SECTION 21 2400WC – CHEMICAL SUPPRESSION SYSTEMS (WET CHEMICAL)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Tanks, mounting bracketry/hardware, distribution piping and discharge nozzles, automatic detection components, actuation components, control panel, gages, and wet chemical agent for system.
   2. Other necessary components required for a complete system.

B. Related Requirements:
   1. Section 21 0000 "General Fire Suppression Requirements."
   2. Applicable Division 11 Section(s) covering kitchen hoods, cooking appliances, etc.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For wet chemical fire suppression systems.
   1. Include plans, elevations, sections, and attachment details.
   2. Include diagrams for power, signal, and control wiring.

C. Delegated-Design Submittal: Wet chemical fire suppression systems indicated, to comply with performance requirements and design criteria, including analysis data signed and sealed by the properly licensed (in the State of Illinois) and qualified professional engineer responsible for their preparation.

D. Piping Mapping Plans: Provide/Submit per University requirements to City/Local Jurisdiction and to the University.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Suppression systems, drawn to scale, on which coordination with all adjacent work/conditions are shown/coordinated.
B. Qualification Data: For qualified Installer and professional engineer.

C. Approved Suppression System Drawings: Working plans, prepared according to NFPA 17A and NFPA 96, that have been approved by authorities having jurisdiction, including calculations if applicable.

D. Welding certificates.

E. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 17A, NFPA 96, and local jurisdiction requirements.

F. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wet chemical suppression systems and specialties to include in emergency, operation, and maintenance manuals.

B. Northwestern University Maintenance Requirement Forms, see Division 01 for more information.

1.6 REFERENCES

A. 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.

B. FM GLOBAL (FM)


C. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1. NFPA 17A - Standard for Wet Chemical Extinguishing Systems

D. UNDERWRITERS LABORATORIES (UL)


1.7 QUALITY ASSURANCE

A. Design and installation Requirements

1. System application, design, and installation shall comply with NFPA 17A and NFPA 96, except as follows:

   a. Compliance shall include conformance to the advisory provisions by changing "should" to "shall."
   b. System components shall be listed in UL Fire Prot Dir or approved by FM APP GUIDE for use with wet chemical fire extinguishing systems.
c. The use of grease extractors does not eliminate the requirement that duct systems, grease removal devices, and hoods be protected by the wet chemical extinguishing system if required.

B. Comply with the Illinois Building Code and Fire Code, and required references, the City of Chicago Building Code, Fire Prevention Code, and required references, and with all other requirements of the local Authority Having Jurisdiction (AHJ).

C. Submit a statement demonstrating successful completion of similar services on at least five projects of similar size and scope, at least 2 weeks before submittal of other items required by this section.

D. Coordination of Trades

1. Each system shall be coordinated with the equipment, hood, and exhaust ducts that it protects along with other construction in order to eliminate any interference.

E. Installation Technician

1. The installation technician shall have been trained by the system manufacturer for system installation, operation, and maintenance. Concurrent with statement of similar services, submit manufacturer's certification of installation technician.

F. Installation Drawings

1. Provide installation drawings prepared by a representative of the system manufacturer to ensure compliance with the requirements listed herein and with all manufacturer's requirements and recommendations. Submit drawings consisting of system layout including assembly and installation details and electrical connection diagrams; piping layout showing pipe sizes, lengths, and supports. Drawings shall include any information required to demonstrate that the system has been coordinated and will function as intended and shall show system relationship to items it protects and clearances required for operation and maintenance. Submit manufacturer's certification of the drawings. Drawings shall also include conduit, cables, manual actuation stations and fusible links. Include detail drawings for the following items:

   a. Storage containers and mounting brackets
   b. Fusible links, cables, conduit, corner pulleys, and link mounting frames/brackets
   c. Release mechanisms
   d. Valves
   e. Discharge nozzles
   f. Piping components
   g. Remote manual actuation stations
   h. Fuel and power shutoff
   i. Alarms, alarm devices, alarm interface(s), control panels

G. Comply with FM Global requirements for general installation of wet chemical systems, and for system inspections, testing and maintenance.

1.8 DELIVERY, STORAGE, AND HANDLING

A. 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 MANUFACTURERS

A. Ansul.
B. Kidde.

2.2 SYSTEM DESCRIPTION

A. General

1. Protect each of the following cooking equipment items [_____], including the exhaust hood, [grease extractor,] [grease filter,] and exhaust duct serving the item by pre-engineered wet chemical fire extinguishing system. System shall be installed with all accessories necessary for system to operate in accordance with manufacturer's instructions and as specified herein.

B. System Controls

1. Each system shall be actuated by fusible link and by a remote manual actuation station connected to the extinguishing system release mechanism by cable. Remote manual actuation stations shall be located along the path of egress and shall automatically actuate the [building] [campus] fire alarm system, and shall alarm to the facility SCADA system (covered by Division 25). The system controls shall automatically shut off fuel flow and electrical power to the protected appliances and other appliances located under the ventilating system protected by the extinguishing system upon system actuation. All cables used shall be stainless steel with corner pulleys employing stainless steel ball bearings at all corners. All cable and wiring shall be enclosed in conduit.

C. Existing Building Fire Alarm Control Panel

1. The existing building fire alarm control panel was manufactured by [_____], Model [_____], and presently has [_____] spare zone modules. The wet chemical fire extinguishing system shall be connected to [the zone currently serving [_____]] [a spare zone module].

