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This MANU-SPEC® utilizes the Construction Specifications Institute (CSI) *Project Resource Manual* (PRM), including *MasterFormat*™, *SectionFormat*™ and *PageFormat*™. A MANU-SPEC is a manufacturer-specific proprietary product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by brackets []; delete optional text in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

This MANU-SPEC specifies flexible stainless steel hose with fittings for fire protection service. These products are manufactured by FlexHead Industries, Inc. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

SECTION 21 11 00
FACILITY FIRE-SUPPRESSION WATER-SERVICE PIPING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

Specifier Note: Revise paragraph below to suit project requirements. Add section numbers and titles per CSI *MasterFormat* and specifier's practice.

1. Flexible stainless steel hose with fittings for fire protection service that connect sprinkler heads to the branch lines in suspended ceilings.

B. Related Sections:

1. Division 01 Section: Submittal Procedures.
2. Division 01 Section: Quality Control.
3. Division 01 Section: Closeout Submittals.
4. Division 09 Section: Acoustical Ceilings.

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain Reference Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 01 References Section may establish the edition date of standards. This article does not require compliance with standard, but is merely a listing of references used. Article below should list only those industry standards referenced in this section. Retain only those reference standards to be used within the text of this Section. Add and delete as required for specific project.

1.02 REFERENCES

A. ASTM International:

1. ASTM C635 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
2. ASTM C636 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In

Panels.

- B. FM Global Technologies LLC (FM):
 - 1. FM Class Number 1637 Approval Standard for Flexible Sprinkler Hose with Threaded End Fittings.
- C. ICC Evaluation Service, Inc.:
 - 1. ICC-ES AC156 Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems.
- D. National Fire Protection Association (NFPA):
 - 1. NFPA 13 Standard for the Installation of Sprinkler Systems.
 - 2. NFPA 13D Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.
 - 3. NFPA 13R Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height.
- E. Underwriters Laboratories, Inc. (UL):
 - 1. UL 2443 Standard for Flexible Sprinkler Hose with Fittings for Fire Protection Service.

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 01 Submittal Procedures Section.

1.03 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 01 Submittal Procedures.
- B. Product Data: Submit manufacturer's product data and installation instructions for FlexHead Commercial Sprinkler Connections including manufacturer's SPEC-DATA® product sheet.
- C. Drawings:
 - 1. Submit shop drawings detailing installation procedures, including layout, dimensions and support placement.
- D. Quality Assurance:
 - 1. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
 - 2. Manufacturer's Instructions: Manufacturer's installation instructions.

Specifier Note: Coordinate paragraph below with Part 3 Field Quality Requirements Article. Retain or delete as applicable.

- E. Manufacturer's Field Reports: Indicate and interpret test results for compliance with performance requirements.
- F. Closeout Submittals: Submit the following:
 - 1. Warranty: Warranty documents specified herein.
 - 2. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 01 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

1.04 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
 - 2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during installation.
 - 3. Fabricator Qualifications: Fabrication performed in quality controlled manufacturing environment by experienced fabricators with references indicating multiple satisfactory experiences fabricating flexible stainless steel hose assemblies as required for this project.
- B. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Division 01 Project Management and Coordination

(Project Meetings).

1.05 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 01 Product Requirements.
- B. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery, Storage and Protection:
 - 1. Store flexible stainless steel hose with fittings for fire protection service inside and away from the elements to prevent accidental damage prior to installation.

Specifier Note: Coordinate article below with Conditions of the Contract and with Division 01 Closeout Submittals (Warranty).

1.06 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards, and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.01 FLEXIBLE STAINLESS STEEL HOSE WITH FITTINGS FOR FIRE PROTECTION SERVICE

- A. Manufacturer: FlexHead Industries, Inc.
 - 1. Contact: 56 Lowland Street, Holliston, MA 01746; Telephone: (800) 829-6975, (508) 893-9596; Fax: (508) 893-6020; E-mail: sales1@FlexHead.com; website: www.flexhead.com.

Specifier Note: Substitution procedures must either be in the Contract Conditions or in Section 01 25 00 - Substitution Procedures. Do not include substitution procedures here. Edit article below to suit project requirements. If substitutions are permitted, edit text below.

