SECTION 264128

SURGE PROTECTIVE DEVICES (SPD)

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**NOTE TO SPECIFIER**

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 1 Specification with completely editable text; therefore, any portion of the text can be modified by the A/E preparing the Solicitation Package to suit the project.***

*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.*

***Provide surge suppression protection on all exterior lighting and communications systems wiring if the “expected lightning stroke frequency” exceeds the “tolerable lightning frequency” to the structure.***

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1. GENERAL
	1. SUMMARY
		1. This section describes the materials and installation requirements for surge protective devices (SPD) for the protection of all power and communications circuits. Provide and install materials, labor and auxiliaries required to furnish and install complete surge suppression for the protection of building electrical and electronics systems from the effects of induced transient voltage surge and lightning discharge as indicated on drawings.
			1. Provide surge suppression devices for the following equipment:
				1. Each main electrical service switchboard as indicated for on drawings.
				2. Distribution and branch panels as indicated for on drawings.
				3. All electronic communications equipment installed including but not limited to: fire alarm, intrusion, ePACS, CCTV, and paging systems.
			2. Provide surge suppression protection on all exterior lighting and communications systems wiring if the “expected lightning stroke frequency” exceeds the “tolerable lightning frequency” of the structure.
		2. Related documents: The contract documents, as defined in Section 011000-Summary of Work, apply to work of this section. Additional requirements and information necessary to complete the work of this section may be found in other documents.
		3. Related sections:
			1. Section 260500 – Common Work Results for Electrical.
			2. Section 262413 – Switchboards.
			3. Section 264100 – Facility Lightning Protection.
			4. Section 265600 – Exterior Lighting.
			5. Section 275116 – IP Integrated, Public Address Zone Paging System.
			6. Section 275117 – Video Intercom and Exterior Gate Control System.
			7. Section 281304 – Enterprise Physical Access Control System.
			8. Section 281600 – Intrusion Detection System.
			9. Section 282305 – Integrated Security and Investigative Platform (ISIP) CCTV System.
			10. Section 283100 – Fire Emergency Voice/Alarm Communication System (EVACS).
	2. REFERENCES
		1. IEEE C62.41.1, IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits,
		2. IEEE C62.41.2, IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits,
		3. IEEE C62.45, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits.
		4. National Electrical Code: Article 285.
		5. UL 1283 - Electromagnetic Interference Filters.
		6. UL 1449, 4th Edition, effective December 30, 2014 – Surge Protective Devices.
	3. SUBMITTALS
		1. Section 013300 - Submittal Procedures: Procedures for submittals.
			1. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
			2. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.
			3. Certification submitted SPDs are manufactured in the United Sates.
			4. Shall include UL 1449 Listing documentation verifying the following:
				1. Short Circuit Current Rating (SCCR)
				2. Voltage Protection Ratings (VPRs) for all modes
				3. Maximum Continuous Operating Voltage rating (MCOV)
				4. I-nominal rating (I-n)
				5. Type 1 Device Listing

VPR, MCOV, I-n, and Type 1 information is posted at www.UL.com, under Certifications, searching using UL Category Code: VZCA. SCCRs are posted in manufacturer’s UL docs.

UL data and visual inspection takes precedence over manufacturer’s published documentation.

* + 1. Section 017704 - Closeout Procedures and Training: Procedures for closeout submittals:
			1. Project Record Documents: Record actual locations of Products; indicate actual branch circuit arrangement.
			2. Operation and Maintenance Data: Include spare parts data listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.
			3. Submit data showing compliance with UL 1449 4th edition.
	1. QUALITY ASSURANCE
		1. SPDs must be manufactured in the United Sates.
		2. Manufacturer Qualifications: Engage a firm with at least 10 years experience in manufacturing transient voltage surge suppressors.
		3. Manufacturer shall be ISO 9001 or 9002 certified.
		4. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of 5 years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
		5. The SPD shall be compliant with the Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC.
	2. DELIVERY, STORAGE AND HANDLING
		1. Handle and store equipment in accordance with manufacturer’s Installation and Maintenance Manuals. One copy of this document to be provided with the equipment at time of shipment.
1. 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, manufacturers offering specified items which may be incorporated in the Work include the following.
			1. ASCO/Advanced Protection Technologies, Incorporated, Clearwater, FL (800) 237-4567
			2. Emerson/Liebert Corporation, Columbus, OH, (800) 877-9222
			3. Atlantic Scientific Corporation, Melbourne, FL, (800) 544-4737
			4. Current Technology Inc., Irving, TX, (800) 238-5000
			5. Ditek Surge Protection, Largo, FL, (800) 753-2345
		2. Section 016000 - Product Requirements: Product options and substitutions. Substitutions: Permitted.
	2. SERVICE ENTRANCE SURGE PROTECTIVE DEVICES (SPDS)
		1. Models:
			1. Basis of Design: Advanced Protection Technologies: “TEXAS” Series.
		2. Surge Protective Device Description: Replaceable module type complying with UL 1283 and UL 1449 4th Edition Listed. Provide unit with the following features and accessories:
			1. LED indicator lights for power and protection status.
			2. Audible alarm, with silencing switch, to indicate when protection has failed.
			3. One set of dry contacts rated at 5.0 amperes, 240 volts ac, for remote monitoring of protection status.
		3. Short Circuit Current Rating: SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR). Fuse ratings shall not be considered in lieu of demonstrated withstand testing of SPD, per NEC 285.6.
		4. SPD Type: SPD shall be UL labeled as Type 1 (verifiable at UL.com), intended for use without need for external or supplemental overcurrent controls. Every suppression component of every mode, including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.
		5. In Rating: SPD shall be UL labeled with 20kA Inominal (I-n) (verifiable at UL.com) for compliance to UL 96A Lightning Protection Master Label and NFPA 780.
		6. SPD shall provide surge current diversion paths for all modes of protection; L-N, L-G, N-G, and L-L in WYE systems, and L-L, L-G in DELTA Systems.
		7. Minimum Single Impulse Surge Current Capability (single pulse rated) per phase shall be.
			1. Single Impulse Surge Current Capacity is to be 300 kA.
		8. Connection Means: Permanently wired via internal disconnect. The device shall have a NEMA designed and certified safety interlocked integral disconnect switch. The switch shall be located within the unit with an externally mounted metal manual operator.
		9. Protection modes and UL 1449 4th Edition Voltage Protection Rating for grounded WYE circuits with voltages of 480Y/277, 3-phase, 4-wire shall be as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| VOLTAGE | L-N | L-G | N-G |
| 208Y/120V | 700V | 700V | 700V |
| 480Y/277V | 1500V | 1500V | 1500V |

* + 1. Install devices at service entrance at load side, with ground lead bonded to service entrance ground.
		2. Test unit in accordance with manufacturer’s written instructions.
	1. DISTRIBUTION SURGE PROTECTIVE DEVICES (SPDS)
		1. Models:
			1. Basis of Design: Advanced Protection Technologies: “TEXDS” Series.
		2. Surge Protective Device Description: Non-modular type complying with UL 1283 and UL 1449 4th Edition Listed. Provide unit with the following features and accessories:
			1. LED indicator lights for power and protection status.
		3. Short Circuit Current Rating: SPD shall be UL labeled with 200kA Short Circuit Current Rating (SCCR). Fuse ratings shall not be considered in lieu of demonstrated withstand testing of SPD, per NEC 285.6.
		4. SPD Type: SPD shall be UL labeled as Type 1 (verifiable at UL.com), intended for use without need for external or supplemental overcurrent controls. Every suppression component of every mode, including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.
		5. In Rating: SPD shall be UL labeled with 20kA Inominal (I-n) (verifiable at UL.com).
		6. SPD shall provide surge current diversion paths for all modes of protection; L-N, L-G, N-G, and L-L in WYE systems, and L-L, L-G in DELTA Systems.
		7. Minimum Single Impulse Surge Current Capability (single pulse rated) per phase shall be.
			1. Single Impulse Surge Current Capacity is to be 150 kA.
		8. Connection Means: Permanently wired via internal disconnect. The device shall have a NEMA designed and certified safety interlocked integral disconnect switch. The switch shall be located within the unit with an externally mounted metal manual operator.
		9. Protection modes and UL 1449 4th Edition Voltage Protection Rating for grounded WYE circuits with voltages of 480Y/277, 3-phase, 4-wire shall be as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| VOLTAGE | L-N | L-G | N-G |
| 208Y/120V | 700V | 700V | 700V |
| 480Y/277V | 1500V | 1500V | 1500V |

