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USACE / NAVFAC / AFCEA / NASA                      UFGS-26 18 23.00 40 (April 2006)  
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Preparing Activity:    NASA                      Superseding  
    NASA-16288S (December 2005)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are NOT in agreement with UMRL dated 01 April 2006

Revised throughout - changes not indicated by CHG tags

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### SECTION 26 18 23.00 40

#### SURGE ARRESTERS 04/06

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NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

This section covers surge and lightning arresters of the distribution, intermediate, and station types. Drawings should show type, voltage, mounting, and connection details.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

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## PART 1    GENERAL

### 1.1    REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature

when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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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 A 123/A 123M (2002) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 153/A 153M (2005) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.11 (1999) Standard for Metal-Oxide Surge Arresters for Alternating Current Power Circuits (>1kV)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA LA 1 (1992; R 1999) Standard for Surge Arresters

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2005) National Electrical Code

1.2 GENERAL REQUIREMENTS

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NOTE: If Section 26 00 00.00 40 GENERAL ELECTRICAL PROVISION is not included in the project specification, applicable requirements therefore should be inserted and the following paragraph deleted.

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Section 26 00 00.00 40 GENERAL ELECTRICAL PROVISIONS applies to work specified in this section.

Equipment and Performance Data shall be submitted for surge arresters including life, test, system functional flows, safety features, and mechanical automated details.

### 1.3 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

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Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.] [for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

#### SD-02 Shop Drawings

Provide the following shop drawings according to requirements set forth in this section:

Fabrication Drawings  
Installation Drawings

#### SD-03 Product Data

Equipment and Performance Data shall be submitted for surge arresters in accordance with paragraph entitled, "General Requirements," of this section.

Manufacturer's product data shall be submitted for the following items:

Surge Arresters  
Mounting Brackets

SD-08 Manufacturer's Instructions

Installation Instructions  
Surge Arresters

SD-10 Operation and Maintenance Data

O & M Manuals  
Surge Arresters

PART 2 PRODUCTS

2.1 EQUIPMENT

Design, fabrication, testing, and performance of arresters shall comply with IEEE C62.11, NEMA LA 1.

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NOTE: Voltage rating of arresters shall be in accordance with manufacturer's recommendations to meet the maximum continuous line-to-ground operating voltage (MCOV). System neutral, whether grounded, ungrounded, or effectively grounded for all possible conditions of operations, including Phase-to-ground faults, shall be considered when selecting arrestors.  
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Arrester shall utilize metal oxide varistor and gapped arrester technologies.

The arresters shall be contained within a polymer housing. The arrester shall be designed to be non-fragmenting to provide extra safety to personnel and equipment. Arresters utilizing a hanger frame type mounting bracket, the frame shall be non-corrosive track resistant glass filled polyester or other suitable non-corrosive/non-conductive material providing high mechanical strength. Arrester mounting hardware shall be designed for installation in severe salt-spray atmosphere and shall be of a corrosion-resistant metal or shall be zinc-coated in accordance with [ASTM A 123/A 123M] [ASTM A 153/A 153M].

2.2 FABRICATION DRAWINGS

Submit fabrication drawings in accordance with paragraph entitled, "Equipment," of this section. Drawings shall show assembly and fabrication details performed in the factory.

2.3 SURGE ARRESTERS

2.3.1 O & M Manuals, Surge Arresters

Provide O & M Manuals for surge arresters specified within these plans and specifications.

### 2.3.2 Distribution

Distribution arresters shall be combination spark gap and metal oxide varistor type. Mounting hardware shall be corrosion resistant.

#### 2.3.2.1 Distribution - Riser-Pole Class

Distribution - Riser-Pole Class shall be combination spark gap and metal oxide varistor type. Mounting hardware shall be corrosion resistant.

### 2.3.3 Intermediate

Arresters shall be single-phase, single-pole, self-supporting type for pedestal, platform, or bracket mounting.

### 2.3.4 Station

Arresters shall be single-phase, single-pole, self-supporting type for pedestal, platform, or bracket mounting.

## 2.4 SURGE PROTECTION FOR ROTATING AC MACHINES

Arresters installed on rotating alternating current equipment shall be the type and rating as recommended by the manufacturer of the equipment.

## 2.5 MOUNTING BRACKETS

Arresters shall be equipped with suitable mounting brackets for the applicable method of mounting.

## PART 3 EXECUTION

### 3.1 INSTALLATION

Arresters shall be installed and connected in accordance with the manufacturer's installation instructions.

Ground connection shall be made to a driven ground rod, counterpoise, or station grounding system and shall meet the intent of the National Electrical Code, [NFPA 70](#).

Lightning arresters shall be connected as close as practicable to the apparatus being protected. When connecting arresters to overhead conductors, a hot line clamp shall be used. The hot line clamp shall be so designed to be compatible to the type of conductor material being used, i.e. aluminum or copper.

#### 3.1.1 [Installation Instructions](#), Surge Arresters

Manufacturer's instructions shall be submitted for surge arresters including special provisions required to install equipment components and system packages. Special notices shall detail impedances, hazards and safety precautions.

#### 3.1.2 [Installation Drawings](#)

Submit installation drawings in accordance with paragraph entitled, "Installation," of this section.

## 3.2 ARRESTERS

### 3.2.1 Distribution Type

Distribution class arresters shall be installed on all overhead lines, riser poles, pad mounted transformers and where applicable installed on distribution load break switches, sectionalizers and fault interrupters.

#### 3.2.1.1 Distribution - Riser-Pole Class

Distribution - Riser-Pole class arrestors shall be installed on all riser poles.

#### 3.2.2 Intermediate Type

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NOTE: Where additional protection is necessary, intermediate class arresters shall be installed. Utilization of intermediate class arresters shall take into consideration the increased size, weight and mounting constraints. Typical areas of consideration are unit substations, primary switches and switching stations.

Install intermediate type arrestors on grounded support brackets/structures suitable to adequately support the weight of the arrestor.

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Install intermediate type arrestors on grounded support brackets/structures suitable to adequately support the weight of the arrestor.

#### 3.2.3 Station Type

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NOTE: Where maximum protection is required the station class arrester shall be utilized. These arresters shall be used where switching surge durability is required. A typical area of utilization is utility substations where the medium voltage distribution system interfaces to the high voltage commercial power provider. Utilization of station class arresters shall take into consideration the increased size, weight and mounting constraints.

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Install station type arrestors on grounded structures suitable to adequately support the weight of the arrestor.

-- End of Section --