- 2. Substitutions: No substitutions permitted.
- B. Description:

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Contract Conditions and Section 01 41 00 - Regulatory Requirements. Repetitive statements should be avoided.

- 1. Regulatory Requirements: Provide flexible stainless steel hose assemblies that comply with the following requirements:
 - a. NFPA 13.
- C. Performance Criteria: Supply products to suit project requirements and that have been listed and approved for their intended use as follows:
 - 1. Pursuant to FM 1637.
 - 2. Pursuant to UL 2443.
 - 3. Seismically qualified pursuant to ICC-ES AC-156.
- D. Materials: FlexHead Commercial Sprinkler Connections.

Specifier Note: Flexhead products are primarily used with standard sprinkler piping, but have also been tested with CPVC and are system compatible.

- 1. FlexHead Flexible Hose Assemblies and End Fittings:
 - a. Composition: 100% Type 304 Stainless Steel.

- b. Straight Hose Assembly Lengths: [10] { } - 2 foot (0.6 m) lengths; model #2024], [and] [10] { } - 3 foot (0.9 m) lengths; model #2036], [and] [10] { } - 4 foot (1.2 m) lengths; model #2048] [and] [10] { } - 5 foot (1.5 m) lengths; model #2060] [and] [10] { } - 6 foot (1.8 m) lengths; model #2072].
- 1) [1/2 inch (12.7 mm)] [3/4 inch (19.1 mm)] outlet.
 - 2) [175 psi (1205 kPa)] [300 psi (2066 kPa)] maximum rated pressure.
 - 3) Fully welded non-mechanical fittings, braided, leak-tested with minimum 1 inch (25.4 mm) true-bore internal corrugated hose diameter.

Specifier Note: Specify elbow units below for confined space applications.

- c. Elbow Hose Assembly Lengths: [10] { } - 2 foot (0.6 m) lengths; model #2024E], [10] { } - 3 foot (0.9 m) lengths; model #2036E], [and] [10] { } - 4 foot (1.2 m) lengths; model #2048E] [and] [10] { } - 5 foot (1.5 m) lengths; model #2060E] [and] [10] { } - 6 foot (1.8 m) lengths; model #2072E].
- 1) [1/2 inch (12.7 mm)] [3/4 inch (19.1 mm)] outlet.
 - 2) [175 psi (1205 kPa)] [300 psi (2066 kPa)] maximum rated pressure.
 - 3) Fully welded non-mechanical fittings, braided, leak-tested with minimum 1 inch (25.4 mm) true-bore internal corrugated hose diameter.

Specifier Note: Same ceiling bracket may be used for suspended ceilings and gypsum board applications.

2. Ceiling Bracket:
 - a. Composition: Galvanized steel.
 - b. Type: Multi-port style having self-securing integrated snap-on clip ends that attach directly to the ceiling with tamper-resistant screws.
 - c. Flexible Hose Attachment: Removable hub type with set screw.
 - d. Acceptable Material: Flexhead Industries, Inc., Model #MP24BKT2 ceiling bracket.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and FlexHead Industries' SPEC-DATA sheet.

3.02 EXAMINATION

- A. Site Verification of Conditions:
 1. Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions.
 2. Examine area to receive insulation for compliance with installation clearances.

3.03 INSTALLATION

- A. FlexHead Commercial Sprinkler Connection:
 1. Comply with manufacturer's installation instructions.

3.04 MAINTENANCE

- A. Ensure facility fire protection system is inactive during maintenance or inspection.

3.05 FIELD QUALITY CONTROL

Specifier Note: Use the following Articles only when manufacturer's field services are desired to verify the quality of the installed components. Establish the number and duration of periodic site visits required by Manufacturer and specify below. Consult Manufacturer for services required. Delete if field services are not required.

- A. Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, and

protection of its product[s], and submit written reports in acceptable format to verify compliance of Work with Contract.

- B. Schedule site visits to review Work as installation is about to begin.

3.06 COMPLETION & CLEANUP

- A. After installation and prior to final acceptance, inspect flexible sprinkler assembly for any damage and confirm proper installation. Replace damaged components prior to activating fire protection system.
- B. Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION