

solenoid valves. NFPA 96 requires that the electrical power and fuel to all protected appliances be shut off upon actuation of the extinguishing system. Additionally, any gas appliance under the same hood as protected appliances must be shut off. NFPA 96 requires the shut off equipment be of the type that requires manual resetting prior to the fuel or power being restored. This includes power outages.

5. Location of remote manual actuation stations.

PART 1 GENERAL

1.1 REFERENCES

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 are automatically deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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 106/A 106M (2006a) Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service

ASTM A 53/A 53M (2006a) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

FM GLOBAL (FM)

FM P7825 (2005) Approval Guide

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 17A (2002) Wet Chemical Extinguishing Systems

NFPA 70 (2005; TIA 2005) National Electrical Code
 NFPA 72 (2006) National Fire Alarm Code
 NFPA 96 (2004) Ventilation Control and Fire Protection of Commercial Cooking Operations

UNDERWRITERS LABORATORIES (UL)

UL 300 (1996) Fire Testing of Fire Extinguishing Systems for Protection of Restaurant Cooking Areas
 UL Fire Prot Dir (2007) Fire Protection Equipment Directory

1.2 SYSTEM REQUIREMENTS

 NOTE: If Section 23 00 00.00 40 HEATING, VENTILATING, AND AIR-CONDITIONING is not included in the project specification, insert applicable requirements therefrom and delete the following paragraph.

Section 23 00 00.00 40 HEATING, VENTILATING, AND AIR-CONDITIONING applies to work specified in this section.

1.2.1 Design Requirements

Provide new [and] [modify existing] pre-engineered wet chemical fire extinguishing system for protection of new [and] [existing] cooking equipment including exhaust hoods, ducts, and related work. Equipment, materials, installation, workmanship, inspection, and testing must be in strict accordance with the required and advisory provisions of the manufacturer's installation manual and NFPA 17A and NFPA 96, except as modified herein. Each system must include materials, accessories, and equipment necessary to provide each system complete and ready for use. Provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts, and other construction and equipment in accordance with detailed working drawings to be submitted for approval. Devices and equipment for fire protection service must be UL Fire Prot Dir listed or FM P7825 approved for use with wet chemical fire extinguishing systems and meet the requirements of UL 300. In the NFPA publications referred to herein, consider the advisory provisions to be mandatory, as though the word "must" had been substituted for "should" wherever it appears; interpret reference to the "authority having jurisdiction" to mean the Kennedy Space Center, Fire Protection Engineer.

1.2.2 Detail Drawings

Submit electrical wiring diagrams and dimensioned or scaled piping layout showing components, pipe sizes, manual activation stations pipe lengths, nozzles, electrical power and gas isolation devices, and valve locations in relation to cooking appliances and fusible link locations.

1.3 SUBMITTALS

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. Keep submittals 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, use a code of up to three characters within the submittal tags 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.

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 reviews the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Submit detailed computer generated drawings in DWG or DGN format of the pre-engineered wet chemical fire extinguishing system. Details must include electrical wiring diagrams, and dimensioned or scaled isometric piping layout showing components, pipe size, pipe lengths, nozzles and valve locations in relation to cooking appliances and fusible link locations must be submitted for approval.

Factory Installation Drawings for approval ten days prior to start of installation.

Submit As-Built computer generated drawings for approval ten (10) days prior to the acceptance testing phase of the project, as described in the paragraph entitled, "Formal Tests and Inspection"

of this specification section.

Submit .DXF or .DWG format computer generated shop drawings, schematics and [As-Built drawings](#).

SD-03 Product Data

Submit Manufacturers Catalog Data for the following items:

- [Agent](#)
- [Storage cylinder](#)
- [Fusible links](#)
- [Regulator](#)
- [Electrical equipment and gas line shut-off devices](#)
- [Release mechanisms](#)
- [Blow-off caps](#)
- [Discharge nozzle](#)
- [Piping and fittings](#)
- [Manual actuators](#)
- [Remote manual pull stations](#)
- [Pressure switches](#)
- [Manufacturer's Installation Manuals](#)
- [Pulley elbows](#)

SD-06 Test Reports

Provide testing of the system in accordance with paragraph entitled, "Field Quality Control".

