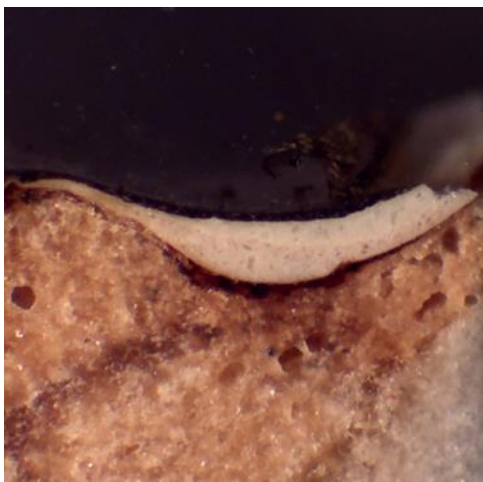
Ball-005 Ultraviolet Light



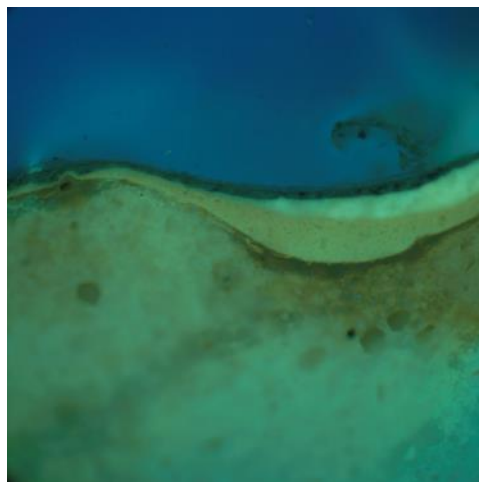
Ball-006 Simulated Daylight



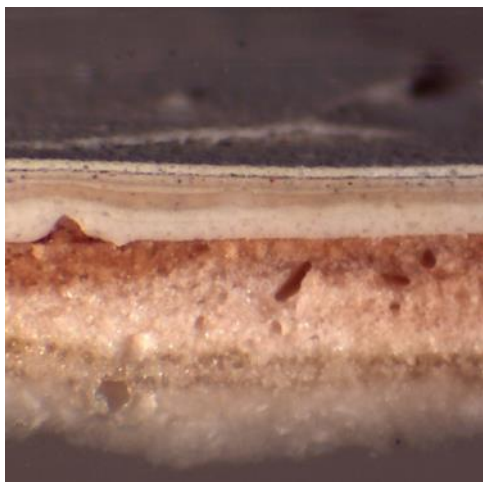
Ball-006 Ultraviolet Light



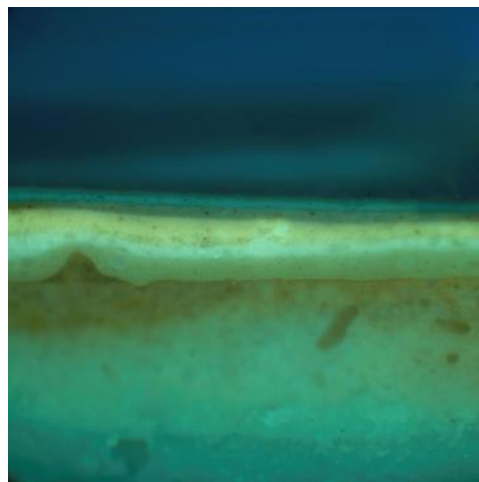
Ball-007 Simulated Daylight



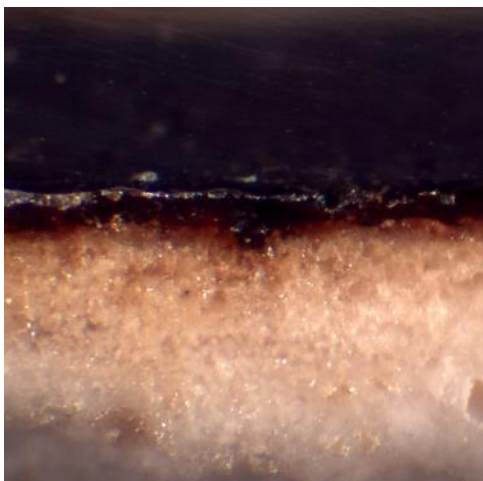
Ball-007 Ultraviolet Light



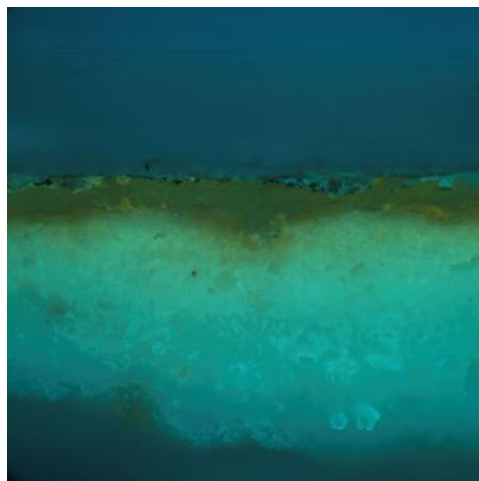
Ball-008 Simulated Daylight



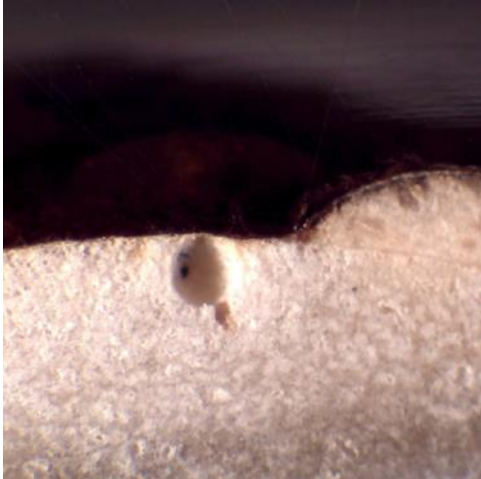
Ball-008 Ultraviolet Light



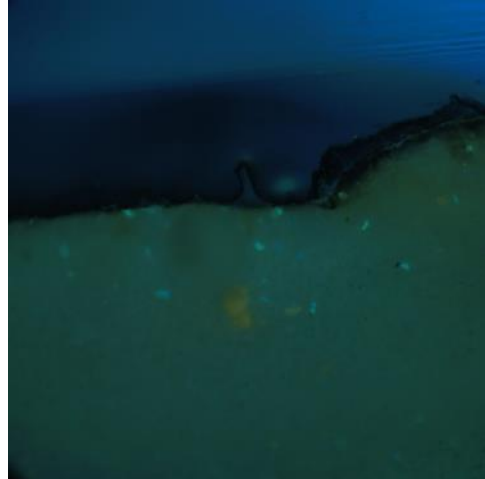
Ball-009 Simulated Daylight



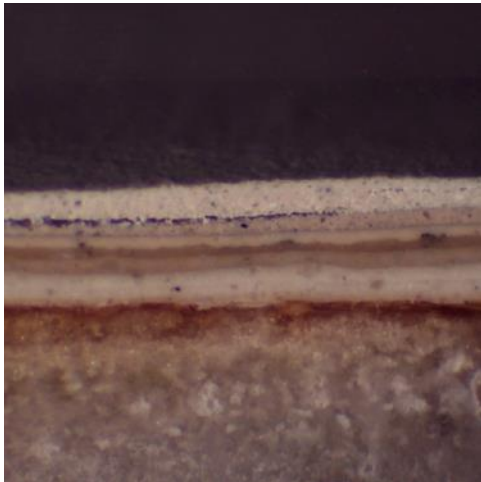
Ball-009 Ultraviolet Light



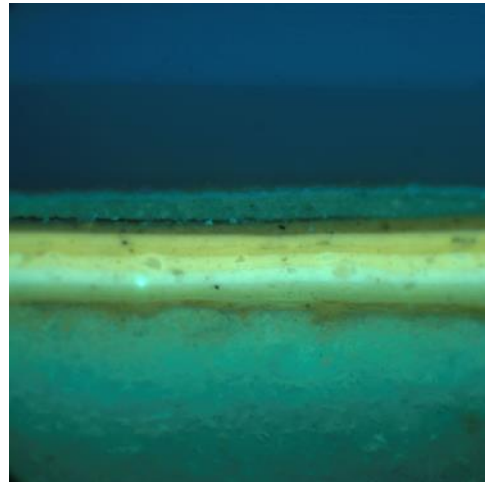
Ball-010 Simulated Daylight



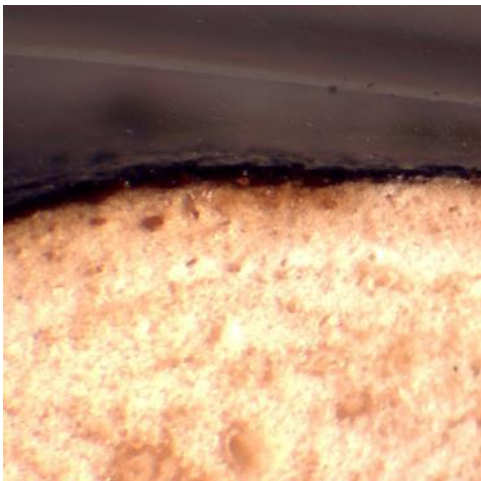
Ball-010 Ultraviolet Light



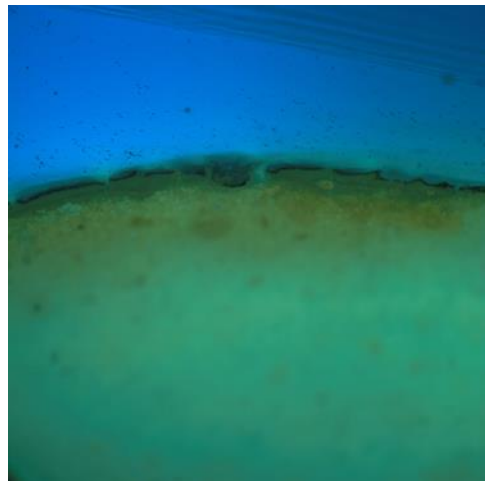
Ball-011 Simulated Daylight



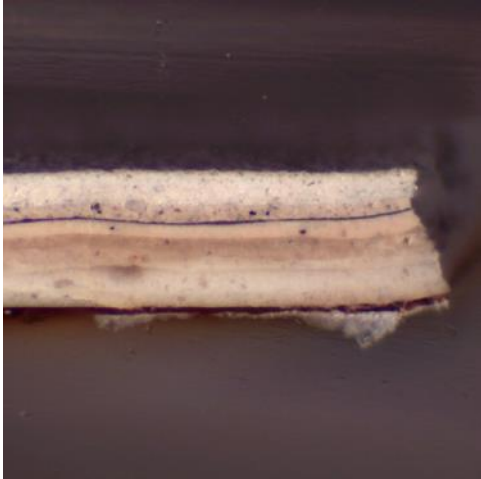
Ball-011 Ultraviolet Light



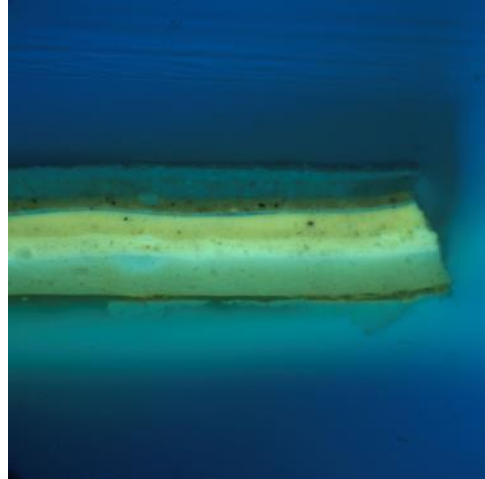
Ball-012 Simulated Daylight



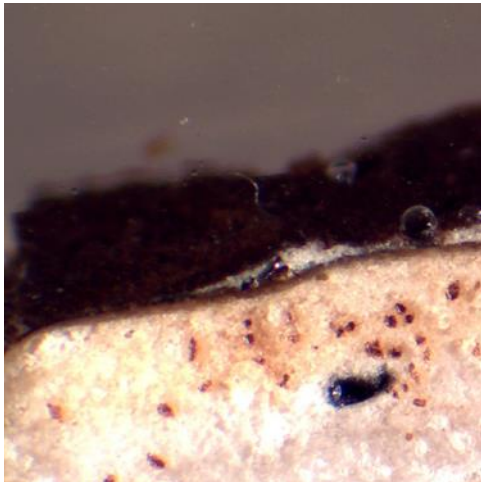
Ball-012 Ultraviolet Light



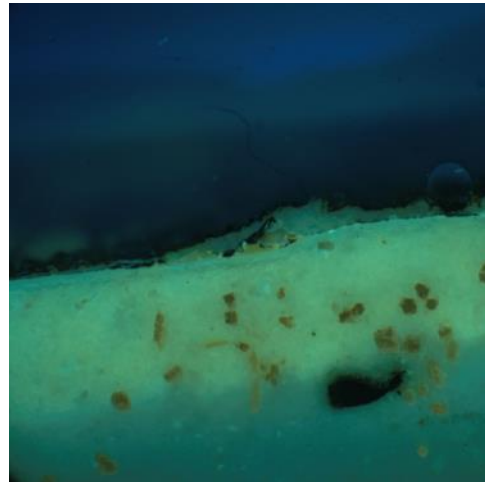
Ball-013 Simulated Daylight



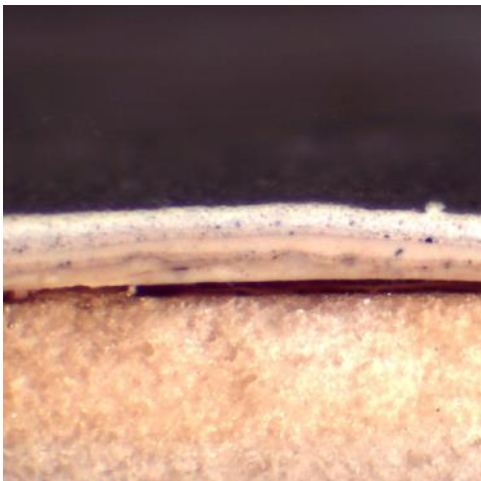
Ball-013 Ultraviolet Light



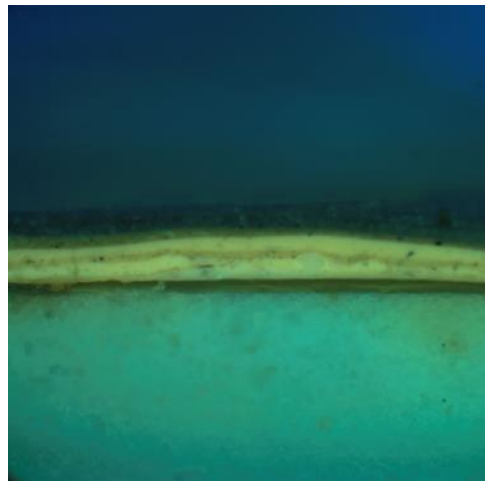
Ball-014 Simulated Daylight



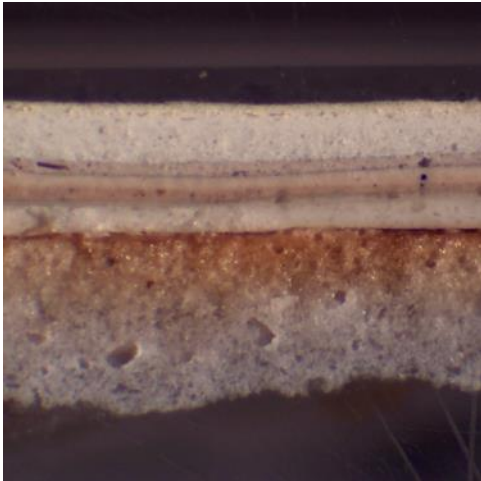
Ball-014 Ultraviolet Light



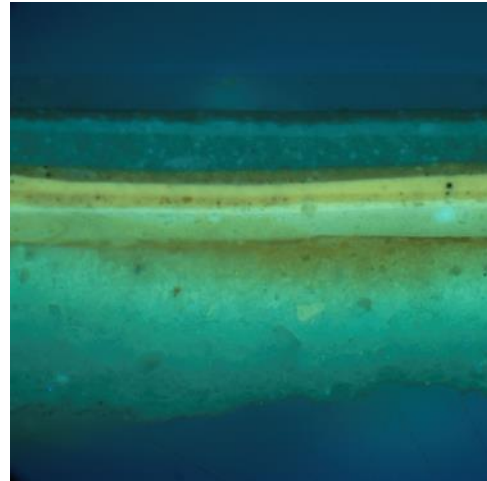
Ball-015 Simulated Daylight



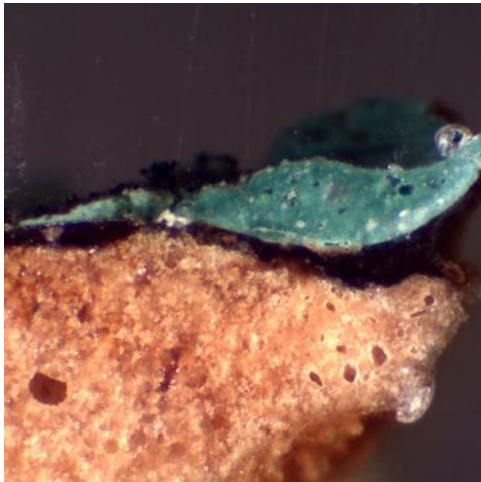
Ball-015 Ultraviolet Light



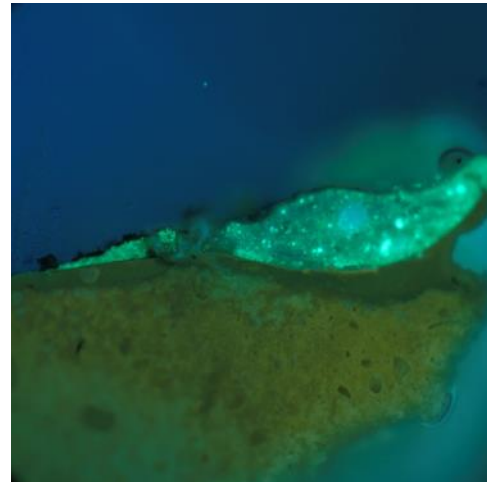
Ball-016 Simulated Daylight



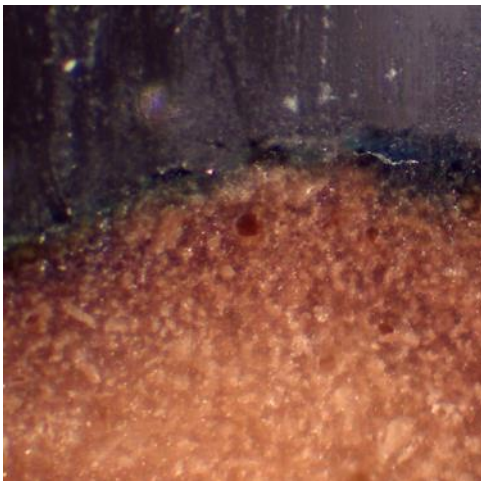
Ball-016 Ultraviolet Light



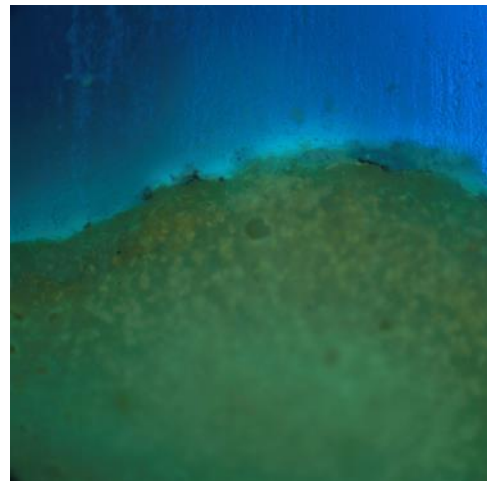
Ball-017 Simulated Daylight



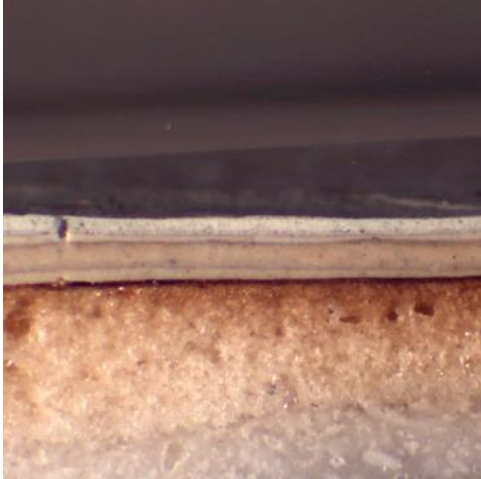
Ball-017 Ultraviolet Light



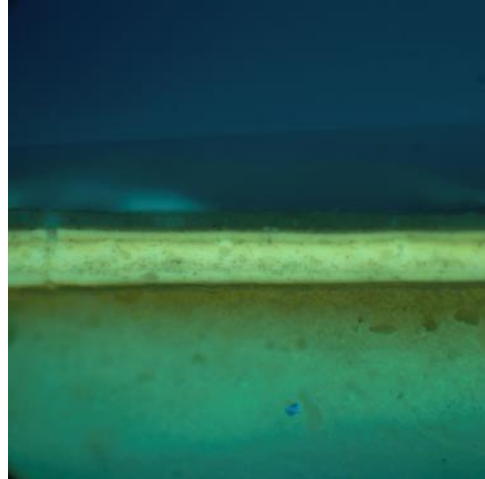
