SECTION 261414

INFRARED VIEWING PANES (IR WINDOWS)

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**NOTE TO SPECIFIER**

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 2 Specification with primarily editable text; therefore, most of the text can be edited, but there is some required text which is noted within the Section with a “Note to Specifier.” Do not revise these paragraphs without an approved Deviation from USPS Headquarters, Facilities Program Management, through the USPS Project Manager.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

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1. GENERAL
	1. SUMMARY
		1. This specification provides the technical requirements for the design, manufacture, testing and installation of Infrared viewing panes. The contractor shall provide and install all components as specified herein and shown on related electrical drawings
		2. Related Documents: The Contract Documents, as defined in Section 011000 – Summary of Work, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
		3. Related Section include the following:
			1. Section 260500 – Common Work Results for Electrical.
			2. Section 261116 – Secondary Unit Substations.
			3. Section 261216 – Dry-Type Medium-Voltage Transformers
			4. Section 261313 – Medium Voltage Circuit Breaker Switchgear.
			5. Section 261317 – Medium-Voltage Interrupter Switchgear.
			6. Section 262200 – Secondary Dry Type Transformers.
			7. Section 262413 – Switchboards.
	2. REFERENCES
		1. Infrared viewing panes shall be U.L. recognized, shall allow visual and infrared scanning and shall comply with the following standards:
			1. IEEE C.37.20.2, section a.3.6 and UL Standard 1558 for impact and load requirements.
			2. U.L. Standard 508C and 746C for impact and flammability requirements.
			3. U.L. 94 5VA Flammability Resistance.
			4. IP65/NEMA 4 rated; both open and closed.
			5. UL Standard 891 – Switchboards.
			6. UL Standards 508A, 50V and 50E recognized.
	3. SUBMITTALS
		1. Submit shop drawings and product data for approval and final documentation in the quantities listed according to the Conditions of the Contract. All transmittals shall be identified by customer name, customer location and customer order number.
		2. Documents for Approval: Pane identification tags, recording inspection parameters, dimensioned drawings and sections, major features and installation instructions. Section 013300 - Submittal Procedures: Procedures for submittals.
	4. QUALITY ASSURANCE
		1. Manufacturer Qualifications: Engage a firm with at least 10 years experience in manufacturing and installing infrared viewing panes (lens and/or optic type).
	5. DELIVERY, STORAGE, AND HANDLING
		1. Deliver products in factory labeled packages.
		2. Store and handle in strict compliance with manufacturer’s instructions and recommendations. Protect from potential damage from weather and construction operations. Section 016000 - Product Requirements: Transport, handle, store, and protect Products.
2. PRODUCTS

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**NOTE TO SPECIFIER**

Verify manufacturer information, Product numbers, and availability at time of Project Manual preparation for Project.