* + 1. Install devices as close as possible to distribution or branch panelboards.
		2. Test unit in accordance with manufacturer’s written instructions.
	1. FIRE ALARM AND SECURITY SYSTEM SURGE PROTECTIVE DEVICES (SPDS)
		1. Power Surge Protection
			1. SPD shall be listed or recognized in accordance with UL 1449 4th Edition verifiable by visiting UL.com.
			2. SPD shall provide surge current L-N or L-G mode of protection.
			3. Every mode of protection shall be protected by internal overcurrent and thermal overtemperature controls.
			4. SPD shall meet or exceed the following criteria:
				1. Minimum surge current capability (single pulse rated) per phase shall be:

120/240 Panel Application 50kA per phase

* + - * 1. UL 1449 4th Edition listed Voltage Protection Ratings for shall not exceed the following:

|  |  |  |
| --- | --- | --- |
|  VOLTAGE | L-N/L-G | MCOV |
| 120V or 240/120V | 600V | 150V |

* + - 1. SPD shall have a warranty for a period of five years, incorporating unlimited replacements of suppressor parts if they are destroyed by transients during the warranty period.
		1. Signal line protection
			1. SPD shall be solid state, silicon avalanche diode circuitry for protection from overvoltages on 2 or 4 wire signal lines such as balanced pair telephone, metallic pair telephone, buried and overhead field cable, remote radio equipment, and control systems. Unit shall have an external ground lug or wire. Connect ground lug or wire to protected equipment grounding system with a No. 12 green insulated stranded ground wire as short as possible.
				1. Pins Protected: Pins 4, 5 on the RJ- 45 Interface; Pins 3, 4 on the RJ- 11 Interface.
				2. Clamping Voltage: 310 Volts in 500 nsec.
				3. Surge Capacity: 1500 Watts for 1 msec.
				4. Protection Mode:

Common Mode Pins 4, 5 to shielding braid.

Differential Mode Pins 4,5.

* + - * 1. Shall be listed to UL497A Telco Specification.
		1. Video 75 ohm coaxial cable
			1. Solid state, silicon avalanche diode circuitry for non-interrupting overvoltage protection of RG- 59/U coaxial cable. Unit shall be provided with one female input connector for "F" series male connector, one output RG-59/U coax cable terminated with an "F" series male cable end connector and A #16 stranded, 18 inch long grounding wire on output end of unit or similar arrangement. Securely mount adjacent to protection equipment and ground to equipment or local building ground if an equipment ground is not available.
				1. Normal Operating Characteristics

Voltage .........................5.8V max

Current.......................500ma max

Frequency.....................DC to 10 Mhz

Insertion Loss................3.5db @ 4Mhz

* + - * 1. Protection Requirements

Transient suppression level.........7.5v Voltage Protection Level

Transient response............<5 nanoseconds

Operating temp................-20o C to +50o C

Energy dissipation............15,000 watts (10X1000 Test Wave)

1. EXECUTION
	1. EXAMINATION
		1. As specified in Section 260500 - Common Work Results for Electrical.
	2. INSTALLATION
		1. The installation shall meet the following criteria:
			1. Install per manufacturer’s recommendations and contract documents.
			2. Install units plumb, level and rigid without distortion.
			3. One primary lightning arrestor shall be installed external to the service entrance in accordance with manufacturer instructions.
			4. Service Entrance SPD shall be installed on the load side of the main service disconnect.
			5. Service Entrance SPD ground shall be bonded to the service entrance ground.
			6. At Service Entrance, a UL approved disconnect switch shall be provided as a means of servicing if a 60A breaker is not available.
			7. One SPD shall be installed external to each designated distribution panelboard.
			8. At Distribution and Branch, SPD shall have an independent means of disconnect such that the protected panel remains energized. A 40A breaker (or larger) may serve this function.
			9. SPD shall be installed per manufacturer’s installation instructions with lead lengths as short (less than 24”) and straight as possible. Gently twist conductors together.
			10. Before energizing, installer shall verify service and separately derived system Neutral to Ground bonding jumpers per NEC.
	3. ADJUSTMENTS AND CLEANING
		1. Remove debris from SPD and wipe dust and dirt from all components.
		2. Repaint marred and scratched surfaces with touch up paint to match original finish.
	4. TESTING
		1. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture’s recommendations.
		2. Check all installed panels for proper grounding, fastening and alignment.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022