Ball-018 Simulated Daylight



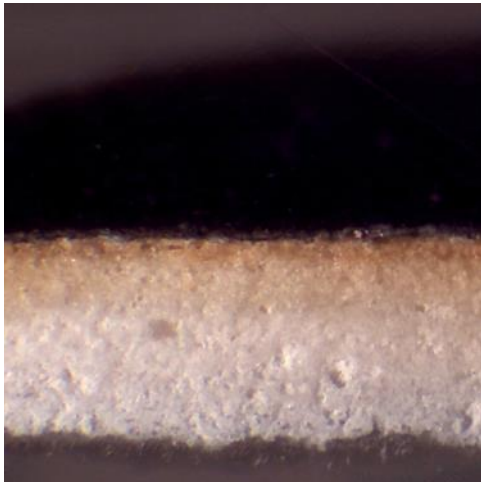
Ball-018 Ultraviolet Light



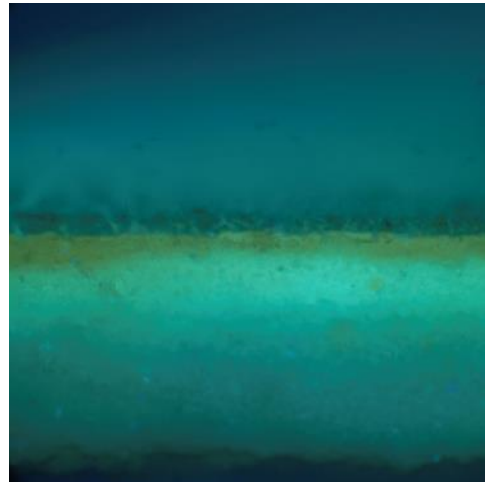
Ball-019 Simulated Daylight



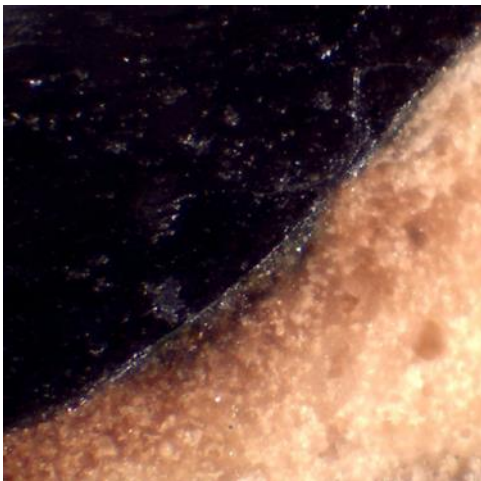
Ball-019 Ultraviolet Light



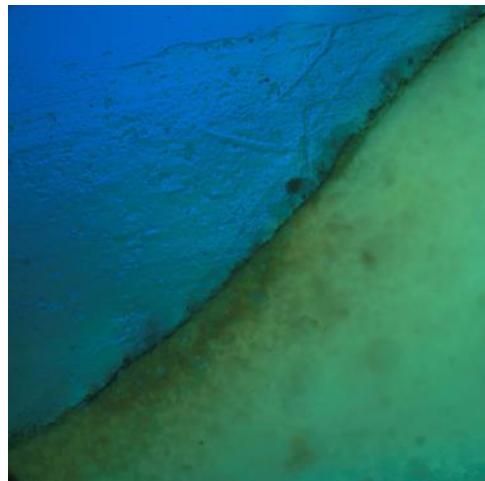
Ball-020 Simulated Daylight



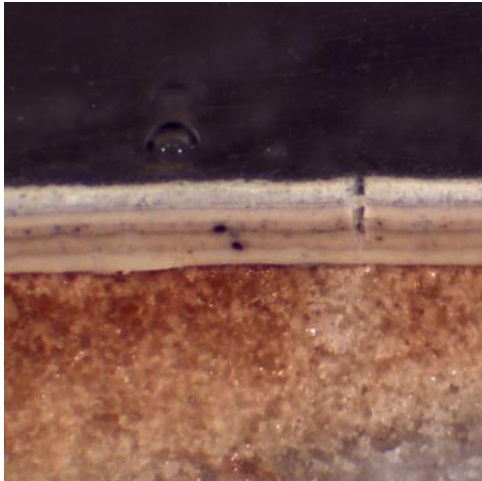
Ball-020 Ultraviolet Light



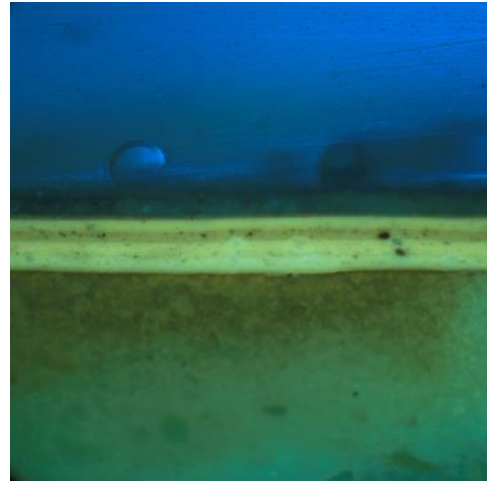
Ball-021 Simulated Daylight



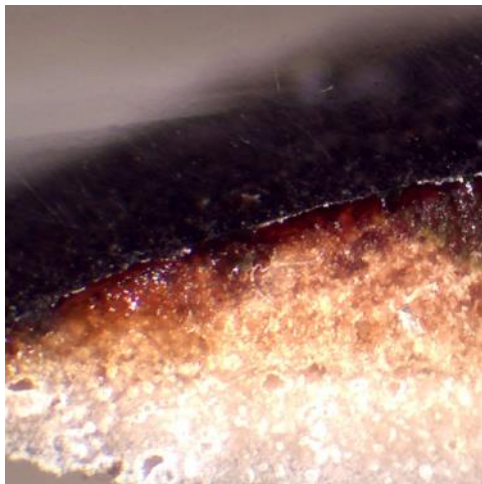
Ball-021 Ultraviolet Light



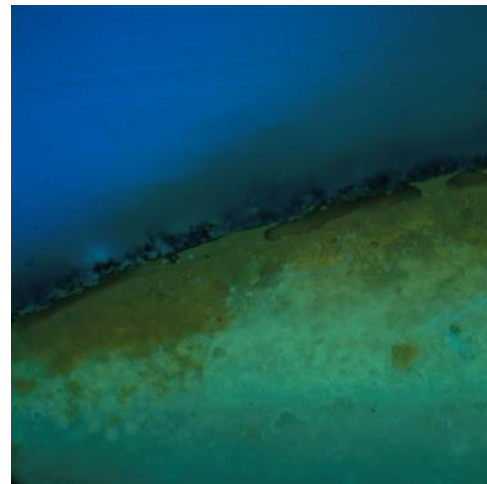
Ball-022 Simulated Daylight



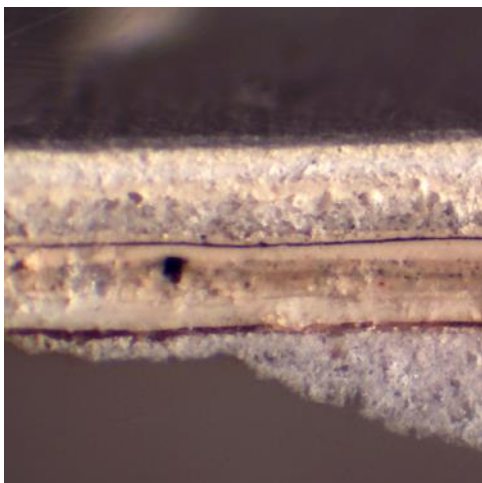
Ball-022 Ultraviolet Light



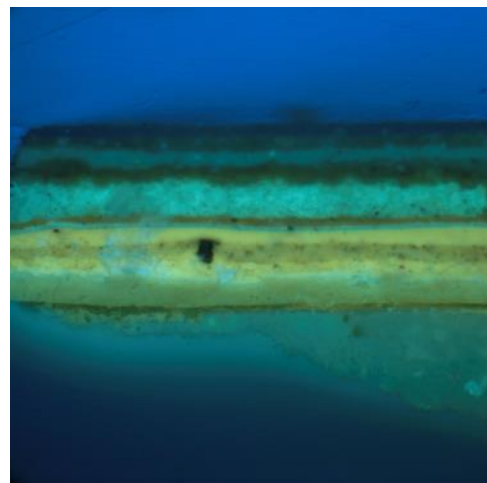
Ball-023 Simulated Daylight



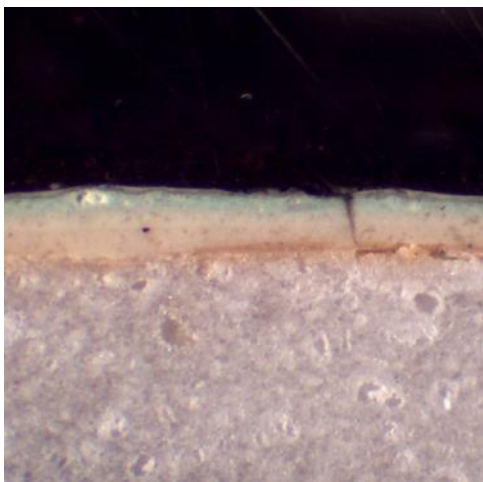
Ball-023 Ultraviolet Light



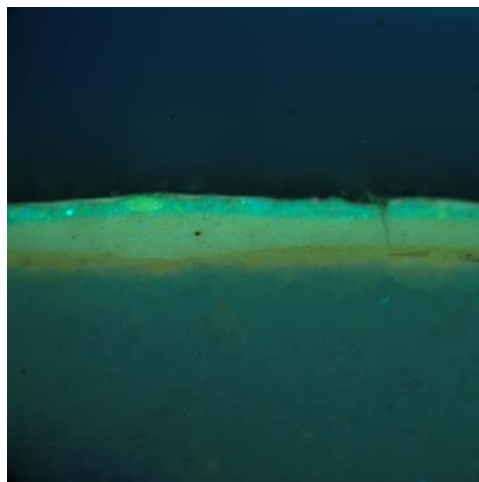
Ball-024 Simulated Daylight



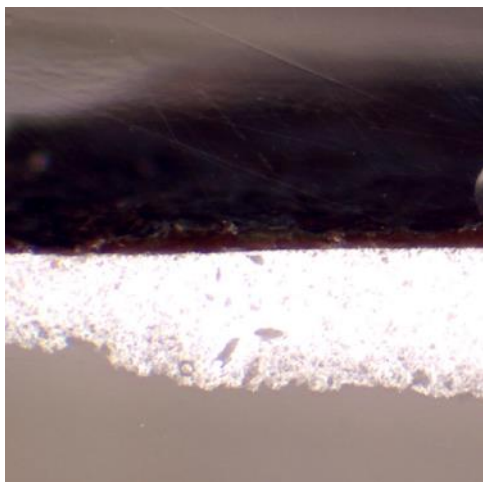