Prepare a [Test Procedure and Test Record Forms](#) for conducting and recording complete test on the suppression system in accordance with manufacturer's requirements and these specifications. Submit for approval the test procedure to the Contracting Officer at least 30 days prior to the preliminary system test described in the paragraph entitled "Field Testing" of this specification section. Test procedure must identify the initial condition, each step or function in the test, required test results, and must provide for recording test results on all equipment devices, and wiring to be tested. Test record forms must also have identified spaces for verification signature of official witnesses and dates of the test.

SD-07 Certificates

- [Qualifications of installer](#)

SD-08 Manufacturer's Instructions

- [Fire extinguishing system](#)

Submit the extinguishing system manufacturer's installation manual.

SD-10 Operation and Maintenance Data

- [Operation and Maintenance Manuals](#)

1.4 ELECTRICAL WORK

Associated with this section must be provided under Section [26 27 26.00 40](#)

WIRING DEVICES except for control [and fire alarm] wiring. [Fire alarm system is specified in Section 28 31 00.00 98 FIRE DETECTION AND ALARM.] Provide control [and fire alarm wiring] , [including connections to fire alarm systems,] under this section in accordance with NFPA 70 and NFPA 72. Provide wiring in rigid metal conduit or intermediate metal conduit, except electrical metallic tubing conduit can be provided in dry locations not enclosed in concrete or where not subject to mechanical damage.

1.5 QUALITY ASSURANCE

1.5.1 Qualifications of Installer

Qualifications of System Technician: Installation drawings, shop drawing and as-built drawings must be prepared, by or under the supervision of, an individual who is experienced with the types of works specified herein, and is currently certified by the National Institute for Certification in Engineering Technologies [_____] as an engineering technician with minimum Level-III certification in Special Hazard System program. Submit data for approval showing the name and certification of all involved individuals with such qualifications at or prior to submittal of drawings.

Submit As-built drawings for approval 21 days prior to the acceptance testing phase of the project as described in the paragraph entitled, "Format Tests and Inspections," of this specification. Provide (2) sets of magnetic media and hard copies of all new and revised software and drawings with the submittal. As-built drawings must document final system configuration including deviations from and amendments to the drawings, and field installation changes, concealed and visible.

1.5.2 Components

Components used in the installation must not be more than one year old.

Devices and equipment for fire protection service must be UL Fire Prot Dir or FM P7825 approved for their intended use and function.

1.6 DELIVERY, STORAGE, AND HANDLING

Deliver, store, protect, and handle products to site in such a manner as to prevent damage caused by dirt, debris, and weather. Storage of materials must not impact safety or work operations in areas adjacent to the storage site.

Deliver materials to the job site in sealed, original containers, each bearing the manufacturer's labels.

Materials that arrive at the site without labels, opened, damaged, or containing less material than specified must not be accepted for use.

Store materials in a well ventilated area at temperatures not exceeding 54.4 degrees C 130 degrees F or less than 0 degrees C 32 degrees F.

PART 2 PRODUCTS

2.1 PREENGINEERED WET CHEMICAL FIRE EXTINGUISHING SYSTEMS

NOTE: If the piping between hood and storage canisters is mounted

against....

specify

A porous surface
(gypsum wallboard, etc.)
that has a painted enamel

Galvanized malleable
iron, or galvanized
steel

A stainless steel wall
plate or other nonporous,
prefinished surface

Chrome plated or
stainless steel

Galvanized pipe and fittings are not permitted for
use with wet chemical extinguishing systems.

