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USACE / NAVFAC / AFCEC | **UFGS-21 23 00 (May 2024)**

Preparing Activity: USACE | **Superseding**
UFGS-21 21 03.00 10 (February 2009)
UFGS-21 23 00.00 20 (April 2006)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated April 2024

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DIVISION 21 - FIRE SUPPRESSION

SECTION 21 23 00

WET CHEMICAL FIRE EXTINGUISHING SYSTEMS

05/24

-- End of Section Table of Contents --

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SECTION 21 23 00

WET CHEMICAL FIRE EXTINGUISHING SYSTEMS
05/24

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NOTE: This guide specification covers the requirements for wet chemical fire extinguishing systems that protect kitchen equipment and exhaust systems.

Adhere to UFC 1-300-02: UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS) FORMAT STANDARD when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions, and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

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NOTE: Ensure that system requirements conform to UFC 3-600-01: FIRE PROTECTION ENGINEERING FOR FACILITIES and NFPA 17A: STANDARD FOR WET CHEMICAL EXTINGUISHING SYSTEMS. A concerted effort was put forth to ensure that requirements from NFPA 17A were not repeated within this UFGS section. NFPA 17A includes many specific requirements for designing, installing, and operating wet chemical fire extinguishing systems. Carefully review and comply with the requirements of NFPA 17A.

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NOTE: Tailoring options are used throughout this Section to differentiate between Army specific

requirements and those requirements applicable to all other entities. To ensure that all applicable requirements are included in the edited Section, ensure that you select either "ARMY" or "NON-ARMY" tailoring, as appropriate for your project. Do not leave both options unselected and do not select both options.

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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 Reference Identifier (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.

FM GLOBAL (FM)

FM APP GUIDE	(updated on-line) Approval Guide http://www.approvalguide.com/

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 4	(2018) Standard for Integrated Fire Protection and Life Safety System Testing
NFPA 17A	(2024) Standard for Wet Chemical Extinguishing Systems
NFPA 70	(2023; ERTA 7 2023; TIA 23-15) National Electrical Code
NFPA 96	(2024) Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
NFPA 170	(2024; ERTA 1 2023) Standard for Fire

Safety and Emergency Symbols

UNDERWRITERS LABORATORIES (UL)

UL Fire Prot Dir	UL Product IQ (updated online) at https://productiq.ulpropsector.com/en

1.2 SYSTEM DESCRIPTION

1.2.1 General

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NOTE: Indicate the location of wet chemical containers, release mechanisms, manual actuators, wiring point of connection to the building fire alarm system or location of building fire alarm control unit, fuel shut-off valves, power shut-down equipment, and ductwork access doors on the Contract Drawings. Ensure the Contract Drawings clearly convey which and to what extent exhaust systems are to be protected.

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Provide[a] new pre-engineered wet chemical fire extinguishing system[s] for the protection of[existing][and][new] cooking equipment including exhaust hoods, ducts, and related work where required by NFPA 96 or indicated on the Contract Drawings. Provide equipment, materials, installation, workmanship, inspection, and testing in strict accordance with NFPA 17A and NFPA 96, except as modified herein. Also, comply with the required and advisory provisions of the manufacturer's installation manual, except as modified herein. Ensure that each system includes all materials, accessories, and equipment necessary to provide each system complete and ready for use.

1.3 SUBMITTALS

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NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES (or the particular specification section for submittal procedures in the project) and edit the following list and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G". Generally, other submittal items can be reviewed and approved by the Contractor's Quality Control System, and only submitted to the Government for reference. Only add a “G” to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification with a code of up to three characters 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 Non-Army projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

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Provide all submittals to the Government, whether for approval or surveillance. Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification require Contractor Quality Control approval and are submitted to the Government for surveillance purposes. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance with Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Qualified Fire Protection Engineer's Qualifications; G[, [_____]]

Installer's Qualifications; G[, [_____]]

Supervisor's Qualifications; G[, [_____]]

Designer's Qualifications; G[, [_____]]

SD-02 Shop Drawings

Shop Drawings; G[, [_____]]

SD-03 Product Data

Pipe And Fittings; G[, [_____]]

Hangers and Supports; G[, [_____]]

Nozzles; G[, [_____]]

Wet Chemical; G[, [_____]]

Agent Cylinders; G[, [_____]]

Discharge Valves; G[, [_____]]

Fusible Links; G[, [_____]]

Manual Actuators; G[, [_____]]

Release Mechanism; G[, [_____]]

Cables and Pulleys; G[, [_____]]

Manual Actuator Sign Verbiage; G[, [_____]]

Portable Fire Extinguisher Sign Verbiage; G[, [_____]]

SD-06 Test Reports

Site Observation Report(s)

Test Procedures; G[, [_____]]

Preliminary Test Report; G[, [_____]]

Final Test Report; G[, [_____]]

SD-10 Operation and Maintenance Data

Operating and Maintenance (O&M) Instructions; G[, [_____]]

System Diagrams and Instructions; G[, [_____]]

SD-11 Closeout Submittals

Special Tools

Spare Parts Data

Spare Parts

As-Built Drawings; G[, [_____]]

Recordings

1.4 SUBMITTAL REQUIREMENTS

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NOTE: Review Section 01 33 00 SUBMITTAL PROCEDURES (or the particular specification section for submittal procedures in the project) to ensure specific quantities and formats of submittals are included therein as desired. Coordinate with the Government's Designated (or Service) Fire Protection Engineer (DFPE) and Contracting Officer on required quantities and formats to be provided.

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Provide submittals in quantities, formats, and transmission means as dictated by Section 01 33 00 SUBMITTAL PROCEDURES. Draw floor plans to a scale no less than 1:100 1/8 inch equals one foot. Utilize NFPA 170 compliant symbols.

Submit Shop Drawings (SD-02) and Product Data (SD-03) simultaneously. Submit all Product Data as a single combined package. Partial submittals; SD-02 and SD-03 submittals not submitted simultaneously; SD-02 and SD-03 submittals submitted prior to SD-01 submittals approval; and submittals not fully complying with the requirements of applicable NFPA standards and the specification; are not acceptable.

1.4.1 Submittal Schedule

Submit all Preconstruction Submittals (SD-01) within [14][_____] days following Notice to Proceed and before any other classification of submittal. Provide submittals for SD-02[,][and] SD-03[,][SD-04][,][and][SD-05] no less than [21][_____] days prior to the proposed start of construction on the subject system. Provide other submittals as specified in other paragraphs of the specification.

1.4.2 Shop Drawings

Provide job specific shop drawings reflecting the actual proposed installation conditions for this project, prepared by a representative of the manufacturer to ensure compliance with the requirements listed herein and with all manufacturer's requirements and recommendations. Do not submit the manufacturer's generic system layout plans, details, and diagrams. Provide drawings that are compliant with the Plans section of NFPA 17A, consisting of system layout including assembly and installation details, electrical connection diagrams, and piping layout showing pipe sizes, lengths, and supports. Include any information on the drawings required to demonstrate that the system has been coordinated and will function as intended, and show system relationship to items being protected and clearances required for operation and maintenance. Also, include locations and connections of conduit, cables, manual actuators, fusible links, fuel shut-off valves, and power shut-off equipment on the drawings.

Include detail drawings for the following items:

a. Storage containers and mounting brackets

b. Fusible links, cables, conduits, corner pulleys, and link mounting frames or brackets

c. Release mechanisms

d. Valves

e. Discharge nozzles

f. Piping components

g. Manual actuators

h. Fuel and power shut-offs

i. Alarms, alarm devices, alarm interface(s), and control panels

1.4.3 Product Data

Provide manufacturer's product data sheets for each system component to be provided, including at least each item specified herein. Annotate product data sheets to indicate precise equipment that is to be provided, including an indication of all options selected. In addition, provide a complete equipment list that includes equipment description, model number, and quantity. Submit copies of current listings or approvals for all equipment furnished. Submit listing or approval documentation from a nationally recognized testing laboratory (NRTL) for each piece of equipment showing that such equipment is listed or approved for use in

fire protection systems.

1.4.4 Test Reports

Submit reports for inspections and tests specified under paragraphs titled "FIELD QUALITY CONTROL". Submit test reports in booklet form showing field tests performed to prove compliance with the specified performance criteria upon completion and testing of the installed system. Document readings, test results, and the final position of controls on each test report.