Ball-024 Ultraviolet Light



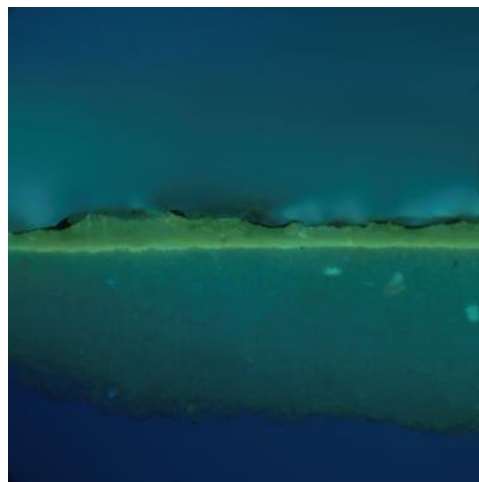
Ball-025 Simulated Daylight



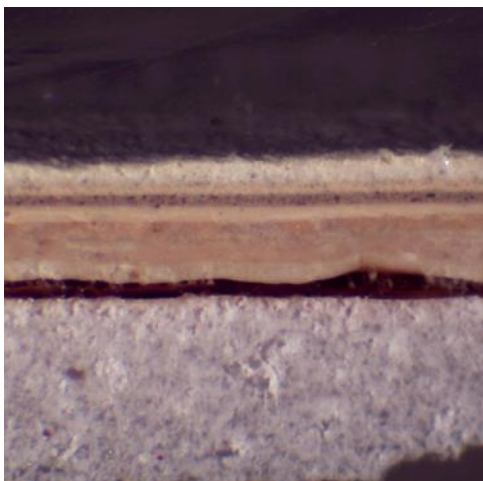
Ball-025 Ultraviolet Light



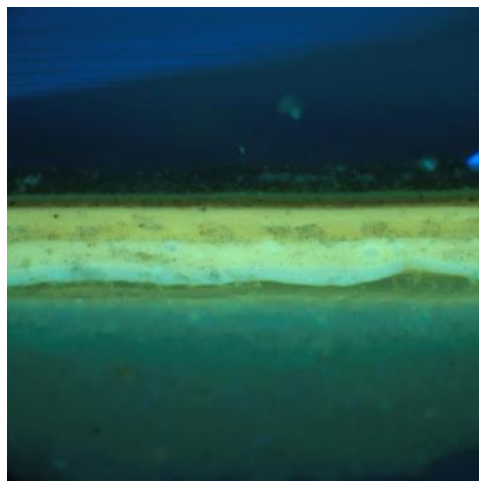
Ball-026 Simulated Daylight



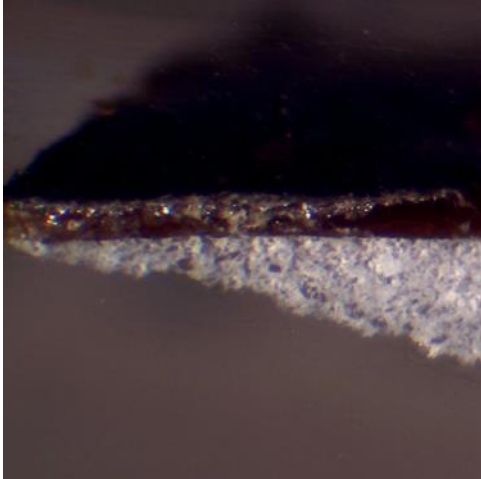
Ball-026 Ultraviolet Light



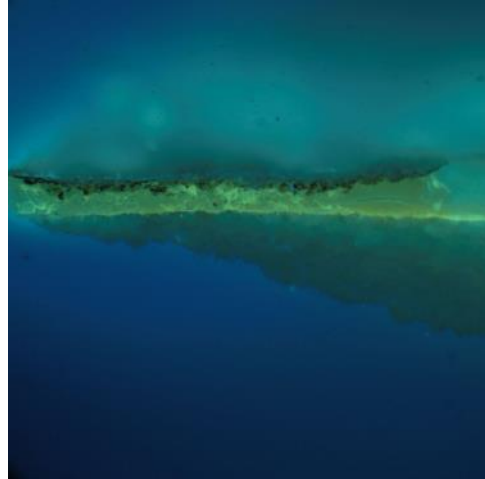
Ball-027 Simulated Daylight



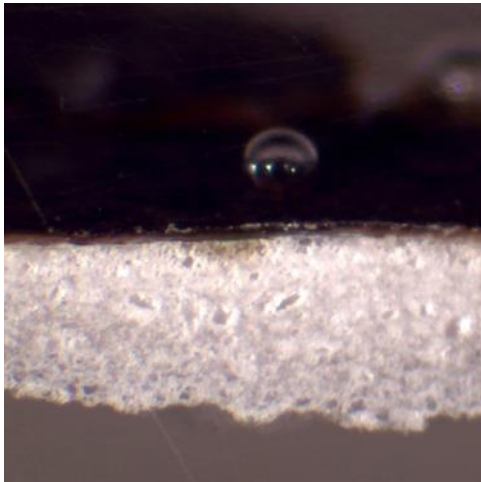
Ball-027 Ultraviolet Light



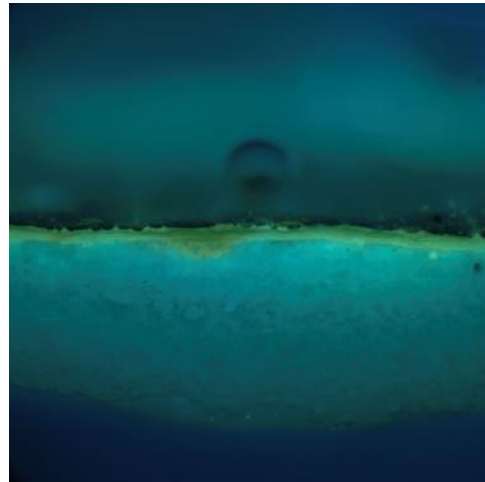
Ball-028 Simulated Daylight



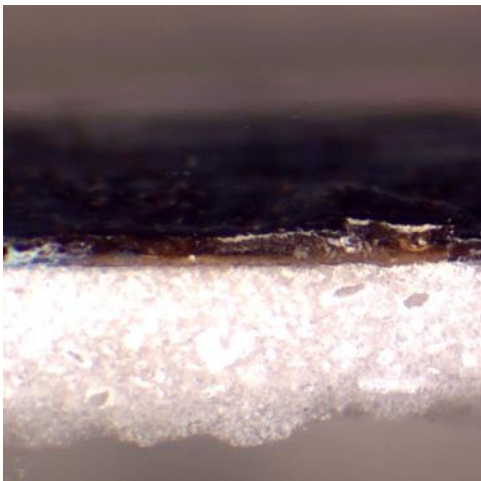
Ball-028 Ultraviolet Light



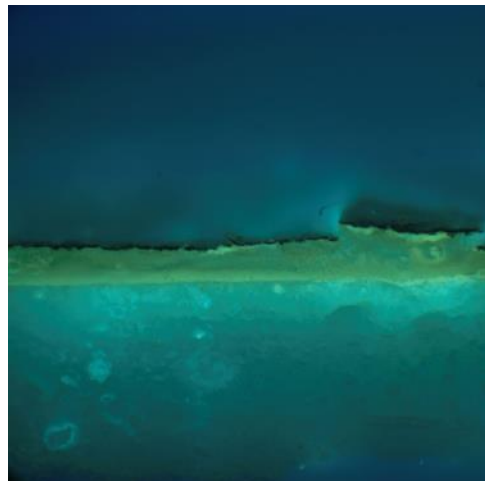
Ball-029 Simulated Daylight



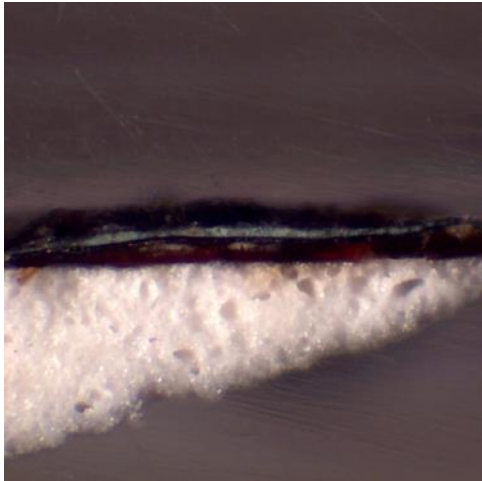
Ball-029 Ultraviolet Light



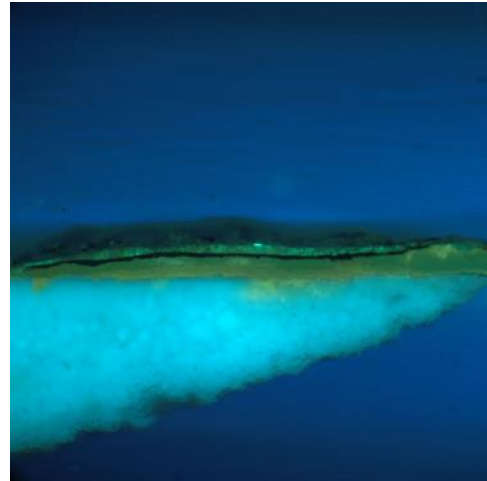
Ball-030 Simulated Daylight



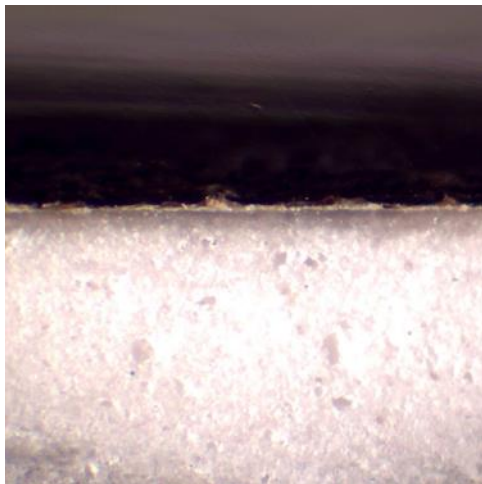
Ball-030 Ultraviolet Light