Systems must comply with NFPA 17A and NFPA 96, except as modified herein. Piping and accessories within the hood must be Schedule 40 stainless steel or chrome plated. All other piping must be [Schedule 40 galvanized malleable iron or galvanized steel, painted to match the adjacent surface] [chrome plated or stainless steel]. Exhaust hoods with grease extractors UL Fire Prot Dir listed or FM P7825 approved are not required to have protection downstream of the grease extractors. Wet chemical agent must be listed for the particular system and recommended by the manufacturer of the system. Provide systems for protection of new [and] [existing] cooking equipment, including exhaust hoods and ducts for cooking equipment requiring protection by NFPA 96.

All system components must be UL 300 listed as part of the manufacturer's UL approved, integrated fire suppression system. Install systems within their maximum and minimum piping and temperature limitations as established by testing laboratories, and as published in the manufacturers installation manual, to comply with their UL 300 listing.

2.2 SYSTEM CONTROLS

NOTE: If there is no building fire alarm system, provision for connection to the base fire alarm system must be included in a separate specification section. Refer to Section 21 09 00.00 98 PREACTION CONTROL SYSTEMS.

Each system must be mechanically actuated by fusible links and by remote manual actuation stations connected to the extinguishing system release mechanisms by stainless steel cables. Arrange each system to automatically shut off the flow of fuel and electrical power to cooking appliances as indicated automatically, shutdown makeup air units is provided, and to automatically actuate the building fire alarm system as indicated. Gas valves must be UL listed and be of the manual mechanical reset type. Electrical power to hood exhaust fans must not be shut off unless specifically required by the UL Fire Prot Dir listing or FM P7825 approval. Provide operating instructions at all system remote manual actuation stations.

2.3 [EXISTING] BUILDING FIRE ALARM CONTROL PANEL

Discharge of the extinguishing system must actuate the fire alarm control panel in the same manner as other actuating devices in accordance with

NFPA 72. Extinguishing system wiring must be supervised in the same manner as other devices connected to the fire alarm system. [Refer to Section 28 31 00.00 98 FIRE DETECTION AND ALARM for related requirements.]

2.4 COMPONENTS

The basic wet chemical suppression system must consist of a regulated release assembly, which includes a regulated release mechanism and a wet chemical storage cylinder housed within a single enclosure. Piping, fittings, discharge nozzles, **blow-off caps**, cartridges, **agent**, fusible links, and **pulley elbows**. Additional equipment must include **remote manual pull stations**, mechanical gas valves, **pressure switches**, and electrical switches for automatic **electrical equipment and gas line shut-off devices**.

Manual Actuators: Manual actuators must not require a force of more than **18.1 kilograms 40 lbs** or a movement of more than **355 millimeter 14 inches** to secure operation. Provide all manual actuators with operating instructions. These instructions must be permitted to include the use of pictographs and must have lettering at least **6.35 millimeter 1/4 inch** in height. All remote manual operating devices must be identified as to the hazard they protect.

Electric Dual Snap-Action Switch: Provide UL listed electric dual snap-action switch(s). All electrical connections to the snap action switch wiring harness must be made in junction boxes mounted adjacent to the stainless steel enclosure for the wet chemical suppression system.

Distribution Piping: Distribution piping must be Schedule 40 black iron, chrome-plated or stainless steel pipe conforming to **ASTM A 53/A 53M**, or **ASTM A 106/A 106M**.

Wet Chemical Agent: The extinguishing agent must be a potassium carbonate, potassium acetate-base formulation designed for flame knockdown and securement of grease-related fires. The agent must be available in plastic container, labeled with handling and usage instructions.

Agent Tank: The agent tank must be installed in a stainless steel enclosure. The tank must be constructed of deep drawn carbon steel, finished in red enamel, **5.7 liter or 11.4 liter 1.5 gallon or 3.0 gallon** in size, as required by manufacturer's design. Tanks must have **689 kilopascal 100 psi** working pressure, **2068 kilopascal 300 psi** minimum burst pressure.