2.3 STANDARD PRODUCTS

A. Provide system components which 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 for 2 years before bid opening. The 2-year experience shall include installations of systems under similar circumstances and of similar size. Systems shall be supported by a service organization.

B. Submit manufacturer's catalog data. The data shall be highlighted to show model, size, options, etc., that are intended for consideration and shall be adequate to demonstrate compliance with contract requirements.

C. Locate identification signs at each remote manual actuation station. Signs shall be fabricated of rigid plastic, red in color, with engraved white letters that are a minimum 0.25 inches in height.
Each sign shall be engraved with "Wet Chemical Fire Extinguishing System" and with a brief description of the equipment protected.

D. Replace the fire alarm panel zone identification label with a new label of similar construction which indicates the equipment is connected to the zone module. Discharge of the extinguishing system shall actuate the fire alarm control panel in the same manner as other actuating devices. Extinguishing system wiring shall be supervised in the same manner as other devices connected to the fire alarm system.

2.4 PIPING COMPONENTS

A. Pipe and Fittings
   1. Pipe and fittings shall be Schedule 40 stainless steel. Stainless steel tubing may be used in accordance with manufacturer's recommendations. Galvanized pipe shall not be used.
   2. No welding allowed.

B. Nozzles
   1. Nozzles shall be stainless steel and shall be equipped with an integral strainer to prevent matter inside the distribution piping from clogging the nozzle orifice. Each nozzle orifice shall be provided with a seal to protect the nozzle from clogging by grease or other obstructions. This seal shall detach upon actuation.

2.5 WET CHEMICAL

A. The wet chemical shall not have an adverse effect on stainless steel during exposure periods of up to 24 hours.

2.6 SPECIAL CONNECTIONS

A. For any devices/components needed to be monitored/alarmed/supervised, provide each with at least two sets of contacts, one for fire alarm system connection and one for SCADA system connection (refer to Division 25).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be performed by the installation technician in accordance with system manufacturer's instructions. Ductwork access doors shall be provided where indicated and at any items requiring service and inspection, including nozzles and fusible links. Ductwork access doors shall be in accordance with applicable Division 23 Section.

3.2 PRELIMINARY TESTS

A. Submit proposed test procedures for preliminary test, at least 2 weeks before the start of related testing. System diagrams that show system layout and typed condensed normal and emergency operating procedures, methods for checking the system for normal, safe operation, and procedures for manual actuation shall be framed under glass or laminated plastic. After
approval, these items shall be posted where directed. After installation has been completed, each system shall be actuated by both fusible link and by remote actuation station to demonstrate proper function of all components, including alarms and fuel flow and power shut off. Actuation by fusible link shall be in a manner approved by the system manufacturer. Test containers, pressurized with either nitrogen or air to normal system operating pressure and of the same size as actual operating containers shall be discharged into system. The seals shall release as during normal actuation. After each discharge, the nozzles shall be removed, disassembled, and strainers shall be cleaned. System piping shall be inspected and cleaned as necessary. All functions of system operation shall be verified, 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, and activation of alarms. Nozzle seals/covers shall be replaced after the preliminary tests are complete. In the event portions of the tests are unsuccessful, repairs shall be made and the entire test repeated until successful. Submit test report for the preliminary tests in booklet form, upon completion of testing. Report shall document test results including repairs and adjustments made, and final test results.

3.3 FINAL ACCEPTANCE TESTS

A. Submit proposed test procedures for final acceptance test, at least 2 weeks before the start of related testing and proposed test schedule for acceptance test, at least 2 weeks before the start of related testing. System shall be actuated by both fusible link and remote manual actuation station and all system functions shall be verified as described in Paragraph PRELIMINARY TESTS [using test containers specified for preliminary tests] [except that actual system containers fully charged with wet chemical shall be used]. Each nozzle shall be provided with a plastic container, hose, and hose fitting to capture all wet chemical discharged. All tests or checks recommended by the manufacturer shall also be performed. In the event portions of the tests are unsuccessful, repairs shall be made and the entire test repeated until successful. Nozzle seals/covers shall be replaced after the final acceptance tests are complete. The system shall be returned to normal operating condition after the completion of testing and wet chemical containers expended shall be recharged and verified leak tight. Extinguishing system and equipment and duct protected by the extinguishing shall be cleaned after completion of testing. Any damage shall be repaired by the Contractor. The weight of each storage container shall be recorded before final acceptance test and after test has been completed and containers recharged. Submit test report for the final acceptance tests in booklet form, upon completion of testing. Report shall document test results including repairs and adjustments made, and final test results. The weight of each storage container shall be recorded before final acceptance test and after test has been completed and containers recharged.
3.4 FIELD TRAINING

A. Submit proposed schedule for field training, at least 2 weeks before the start of related training. Conduct a training course for operating and maintenance personnel as designated by the University. Training shall be provided for a period of [_____] hours of normal working time and shall start after the system is functionally complete and after the Final Acceptance Test. The field instruction shall cover all of the items contained in the approved Operation and Maintenance Instructions. Submit [6] [_____] manuals listing step-by-step procedures required for system actuation (automatic and manual), recharging, and routine maintenance, at least 2 weeks before field training. The manuals shall include the manufacturer's name, model number, parts list, list of tools and parts that should be kept in stock by the owner for routine maintenance including the name of a local supplier, simplified wiring and control diagrams, troubleshooting guide, and recommended service organization (including address and telephone number). Service organization shall be capable of providing [4] [_____] hour onsite response to a service call on an emergency basis.

END OF SECTION 21 2400WC
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