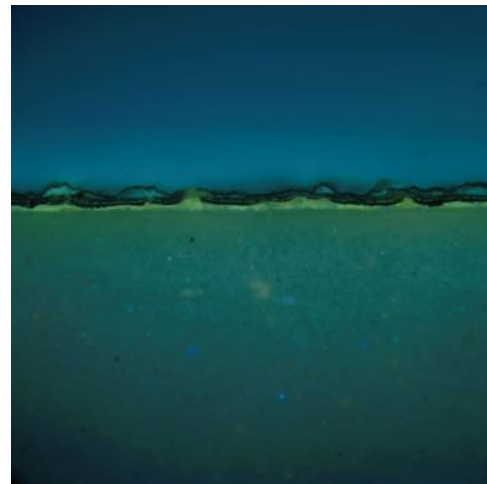
Ball-031 Simulated Daylight



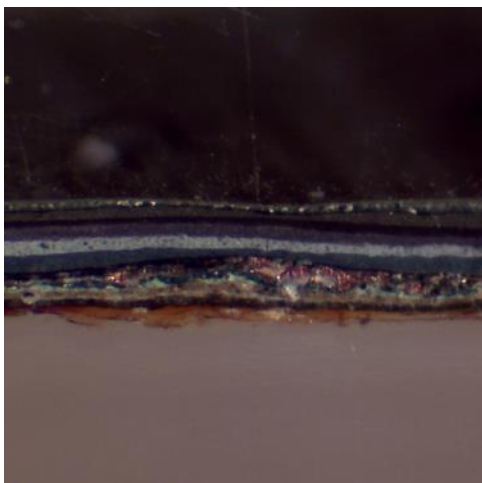
Ball-031 Ultraviolet Light



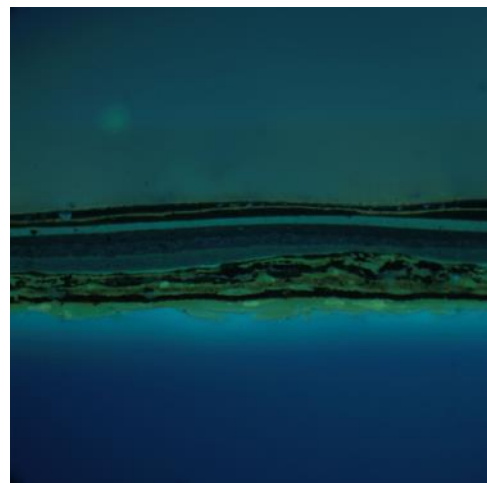
Ball-032 Simulated Daylight



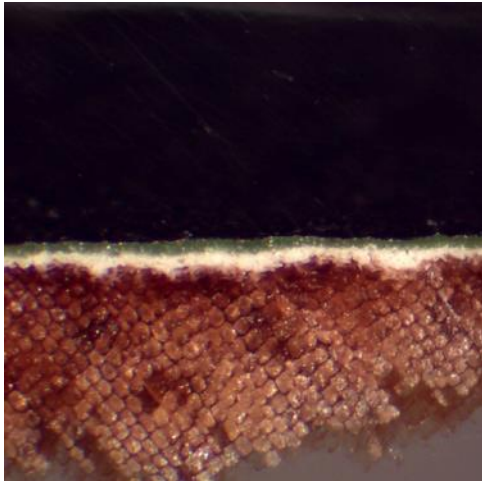
Ball-032 Ultraviolet Light



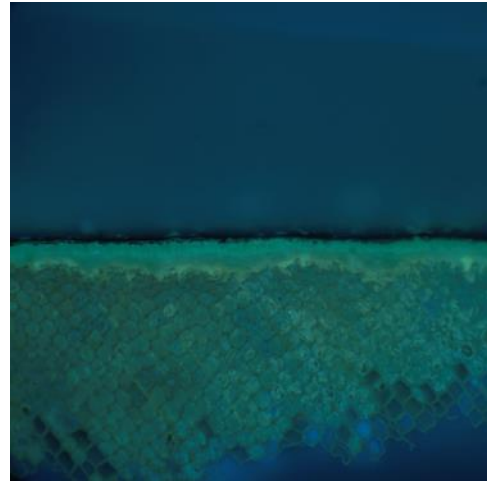
Ball-033 Simulated Daylight



Ball-033 Ultraviolet Light



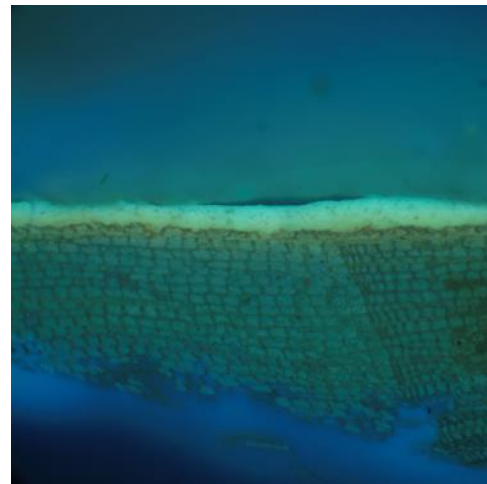
Ball-034 Simulated Daylight



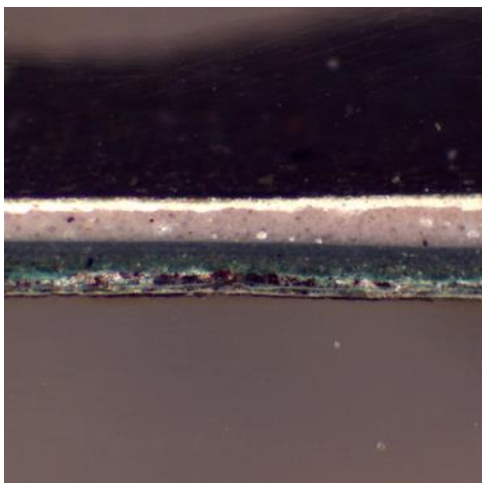
Ball-034 Ultraviolet Light



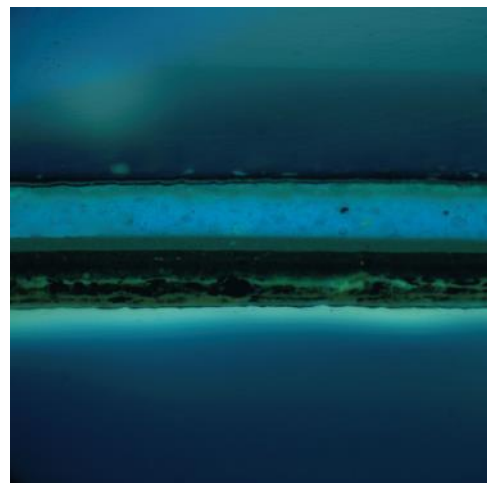
Ball-035a Simulated Daylight



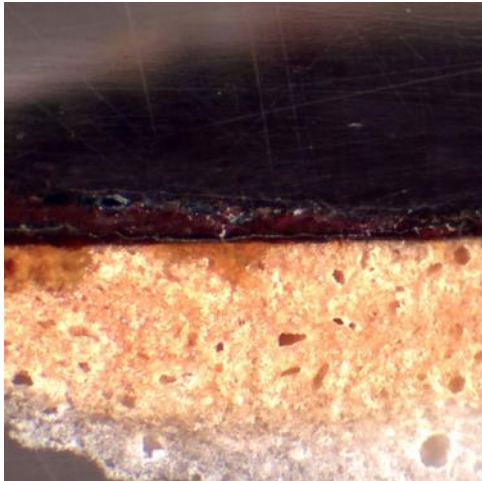
Ball-035a Ultraviolet Light



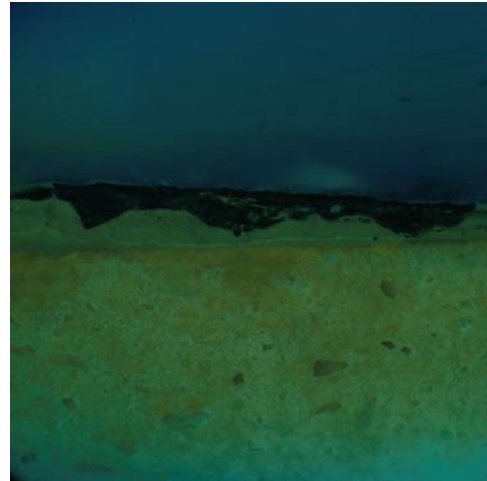
Ball-035b Simulated Daylight



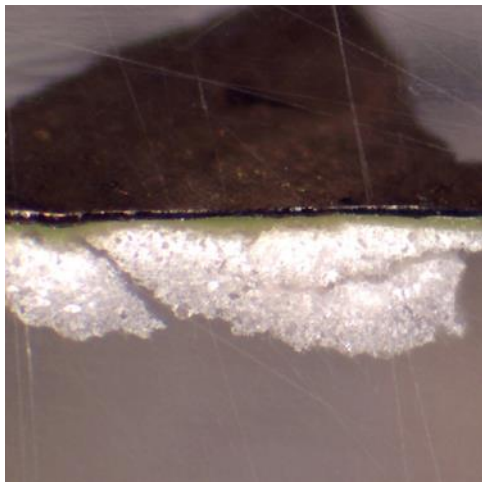
Ball-035b Ultraviolet Light



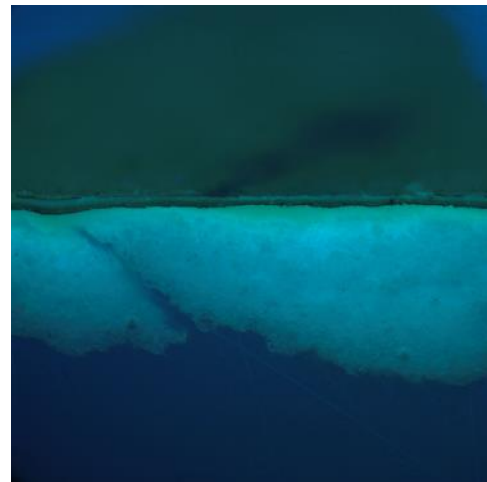
Ball-036a Simulated Daylight



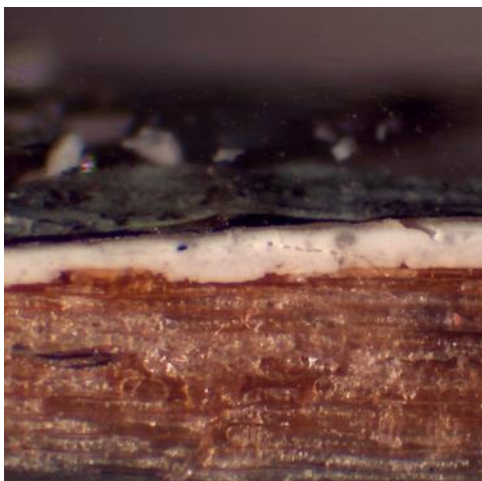