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* 1. MANUFACTURERS
		1. Subject to compliance with project requirements, manufacturer’s offering Products which may be incorporated in the Work include the following:
			1. IRISS, Bradenton, FL (877) 704-7477.
			2. Schneider Electric, Westchester, OH (888) 778-2733.
			3. FLIR, Nashua, NH (866) 477-3687.
		2. Infrared viewing panes shall be manufactured utilizing a crystal or IR optic polymer, shall be sized as indicated and shall be transparent or opaque as specified.
			1. Opaque 2 inch round IR windows:
				1. Basis of Design: IRISS #VPFR-50.
				2. Acceptable manufacturers: As listed in para. 2.1A.
			2. Transparent 2 inch round IR windows:
				1. Basis of Design: IRISS #VPT-50.
				2. Acceptable manufacturers: As listed in para. 2.1A.
			3. Opaque 3 inch round IR windows:
				1. Basis of Design: IRISS # VPFR-75.
				2. Acceptable manufacturers: As listed in para. 2.1A.
			4. Transparent 3 inch round IR window:
				1. Basis of Design: IRISS # VPT-75.
				2. Acceptable manufacturers: As listed in para. 2.1A.
			5. Opaque 9 inch W x 5 inch H rectangular IR window:
				1. Basis of Design: IRISS # CAP-C-12.
				2. Acceptable manufacturers: As listed in para. 2.1A.
			6. Transparent 9 inch W x 5 inch H rectangular IR window:
				1. Basis of Design: IRISS # CAP-CT-12.
				2. Acceptable manufacturers: As listed in para. 2.1A.
			7. Opaque 21 inch W x 6 inch H rectangular IR windows:
				1. Basis of Design: IRISS #CAP-C-24.
				2. Acceptable manufacturers: As listed in para. 2.1A.
			8. Transparent 21 inch W x 6 inch H rectangular IR windows:
				1. Basis of Design: IRISS #CAP-CT-24.
				2. Acceptable manufacturers: As listed in para. 2.1A.
	2. TESTING REQUIREMENTS
		1. The IR viewing panes (opaque or transparent and sized as specified) shall meet or exceed the following minimum requirements:
			1. IR viewing panes shall be impact tested in accordance with U.L. 746c, section 56 with cover open and closed.
				1. After conditioning at 0 degrees C for 3 hours, an impact of 5 foot-pounds shall be applied front and rear of the viewing panes. The test shall be deemed to have failed if the IR viewing pane cracks, shatters, or dislodges.
			2. IR viewing panels shall undergo a front and rear load test as per IEEE standard C37.20.2, specifically section A.3.6.
				1. A force of 445 N (100 ibf) shall be exerted perpendicular to the surface in which the viewing pane is mounted. This force should be distributed evenly over an area of 0.010 M2 (16 in2), as nearly square as possible, and as near the geometric center of the viewing pane as possible. If the viewing pane has an area less than 0.010 M2 (16 in2), the force should be evenly distributed over the entire viewing area. The 445 N (100 ibf) should be sustained for a period of 1 min on the front and rear of the viewing panels. The test shall be deemed to have failed if the IR viewing panel cracks, shatters, or dislodges.
			3. IR viewing pane lens materials shall undergo a 5V flammability test in accordance with U.L. 746c, section 56.
				1. After conditioning at 0 degrees C for 3 hours, the materials are subjected to a 5 inch flammability test. The test shall be deemed to have failed if the IR viewing panel cracks, shatters or dislodges.
			4. IR viewing panes shall have fixed metal covers (i.e. the cover cannot be removed by removing a screw, etc.).
				1. This requirement ensures that locking screws and protective covers are never lost and that the viewing panel will be secured at all times when not in use.
			5. IR viewing panes shall be fail safe.
				1. In the event of a premature failure of the lens, through accidental damage or misuse, the maximum opening within the panel should not exceed the requirement for IP2X.
			6. IR viewing panes shall withstand a minimum of 25 psi.
			7. IR viewing panes requiring PPE protection shall not be acceptable.
	3. MECHANICAL PROPERTIES
		1. Infrared panes shall allow for safe visual and thermal imaging of fully energized electrical components through closed doors for voltages up to 72 KV. The IR windows as a minimum shall have the following mechanical properties:
			1. Environmental minimum standard: IP65 (Europe) or NEMA 4 (USA) both closed and when in use.
			2. Lens or optic shall be resistant to acids, alkalis, and water (non-hydroscopic materials).
			3. Lens or optic must have vibration resistance.
			4. Gaskets and materials shall meet minimum flammability resistance per UL 94 5VA.
			5. IR window assembly shall be recognized by UL 508A and UL 50V.
			6. IR window assembly shall be supplied with all fitting instructions, cutting templates and fixing screws.
			7. Standard round viewing window lens or optic diameters shall be minimum 3 inch.
			8. Rectangular window viewing lens or optics shall be available in standard 9 inch W x 5 inch H or customized solutions.
			9. Visual inspection option shall be made available where specified and shall be in full compliance with UL 746C and IEEE C 37.20.2 section a.3.6.
			10. Optional training and support shall be made available to the owner for additional cost.
			11. IR window assemblies shall be reusable and recyclable.
	4. INFRARED PERFORMANCE PROPERTIES
		1. The IR viewing panes shall be suitable for use with any thermal camera (i.e.: ultraviolet, shortwave, midwave and longwave IR ranges).
		2. Lens or optic material shall have stable transmission rates between 4 and 9 micron wavelengths. Transmission rates of the IR viewing panes shall therefore be quoted for the following wavelengths:
			1. Shortwave IR wavelength = 4 microns (Basis of design @ 68 percent transmittance).
			2. Longwave IR wavelength = 9 microns (Basis of design @ 72 percent transmittance.
1. EXECUTION
	1. INSTALLATION

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**NOTE TO SPECIFIER**

REQUIRED: IR viewing panes are to be factory installed by the switchgear manufacturer for new construction projects and are to be field installed for R&A projects. Select paragraphs 3.1A accordingly.

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* + 1. [IR viewing panes shall be factory installed by the switchgear manufacturer as recommend by the IR viewing pane manufacturer.]

A. [IR viewing panes are to be field installed. Installer shall be factory certified and trained by the IR viewing pane manufacturer.]

* + 1. Refer to applicable requirements contained within specification sections 261116, 261216, 261313 and 261317.
	1. ADJUSTMENTS AND CLEANING
		1. Repaint marred and scratched switchgear surfaces to match original finish.
	2. REQUIREMENTS FOR IR VIEWING PANES MANUFACTURERS.
		1. IR viewing panes manufacturers have a duty of care to their customers to provide all the relevant details regarding the IR viewing panes materials that are utilized and as such shall, as a minimum, provide the following information:
			1. IR viewing panes shall be provided with instructions for use labels.
			2. IR viewing panes shall be provided with label system that identifies the material in viewing panes and the IR wavelength to LW & SW IR.
			3. IR viewing panes manufacturers shall provide MSDS on all substances in the assembly as per current regulations.
			4. IR viewing panes shall not be manufactured utilizing barium fluoride due to its restricted and hazardous classification.
	3. TESTING
		1. IR viewing panes shall be operationally tested after installation to ensure satisfactory performance as specified by the manufacturer.
			1. This test ensures the IR viewing panes are fit for the purpose and provide the thermographers using the IR viewing panels with all the relevant information required to view the pane correctly and to ensure accuracy of data gathered.
		2. The actual IR transmission rates of the lens materials shall be factory tested and documented by the manufacturer.
			1. The manufacturer shall be responsible to complete regular functional testing to prove the IR transmission of the IR lens materials. These results shall then be made available to the inspecting bodies and clients utilizing the viewing panes.
	4. LABELING
		1. All IR viewing panes shall be provided with labels to record the following:
			1. Instructions for use: Clearly defined instructions that ensure the operator can correctly utilize the IR viewing pane.
			2. Identification labels: A labeling system shall be provided to identify the type of lens, IR characteristics, targets, etc. to ensure that the IR data gathered is correct and repeatable.
	5. GUARANTEE
		1. Manufacturer shall provide unconditional lifetime guarantee on the complete pane assembly (guarantee covering only manufacturing defects shall not be acceptable).

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022