1.4.5 Operation and Maintenance Instructions

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NOTE: Edit brackets based on whether hard copy manuals (first bracketed options) or electronic only manuals (second bracketed options) will be provided.
****

Submit the Operating and Maintenance (O&M) Instructions indexed and in booklet form as a single[volume][file] or in separate[volumes][files]. Inscribe the following identification on the[cover][cover sheet]: the words "WET CHEMICAL FIRE EXTINGUISHING SYSTEMS OPERATION AND MAINTENANCE MANUAL", the name of the building, the number of the building, the name of the Contractor, the name of the system manufacturer, and the Contract number. Provide instructions that are legible and easily read, with full size drawings[folded in][included].

Provide submittals for SD-10 at least [21][_____] days prior to the proposed start of training. Do not provide training prior to approval of SD-10 submittals. Include at least the following in the Operation and Maintenance Instructions:

a. "Data Package Five" as specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA.

b. Routine maintenance checklist arranged in a columnar format. List all installed devices, appliances, and components in the first column, state the maintenance activity or state no maintenance required in the second column, state the frequency of the maintenance activity in the third column, and provide a fourth column for additional comments or notes.

1.4.6 As-Built Drawings

Show the system as installed, including deviations from both the Contract Drawings and the approved shop drawings. Ensure the accuracy of the as-built drawings is plus or minus 150 millimeters (mm) 6 inches. Maintain redlined as-built mark-ups throughout the duration of construction and incorporate these mark-ups into the native drawing files for the final As-Built Drawings Submittal.

a. Prepare the drawings in the same format, size, and layout as the approved shop drawings.

b. Include complete wiring diagrams showing connections between devices, appliances, and equipment, both factory and field wired.

c. Include a riser diagram and drawings showing the as-built location of

devices, appliances, and equipment.

1.5 SPECIAL TOOLS AND SPARE PARTS

Furnish special tools necessary for the maintenance of the equipment. Submit spare parts data for each different item of material and equipment specified, after approval of shop drawings, and no later than [60][_____] days prior to the anticipated date of beneficial occupancy. Include a complete list of parts and supplies with the current unit prices and source of supply, and a list of the parts recommended by the manufacturer to be replaced after [one][_____] year[s] of service.

Furnish the following spare parts:

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NOTE: Edit the list as desired by the contracting organization. Generally, spare parts are discouraged by UFC 1-300-02: UNIFIED FACILITIES GUIDE SPECIFICATIONS (UFGS) FORMAT STANDARD, but some hard to replace or easily lost items may be warranted for inclusion.

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a. [Five][_____] fusible links.

b. [Five][_____] release actuation cartridges.

c. [Five][_____] complete sets of system keys.

1.6 QUALITY ASSURANCE

1.6.1 Materials

Provide all labor, material, tools, and equipment necessary for and incidental to a complete and usable wet chemical fire extinguishing system.

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NOTE: For OCONUS projects, use the blank brackets to insert local certification organizations that are considered equivalent to United States (U.S.) Nationally Recognized Testing Laboratories (NRTLs) for your project.

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Ensure all devices, appliances, and equipment for fire protection service are listed or approved by [UL Fire Prot Dir, FM APP GUIDE, or another Nationally Recognized Testing Laboratory (NRTL) acceptable to the Government's Designated (or Service) Fire Protection Engineer (DFPE)][_____] for the intended use. For components that must function together to form a system, ensure they are listed or approved by the same NRTL.

1.6.2 Codes, Standards, and Manufacturer's Literature

Provide the system in accordance with NFPA 17A, NFPA 70, NFPA 96, and as specified herein. Interpret reference to "Authority Having Jurisdiction" to mean the Contracting Officer.

Follow all recommended installation and start-up practices stated in the

manufacturer's literature or documentation.

1.6.3 Coordination of Trades

Coordinate each system with the equipment, hood, and exhaust ducts being protected along with other construction in order to eliminate any interference.

1.6.4 Qualifications

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NOTE: Section 01 45 00 QUALITY CONTROL includes requirements related to the Fire Protection Quality Control Specialist (FPQC). Edit that Section as necessary to refine the requirements for the FPQC to the project. Coordinate with the DFPE to ensure edits meet their expectations. The intent is for the FPQC defined in the 01 45 00 QUALITY CONTROL Section to provide the review and oversight required by UFC 3-600-01: FIRE PROTECTION ENGINEERING FOR FACILITIES. Only include the requirements related to that FPQC in the 01 45 00 QUALITY CONTROL Section; do not include them in this Section. The tailoring applied to all mentions of a Qualified Fire Protection Engineer (QFPE) in this Section is intentional. A QFPE, as discussed in this Section, is only required for Army projects and is in addition to the FPQC required by the 01 45 00 QUALITY CONTROL Section. The QFPE specified in this Section for Army projects is not permitted to also fulfill the role of FPQC as specified in the 01 45 00 QUALITY CONTROL Section.

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1.6.4.1 Qualified Fire Protection Engineer (QFPE)

Provide the services of a Qualified Fire Protection Engineer (QFPE). A QFPE is an individual who is a licensed Professional Engineer (P.E.), who has passed the fire protection engineering written examination administered by the National Council of Examiners for Engineering and Surveying (NCEES) and has relevant fire protection engineering experience. Ensure that the QFPE is an integral part of the construction team and is involved in every aspect of the system's submittals, installation, and testing. Ensure that the QFPE does not also serve as the Fire Protection Quality Control Specialist (FPQC) as defined by Section 01 45 00 QUALITY CONTROL. Submit the Qualified Fire Protection Engineer's Qualifications, including the name and documentation of qualifications of the proposed QFPE.

Ensure that the QFPE:

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NOTE: UFC 3-600-01: FIRE PROTECTION ENGINEERING FOR FACILITIES requires that shop drawings, calculations, and material data sheets bear the Professional Engineer seal and signature of the QFPE prior to submission to the FPQC for approval.

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a. Reviews all required shop drawings, material data, calculations, qualifications, test procedures, test reports, as-built drawings, and O&M manuals for completeness and compliance with the provisions of the Contract prior to submitting them to the FPQC. Ensure that construction (shop) drawings and calculations are prepared by, or prepared under the immediate supervision of, the QFPE. Affix the QFPE's Professional Engineer seal with signature to the shop drawings, calculations, and material data sheets, indicating approval prior to submitting them to the FPQC.

b. Performs in-progress construction surveillance prior to installation of ceilings (rough-in inspection)[or closure of trenches]. Performs at least [one][_____] interim site observation visit[s] prior to completion of installation, separate from the preliminary testing, to confirm that all systems are being installed in accordance with the Contract.

c. Witnesses and approves all preliminary and final functional performance testing and performs a final installation review.

d. Signs applicable certificates under SD-07.

1.6.4.2 Installer

Provide an Installer that is regularly engaged in the installation of the type and complexity of system specified herein. Submit the Installer's Qualifications including written certificate demonstrating that the wet chemical fire extinguishing system Installer has been regularly engaged in the installation of such systems meeting NFPA standards for a minimum of three years immediately preceding commencement of the Contract. Include proof of satisfactory performance on at least three projects similar to that required by these specifications, including the names and telephone numbers of using agency points of contact for each of these projects. Indicate the type of each system installed and include a written certification that each system has performed satisfactorily in the manner specified for a period of not less than 18 months following completion. Ensure Installer is able to provide service within 24 hours.

1.6.4.3 Supervisor

Provide the services of a qualified technician, factory trained, certified, and experienced in the installation and operation of the type of system being provided to supervise the installation, adjustment, preliminary testing and final testing of the system, and to provide instruction to Government maintenance and operating personnel.

Submit the Supervisor's Qualifications including name(s) of the Supervisor(s) who will oversee installation and testing of the system, and who will provide instruction to Government personnel, along with the manufacturer's certification of the qualifications of the proposed Supervisor(s).

1.6.4.4 Designer

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NOTE: Tailoring options are included in this paragraph to differentiate between the duties of the Designer under Army projects versus Non-Army projects.

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NOTE: UFC 3-600-01: FIRE PROTECTION ENGINEERING FOR FACILITIES specifically requires that the Designer be certified by the National Institute for Certification in Engineering Technology (NICET). In order for a Designer holding a certification from another entity to be considered acceptable, they must request an equivalency be approved by the Component Fire Protection Engineer (CFPE).
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Prepare shop drawings, product data, design data, O&M manual(s), and as-built drawings by, or under the direct supervision of, the Designer. Ensure that the Designer is an individual experienced with the types of work specified herein and currently certified by the National Institute for Certification in Engineering Technologies (NICET) as an engineering technician with Level IV certification in special hazards systems. Submit the Designer's Qualifications including the name and documentation of certification of the proposed Designer.

Ensure that the Designer:

a. Reviews all required shop drawings, material data, calculations, qualifications, test procedures, test reports, as-built drawings, and O&M manuals for completeness and compliance with the provisions of the Contract prior to submitting them to the FPQC.

b. Performs in-progress construction surveillance prior to installation of ceilings (rough-in inspection)[or closure of trenches]. Performs at least [one][_____] interim site observation visit[s] prior to completion of installation, separate from the preliminary testing, to confirm that all systems are being installed in accordance with the Contract.

c. Witnesses and approves all preliminary and final functional performance testing and performs a final installation review.

d. Signs applicable certificates under SD-07.

1.7 DELIVERY, STORAGE, AND HANDLING

Protect equipment delivered and placed in storage from the weather, humidity and temperature variations, dirt and dust, or other contaminants.

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

a. Provide system components that are the standard products of a manufacturer regularly engaged in the manufacturing of products that are of similar material, design, and workmanship, and that have been in satisfactory commercial or industrial use under similar circumstances and of similar size for at least two years before bid opening. Provide systems that are supported by a service organization.

b. Only use system components that are referenced in or permitted by the manufacturer's design, installation, and maintenance manual or alternative components that are listed for use with the specific

extinguishing system.

2.2 PIPE AND FITTINGS

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NOTE: If the piping between the hood and storage canister(s) is mounted against a porous surface (such as gypsum wallboard) that has a painted enamel finish, specify black steel. If the piping between the hood and the storage canister(s) is mounted to a stainless steel wall plate or other nonporous prefinished surface, specify chrome-plated or stainless steel. Do not specify galvanized pipe or fittings for use with wet chemical extinguishing systems.

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Provide Schedule 40[stainless steel][,][or][chrome-plated steel][,][or][black steel] pipe. Provide standard weight[stainless steel][,][or][malleable iron][,][or][ductile iron][,][or][cast iron] fittings.[Stainless steel tubing is permitted if provided in accordance with the manufacturer's recommendations.] Do not provide galvanized pipe or fittings.

2.3 HANGERS AND SUPPORTS

Provide hangers and supports in accordance with the manufacturer's recommendations.

2.4 NOZZLES

Provide stainless steel nozzles and equip nozzles with an integral strainer to prevent matter inside the distribution piping from clogging the nozzle orifice. Provide each nozzle orifice with a cap to protect the nozzle from clogging by grease or other obstructions. Ensure that the cap detaches upon actuation.

2.5 WET CHEMICAL

Provide wet chemical that is appropriate for the particular hazard and system, and is recommended by the manufacturer of the system. Ensure that the wet chemical does not have an adverse effect on stainless steel during exposure periods of up to 24 hours.

2.6 AGENT CYLINDERS AND DISCHARGE VALVES

Provide the quantity and size of agent cylinder(s) required by the manufacturer for the hazard to be protected. Ensure the cylinder(s) is appropriately rated for the pressure anticipated and is compatible with the wet chemical being provided. Provide each cylinder with a discharge valve that is appropriate for the particular system and recommended by the manufacturer of the system.

2.7 SYSTEM CONTROLS

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NOTE: This specification is written around providing a mechanical release type system. While pneumatic and electronic release type systems are

available in the industry, they require additional cost to install and maintain, and the Government personnel responsible for these systems are not as familiar with these other types of releasing systems.

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2.7.1 Fusible Links

Provide fusible links for automatic mechanical actuation of the system. Ensure fusible links do not require any external power for operation. Select fusible link temperature rating based on the manufacturer's recommendations.

2.7.2 Manual Actuators

Provide manual actuators for manual mechanical actuation of the system. Ensure manual actuators do not require any external power for operation.

2.7.3 Release Mechanism

Provide a release mechanism to actuate the agent cylinder discharge valve upon operation of a fusible link or manual actuator.

2.7.4 Cables and Pulleys

Provide stainless steel cables with corner pulleys employing stainless steel ball bearings at all corners.

2.8 IDENTIFICATION SIGNS

[Provide the English translation on each sign provided in any language other than English.

]2.8.1 Manual Actuator Sign

Provide red rigid plastic signs with engraved 6 mm 0.25 inch high white lettering at each manual actuator. Include the verbiage "ACTUATE FIRE EXTINGUISHING SYSTEM" followed by a brief description of the equipment protected on each sign. Submit full manual actuator sign verbiage for approval with the Shop Drawings submittal.

2.8.2 Portable Fire Extinguisher Sign

Provide red rigid plastic signs with engraved 6 mm 0.25 inch high white lettering at each Class K portable fire extinguisher. Coordinate with the Contract Drawings and Section 10 44 16 FIRE EXTINGUISHERS for location and other requirements related to portable fire extinguishers. Include the verbiage "ACTUATE FIRE EXTINGUISHING SYSTEM PRIOR TO USING PORTABLE FIRE EXTINGUISHER" on the sign. Submit full portable fire extinguisher sign verbiage for approval with the Shop Drawings submittal.

PART 3 EXECUTION

3.1 INSTALLATION

Perform installation in accordance with the system manufacturer's instructions and NFPA 17A. Provide ductwork access doors where indicated on the Contract Drawings and at any item requiring service and inspection, including nozzles and fusible links. Provide ductwork access doors in

accordance with Section 23 30 00 HVAC AIR DISTRIBUTION.

3.1.1 System Controls

Arrange each system to be mechanically actuated by fusible links and by manual actuators connected to the extinguishing system release mechanisms by stainless steel cables. Enclose all cable and wiring in conduit. Provide operating instructions at all manual actuators.

Provide manual actuators in the normal path of egress, at least 3000 mm 10 feet, and no more than 6000 mm 20 feet, from the protected cooking appliances. Do not group manual actuators for different systems together.

3.1.2 Fire Alarm Integration

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NOTE: UFC 3-600-01: FIRE PROTECTION ENGINEERING FOR FACILITIES requires that fire extinguishing systems be monitored by the Installation's fire alarm reporting system. If the Installation is not equipped with a fire alarm reporting system, the fire extinguishing system must be monitored by a remote supervising station. Connect the fire extinguishing system to the building's fire alarm system, if provided. If the building has no fire alarm system, connect the fire extinguishing system directly to the Installation's fire alarm reporting system or a remote supervising station. If connection to the Installation's fire alarm reporting system or a remote supervising station is required, a separate specification should be developed to direct that portion of the work.

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Configure the system(s) such that discharge of the wet chemical fire extinguishing system[activates the building's fire alarm control unit in the same manner as other fire alarm initiating devices][sends an alarm signal to the Installation's fire alarm receiving system][sends an alarm signal to a remote supervising station]. Supervise extinguishing system wiring in the same manner as other devices connected to the fire alarm[reporting] system.[

3.1.2.1 Existing Building Fire Alarm Control Unit

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NOTE: Use this paragraph only where connection to an existing building fire alarm system is required.

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NOTE: Verify whether or not spare capacity is available in the existing building fire alarm system for the addition of the wet chemical fire extinguishing system. Where an existing fire alarm system does not have sufficient spare zone modules or capacity for additional addressable modules, consult with the DFPE for the means of resolution.

****

The existing building fire alarm control unit was manufactured by [_____],

Model [_____], and presently has [[_____] spare zone modules][the capacity for [_____] additional addressable monitor modules]. Connect the wet chemical fire extinguishing system to [the zone currently serving [_____]][a spare zone module][a new addressable monitor module].]

3.1.3 Electrical Work

Except as modified herein, provide electrical equipment and wiring in accordance with Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and NFPA 70.[Provide alarm signal wiring connected to the building fire alarm system in accordance with Section [28 31 60 INTERIOR FIRE ALARM SYSTEM, NON-ADDRESSABLE][28 31 66 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, NON-ADDRESSABLE][28 31 70 INTERIOR FIRE ALARM SYSTEM, ADDRESSABLE][28 31 76 INTERIOR FIRE ALARM AND MASS NOTIFICATION SYSTEM, ADDRESSABLE] and NFPA 70.] Provide wiring in rigid metal conduit or intermediate metal conduit, except electrical metallic tubing may be provided above suspended ceilings or exposed where not subject to mechanical damage.