Ball-036a Ultraviolet Light



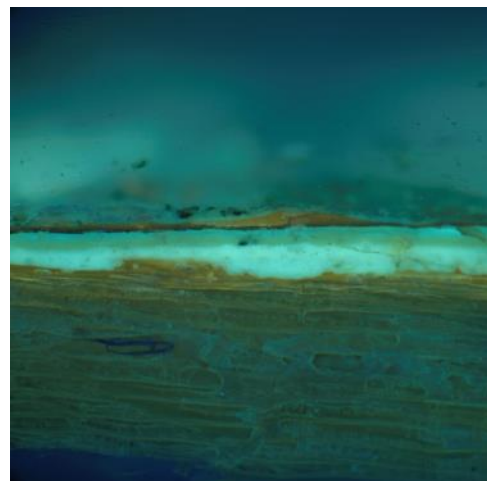
Ball-036b Simulated Daylight



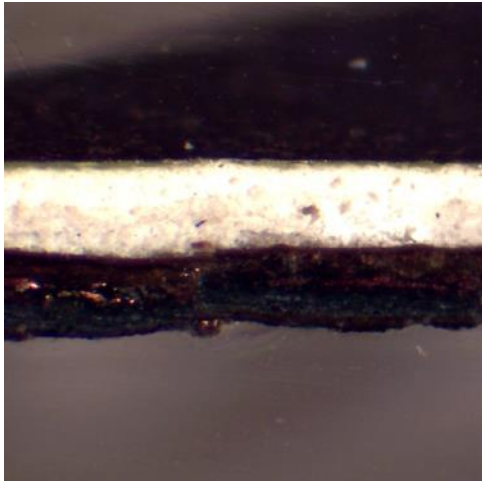
Ball-036b Ultraviolet Light



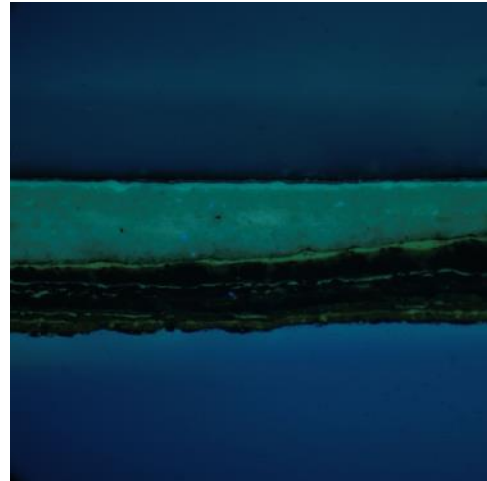
Ball-037a Simulated Daylight



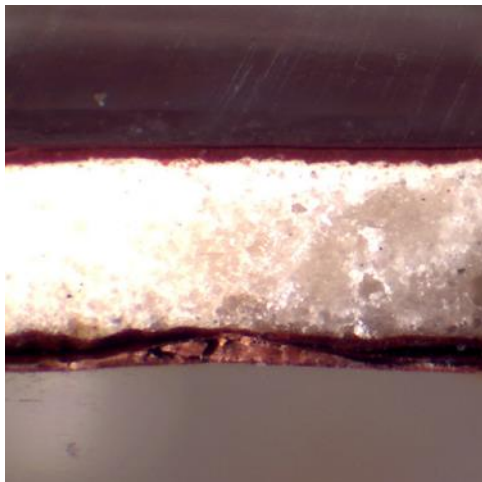
Ball-037a Ultraviolet Light



Ball-037b Simulated Daylight



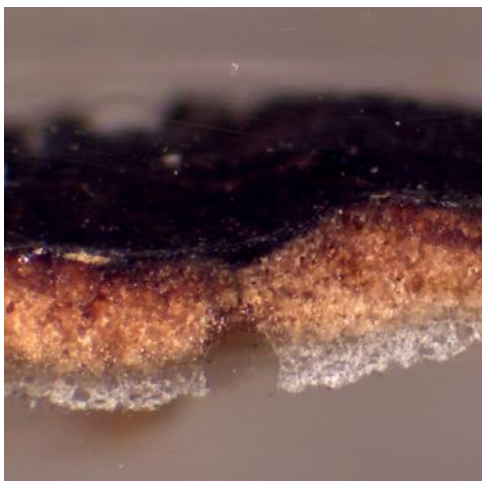
Ball-037b Ultraviolet Light



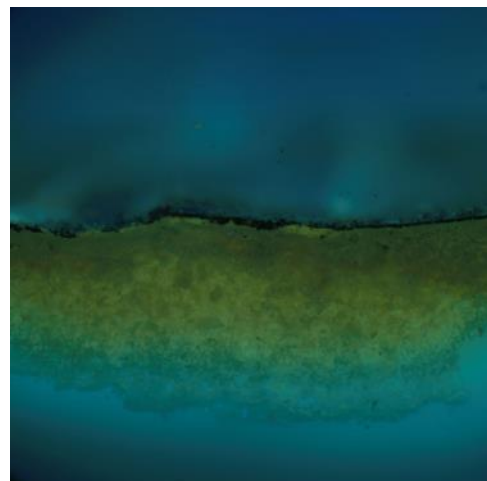
Ball-038 Simulated Daylight



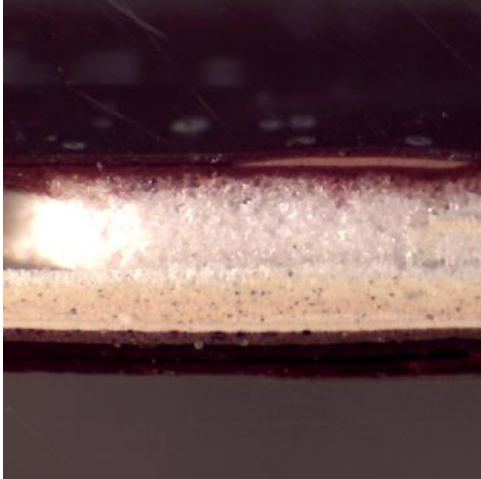
Ball-038 Ultraviolet Light



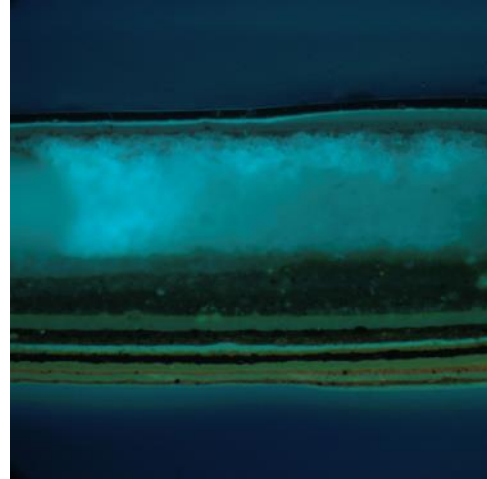
Ball-039 Simulated Daylight



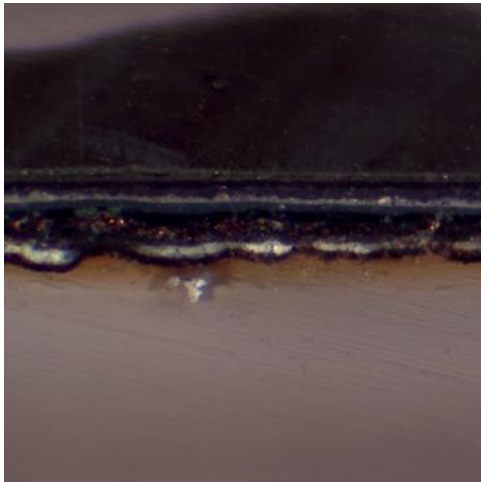
Ball-039 Ultraviolet Light



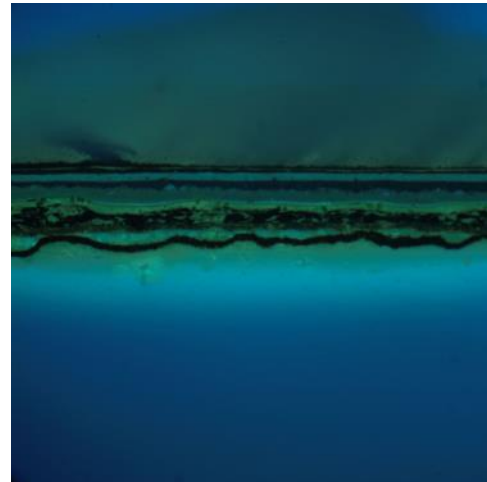
Ball-040 Simulated Daylight



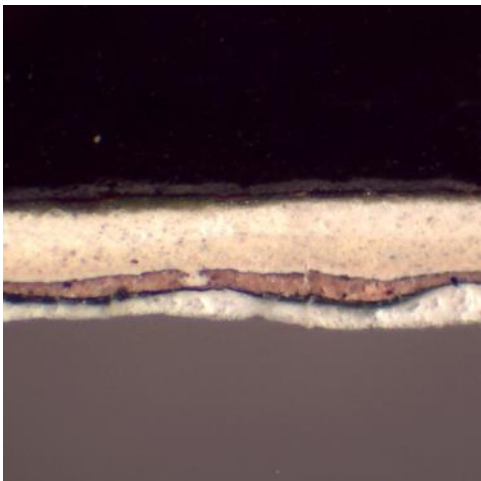
Ball-040 Ultraviolet Light



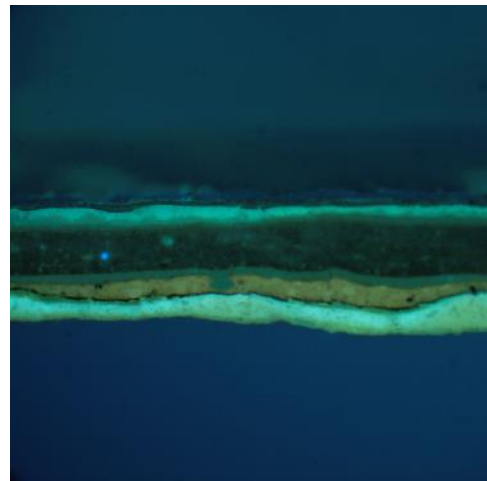
Ball-041 Simulated Daylight