Tank Adaptor: Tank adaptor assembly must be chrome-plated steel with a (**6.35 millimeter 1/4 inch**) NPT female inlet and a (**19 millimeter 3/4 inch**), NPT male outlet.

Regulated Release Mechanism: Spring-loaded mechanical/fusible link pneumatic type **regulator** capable of providing expellant gas supply to agent tank(s). It must contain a factory installed regulator deadset at **689 kilopascal 100 psi** and be compatible with mechanical and electrical gas shut-off devices.

Regulated Actuator Assembly: Provide expellant gas for additional tanks in systems requiring (three) or more tanks. It must contain a factory installed regulator deadset at **689 kilopascal 100 psi**.

Discharge Nozzles: Tested and listed for a specific application, each must be stamped with flow designation and tip part number. Each nozzle must be quipped with a protective cap to keep the nozzle tip orifice free if

cooking grease build-up.

2.5 IDENTIFICATION SIGNS

NOTE: Locate remote manual actuation stations in the normal path of egress and at least 1.50 meters 5 feet from the protected cooking appliances. Avoid grouping stations for different systems together; however, when this is not possible, include identification signs.

Provide red rigid plastic signs with engraved 6.35 millimeter 0.25 inch high white lettering at each remote manual actuation station. Sign legends must be "Fire Extinguishing System" followed by a brief description of the equipment protected.

PART 3 EXECUTION

3.1 INSTALLATION

Equipment, materials, installation, workmanship, inspection, and testing must be in accordance with the [manufacturer's installation manuals](#) and maintenance manuals [NFPA 17A](#), except as modified herein.

3.1.1 Piping

Install piping in accordance with the manufacturers UL listing. Where possible, run piping concealed or otherwise located to minimize the potential of inadvertent damage. Install piping parallel or perpendicular to the line of buildings and within hoods.

Seal all piping, fittings, and connections with pipe tape. When applying pipe tape, start on second male thread and wrap the tape (two turns maximum) clockwise around the threads, away from the pipe opening. Do not allow tape to overlap the pipe opening as this could cause possible blockage of the gas pressure.

Properly support piping to withstand static and dynamic loading. Install piping to prevent contact of dissimilar metals.

3.2 FIELD QUALITY CONTROL

Perform tests to determine compliance with the specified requirements in the presence of the Contracting Officer. Test, inspect, and approve piping before covering or concealing. Provide [Test Procedure and Test Record Forms](#) for approval 21 days prior to formal testing and inspection.

3.2.1 Preliminary Tests

Upon completion and before final acceptance of the work, test each [piping and fittings](#) system by discharging a minimum of one [storage cylinder](#) of same size as system cylinder of compressed air or nitrogen (do not use wet chemical) to demonstrate the reliability and proper functioning of all pressure switches, electrical and gas shutoff features, and the discharge of gas from each system [discharge nozzle](#). Individually test remote control stations and other components and accessories to demonstrate proper functioning. Testing must also include automatic and manual actuation, and

fuel or electrical power shutoff and automatic actuation of the building fire alarm system. When tests have been completed and corrections made, submit a signed and dated certificate, with a request for formal inspection and tests.

3.2.2 Formal Tests and Inspection

The Contracting Officer must witness formal tests and approve systems before acceptance. Submit As-Built drawings and a written request for formal inspection at least [21][_____] working days prior to inspection date. An experienced technician regularly employed by the system installer must be present during the inspection. At the inspection, repeat all of the required tests as directed. Provide nitrogen or CO2 and discharge each system to demonstrate uniform distribution of the wet chemical among the nozzles. Furnish nitrogen, or CO2, and personnel for the tests. Refill and reset systems after tests have been completed.

3.3 OPERATION AND MAINTENANCE

[Operation and Maintenance Manuals](#), grouped by technical sections consisting of manufacturer's standard catalog data, as-built schematics, testing and maintenance procedures, recommended spare parts, recommended test equipment, and safety precautions. Submit this information prior to acceptance test being performed.

-- End of Section --