3.1.4 System Diagrams And Instructions

Provide system diagrams and instructions that show the system layout and typed, condensed, normal and emergency operating procedures; methods for checking the system for normal, safe operation; and procedures for manual actuation; framed under glass or laminated plastic. After approval, post these items where directed by the Contracting Officer.

3.1.5 Pipe and Fittings

Prior to assembly, ream pipe and clean pipe internally by means of swabbing, using a suitable nonflammable cleaner. Once piping is assembled and prior to nozzle installation, blow out the entire piping system with nitrogen or dry air. Securely support the piping system with pipe hangers or brackets fastened to rigid surfaces, and ensure the piping system is not subjected to mechanical, chemical, or other damage. Install piping mounting brackets, hangers, and support fixtures in a manner that ensures nozzles are properly aligned and that prevents nozzles from being moved out of alignment. Provide a union between the extinguishing agent storage container and the supply line.

Provide fittings for direction changes in piping and for connections. Do not provide pipe thread tape or pipe jointing compound unless specifically recommended by the manufacturer.

[3.2 FIELD PAINTING

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NOTE: Coordinate Section 09 90 00 PAINTS AND COATINGS with this paragraph.
****

Clean, pretreat, prime, and paint exposed black steel piping and associated fittings. Apply coatings to clean, dry surfaces, using clean brushes. Clean surfaces to remove dust, dirt, rust, and loose mill scale. Immediately after cleaning, provide the metal surfaces with one coat of zinc molybdate primer applied to a minimum dry film thickness of 25 micrometer (µm) one mil. Provide primed surfaces with[one coat of red alkyd gloss enamel applied to a minimum dry film thickness of 25 µm one mil][two coats of paint to match adjacent surfaces]. Shield operating devices and other adjacent systems with protective coverings while

painting is occurring. Upon completion of painting, remove protective coverings.

]3.3 FIELD QUALITY CONTROL

Test, inspect, and approve piping before covering or concealing. Perform integrated systems testing in accordance with NFPA 4.

3.3.1 Interim Construction Observation Visit[s]

Perform interim construction observation visit[s] when construction is[sufficiently underway to provide sufficient evidence of installation practices being followed, but not so far along as to cause major schedule delays to correct any deficiencies observed][approximately 50 percent complete]. Document each site observation visit with a separate site observation report documenting what was observed and any corrective actions required as a result of the visit. Submit site observation report(s) within [14][_____] days of conclusion of respective site observation visit.

3.3.2 Test Procedures

Submit detailed test procedures at least [30][_____] days prior to proposed start of performing system tests. List all components of the installed system such as piping, hangers, hoses, nozzles, tanks, and actuating devices. Include sequence of testing, time estimate for each test, and sample test data forms. Provide test data forms in a check-off format (pass or fail with space to add applicable test data) and use them for the preliminary testing and the final testing. Provide test data forms that record the test results and:

a. Identify each test required by NFPA 17A Approval of Installations section; Inspection, Maintenance, and Recharging section; and herein; to be performed on each component, and describe how to perform the test.

b. Identify all test equipment and personnel required to perform each test.

c. Provide space to identify the date and time of each test. Provide space to identify the names and signatures of the individuals conducting and witnessing each test.

3.3.3 Test Stages

3.3.3.1 Preliminary Tests

****
NOTE: Tailoring has been used in this paragraph to differentiate between Army and Non-Army requirements for who attends the preliminary testing.
****

After installation has been completed, actuate each system by both fusible link and by each manual actuator to demonstrate proper function of all components, including alarms and[fuel][and][power] shut-off. Actuate by fusible link as approved by the system manufacturer. Discharge contents of test containers, pressurized with either nitrogen or air to normal system operating pressure and of the same size as actual operating

containers, into the system. Ensure that the seals on all nozzles release as during normal actuation. After each discharge, remove and disassemble the nozzles, and clean the strainers. Inspect and clean system piping. Verify all functions of system operation, including switches, shutdown of[fuel][and][power] to appliances protected by the system or served by the same ventilation system, uniform delivery of air or nitrogen to all nozzles, and activation of alarms. Replace nozzle seals after the preliminary tests are complete. In the event portions of the tests are unsuccessful, make repairs and repeat the entire test until successful. Ensure that the QFPE, as well as the Supervisor and an authorized representative from each supplier of equipment, are in attendance at the preliminary testing and sign off on the certification letter. Ensure that the Designer, as well as the Supervisor and an authorized representative from each supplier of equipment, are in attendance at the preliminary testing and sign off on the certification letter.