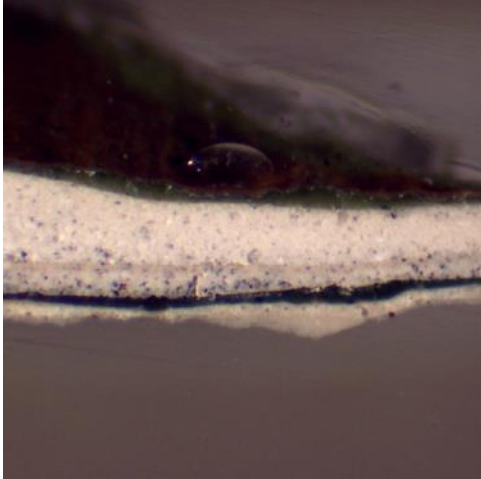
Ball-041 Ultraviolet Light



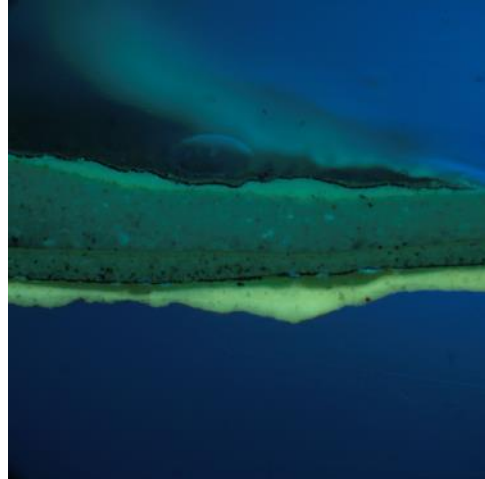
Ball-042 Simulated Daylight



Ball-042 Ultraviolet Light

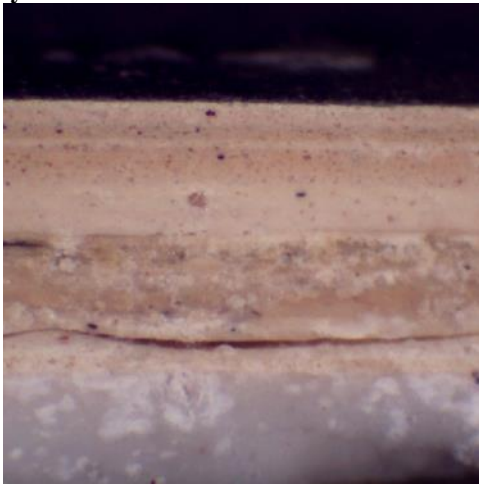


Ball-043 Simulated Daylight

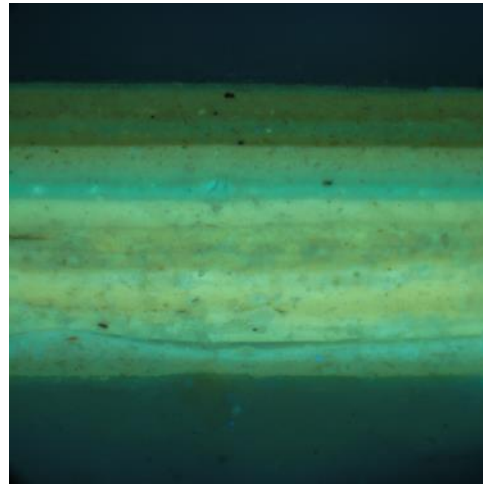


Ball-043 Ultraviolet Light

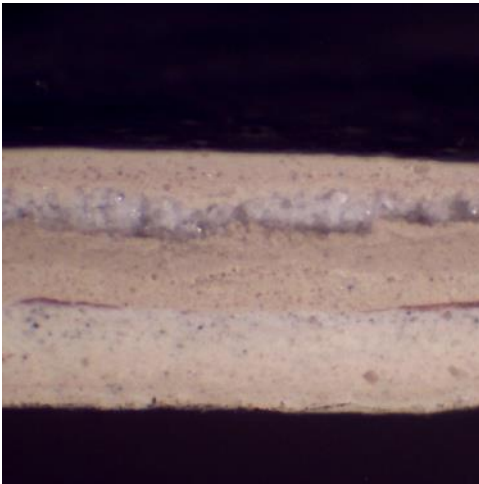
Balcony



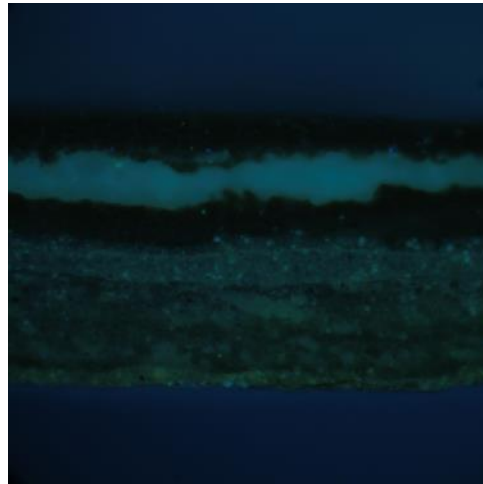
Balc-001a Simulated Daylight



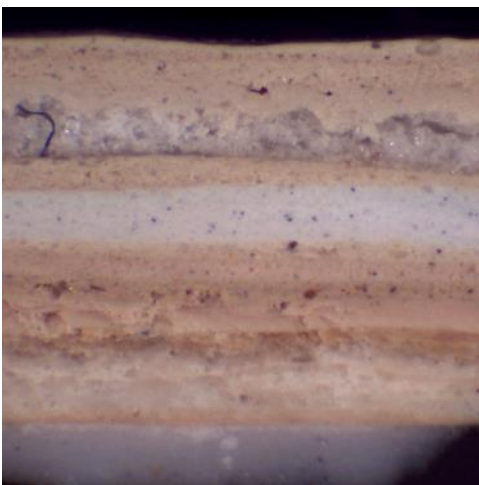
Balc-001a Ultraviolet Light



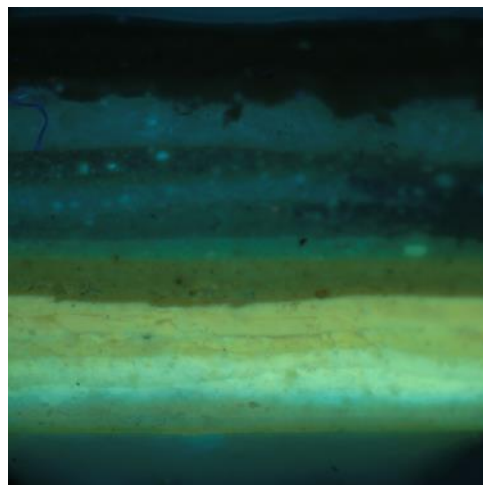
Balc-001b Simulated Daylight



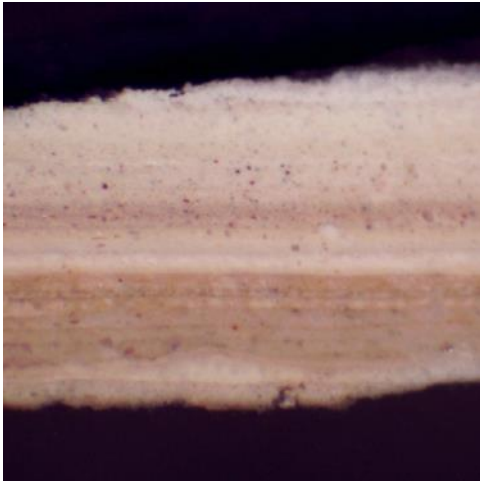
Balc-001b Ultraviolet Light



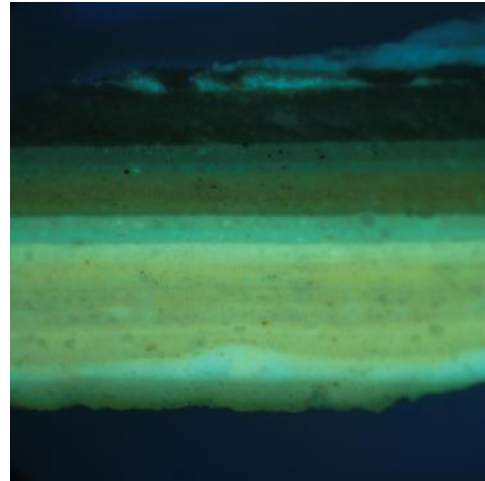
Balc-002 Simulated Daylight



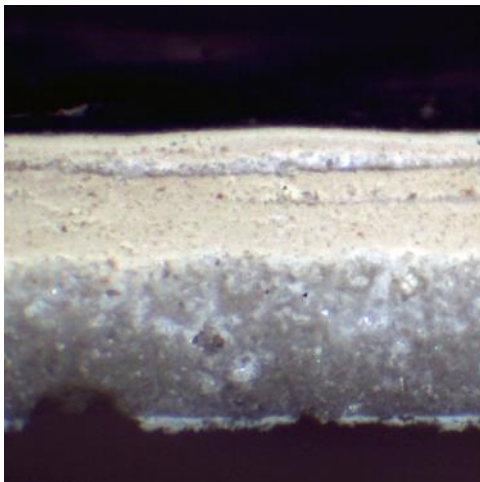
Balc-002 Ultraviolet Light



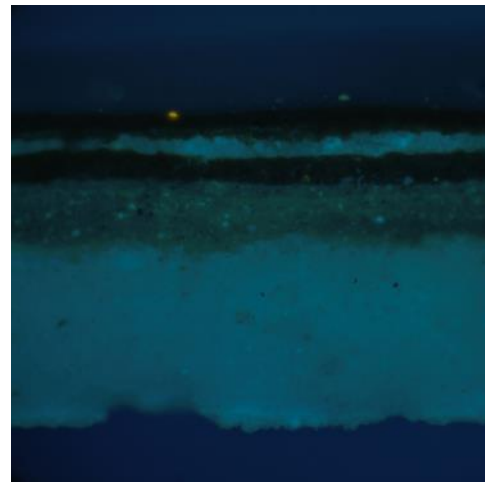
Balc-003a Simulated Daylight



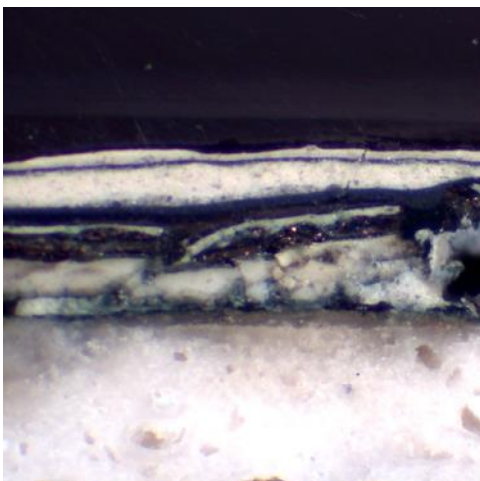