3.3.3.1.1 Preliminary Test Report

Submit a preliminary test report in booklet form, upon completion of testing. Document test results including repairs and adjustments made, and final test results, in the report. As a part of the report, provide a letter certifying that the installation is complete and fully operable. State in the letter that each actuation device was tested in place and functioned properly, that control functions were tested and operated properly, and include the names and titles of the witnesses to the preliminary tests. Along with the letter, include a request for formal inspection and tests. Notify the Contracting Officer in writing when the system is ready for final testing. Submit request for final test at least [30][_____] days prior to the proposed test date.

3.3.3.2 Final Testing

****
NOTE: The Government's representative to witness final testing may vary by project, by branch, by location, or by any other number of factors. Coordinate with the DFPE to ensure the appropriate Government Representative is specified herein.
****
****
NOTE: The requirement to conduct an actual liquid discharge test comes from UFC 3-600-01: FIRE PROTECTION ENGINEERING FOR FACILITIES.
****
****
NOTE: Tailoring has been used in this paragraph to differentiate between Army and Non-Army requirements for who attends the final testing.
****

Utilize the same test procedures as the preliminary tests for the final tests, except perform liquid discharge test using the manufacturer's recommended flushing concentrate to demonstrate equal distribution of chemical and no leakage at pipe joints. Provide each nozzle with a plastic container, hose, and hose fitting arranged to capture all liquid discharged. In the event portions of the tests are unsuccessful, make repairs and repeat the entire test until successful. Costs for witnessing of retesting incurred by the Government may be charged to the Contractor at the discretion of the Contracting Officer. Replace nozzle seals and

return the system to normal operating condition after the final tests are complete. Reconnect the wet chemical container[s] and verify the connection[s][is][are] not leaking. Clean the extinguishing system and the equipment and duct protected by the extinguishing system after completion of testing. Repair any damage. Ensure that the final testing is witnessed by the [DFPE][Contracting Officer][_____] and the QFPE.Ensure that the final testing is witnessed by the [DFPE][Contracting Officer][_____] and the Designer. Ensure that the Supervisor is present to operate the system during tests.

3.3.3.2.1 Final Test Report

****
NOTE: Tailoring has been used in this paragraph to differentiate between Army and Non-Army requirements for who signs the final test report.
****

Provide a final test report including a letter certifying that the installation is complete and fully operable. Document test activities, including repairs and adjustments made, and final test results in the report. Also, record the final weight of each storage container. Include the names and titles of the witnesses to the final tests in the letter. Ensure that the QFPE, as well as the Supervisor, sign off on the letter. Ensure that the Designer, as well as the Supervisor, sign off on the letter. Submit the final test report within [14][_____] days of test completion.

3.3.4 System Acceptance

Following acceptance of the system, deliver as-built drawings and operating and maintenance (O&M) instructions (O&M Manuals) to the Contracting Officer for review and acceptance. Submit the drawings and manuals within [14][_____] days after the final testing of the system. Provide at least one set of as-built (marked-up) drawings at the time of, or prior to, the final testing for use in field verification.

3.4 CLOSEOUT ACTIVITIES

3.4.1 Training

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NOTE: Determine the number of hours of instruction based on the number and complexity of the systems specified.
****

3.4.1.1 Instruction of Government Personnel

Instruct Government operating and maintenance personnel, as designated by the Contracting Officer, for a minimum of [two][_____] total hours covering at least the following for all items of equipment provided under this Contract:

a. Theory of operation.

b. Procedures for start-up, operation, and shutdown.

c. Maintenance instructions.

d. Safety precautions.

e. Test procedures.

f. Field troubleshooting and diagnostic procedures.

g. Repair procedures for field repairs that can be made by replacing plug-in components.

Provide instruction by the manufacturer's technical representative at the project site using the documents specified in the paragraph entitled "Operation and Maintenance Manuals".

3.4.1.2 Recordings

Record all training presented on-site utilizing recording equipment acceptable to the Contracting Officer. Perform recording such that all visual aids are clearly visible and all discussion is clearly understandable. Provide record copies of the recordings to the Contracting Officer within [14][_____] days following completion of training.

-- End of Section --