Balc-003a Ultraviolet Light



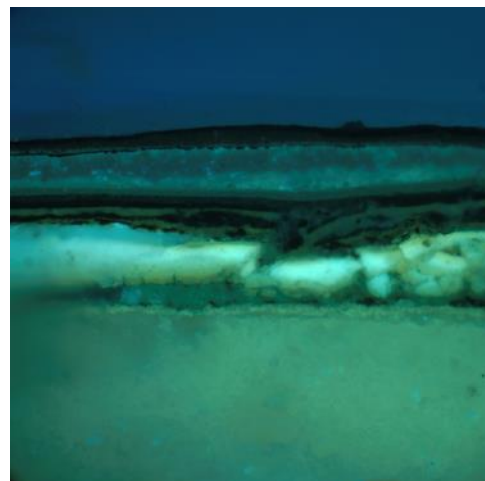
Balc-003b Simulated Daylight



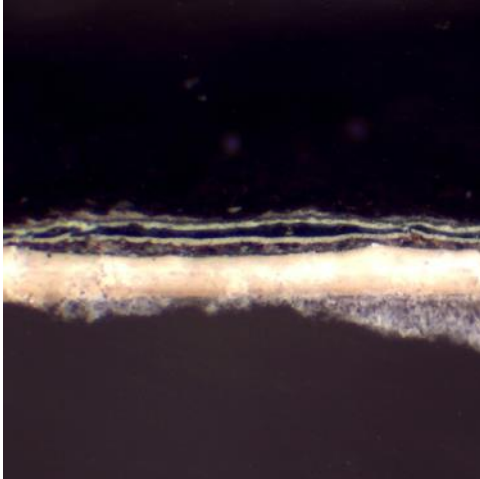
Balc-003b Ultraviolet Light



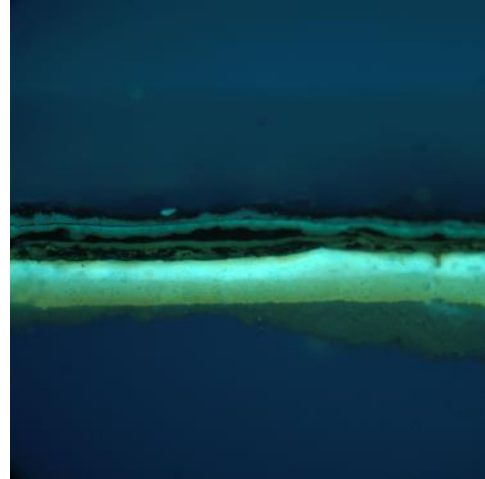
Balc-004 Simulated Daylight



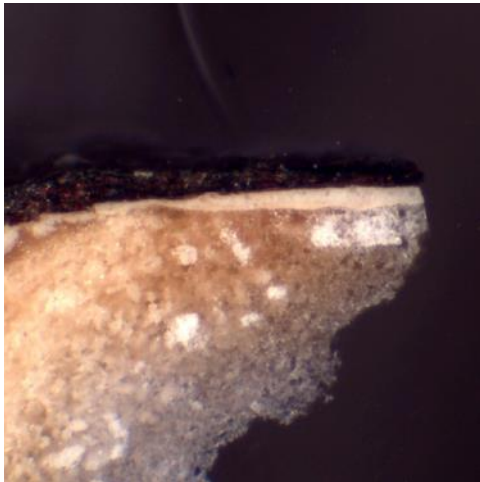
Balc-004 Ultraviolet Light



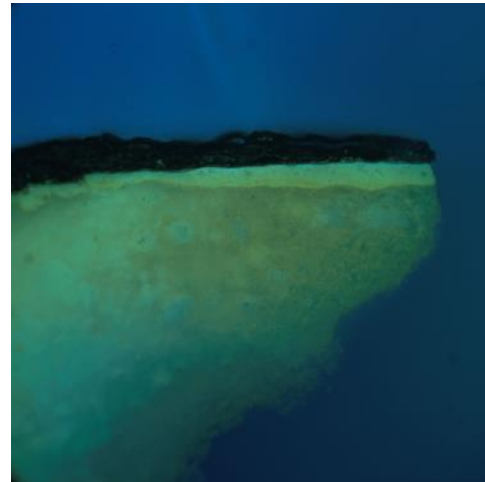
Balc-005 Simulated Daylight



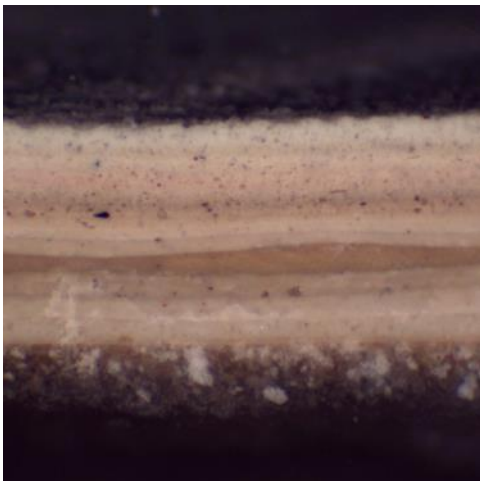
Balc-005 Ultraviolet Light



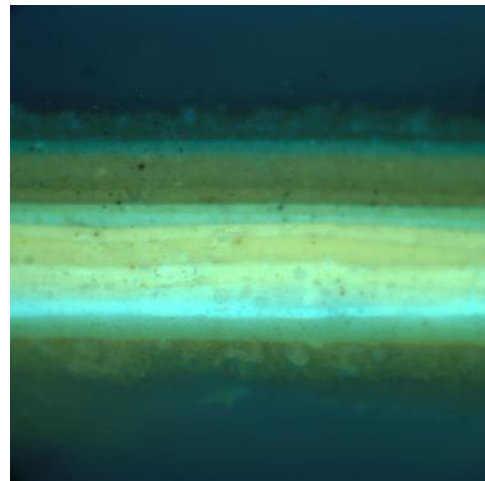
Balc-006 Simulated Daylight



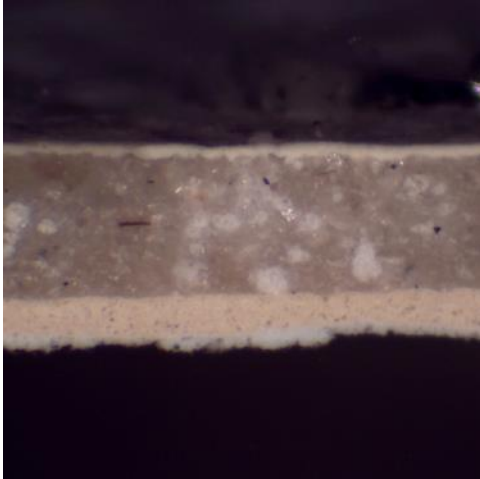
Balc-006 Ultraviolet Light



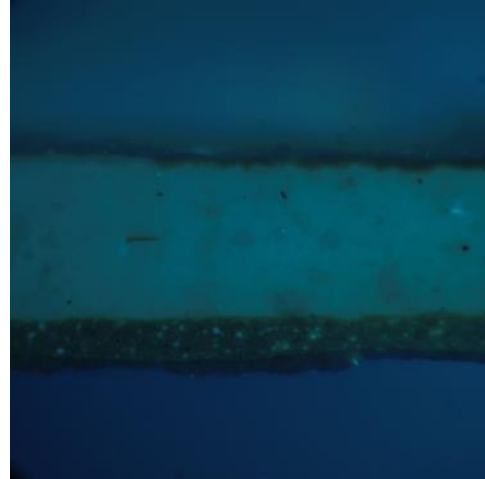
Balc-007a Simulated Daylight



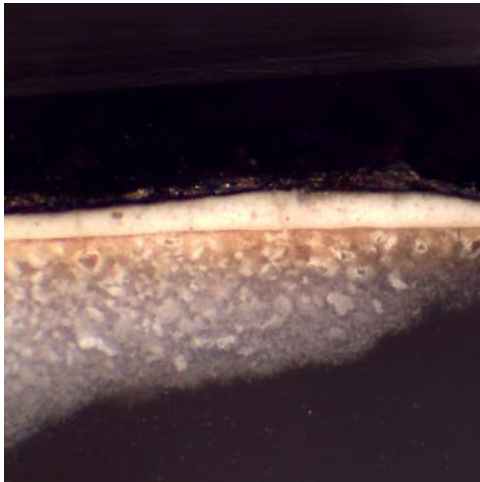
Balc-007a Ultraviolet Light



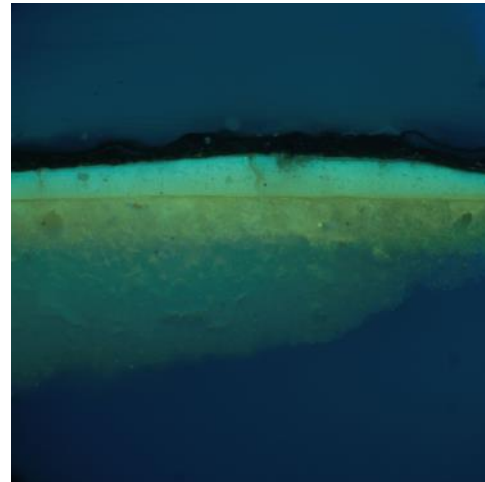
Balc-007b Simulated Daylight



Balc-007b Ultraviolet Light



Balc-008 Simulated Daylight



Balc-008 Ultraviolet Light