



SECTION 21 22 00 CLEAN AGENT FIRE SUPPRESSION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes design, installation and certification of Clean Agent Fire Suppression Systems Addressable Detection.

1.2 REFERENCES

- A. General: Comply with appropriate standards.
 - 1. American Welding Society: AWS.
 - 2. Underwriter Laboratories, Inc.: U.L.
 - 3. Factory Mutual Standards: FM.

1.3 SUBMITTALS

- A. Submit data on all materials, including manufacturers' installation instructions.
- B. Shop Drawings: Indicate complete layout of all system components, including: coordinated nozzle locations, detailed pipe layout, hangers and supports, required components, accessories and system controls.
- C. Design Data: Submit signed and sealed design calculations for the complete system, including battery stand-by power calculations for the control panel and the battery stand-by power supply.
- D. Provide Manufacturers Certificate.

1.4 WARRANTY

- A. All System components furnished under this contract shall be guaranteed against defect in design, material and workmanship for the full warranty time which is standard with the manufacturer and/or supplier, but in no case less than one year.

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to LAWA.
 - 1. Detection Devices: Not less than 10 percent of amount of each type installed.
 - 2. Audible Devices: Not less than 10 percent of amount of each size and type installed.
 - 3. Visual Devices: Not less than 10 percent of amount of each type installed.



PART 2 - PRODUCTS

2.1 INTEGRATED FIRE SUPPRESSION SYSTEMS

A. Manufacturers:

1. **Fike Corp.**
2. **Ansul.**
3. **Viking.**

2.2 PERFORMANCE REQUIREMENTS

- A. Design clean-agent extinguishing system and obtain approval from authorities having jurisdiction. Design system for Class A, B, or C fires as appropriate for areas being protected and include safety factor. Use clean agent indicated and in concentration suitable for normally occupied areas.
- B. The system shall be complete in all ways necessary for a functional, UL listed and/or FM approved, clean agent suppression system. It shall include: All mechanical and electrical installation, all detection and control equipment, agent storage containers, clean agent, nozzles, pipe and fittings, manual release and abort stations, audible and visual alarm devices, auxiliary devices and controls, shutdowns, alarm interface, caution/advisory signs, functional checkout testing, and training.
- C. Performance Requirements (Agent): Per manufacturer's data.
- D. Performance Requirements (Detection): Per manufacturer's data.
- E. System Operating Sequence: As described by manufacturer.

2.3 PIPING MATERIALS

- A. Steel Pipe: ASTM A53, Type S, Grade B or ASTM A106, Grade B; Schedule 40, seamless steel pipe.
1. Threaded Fittings:
 - a. Malleable-Iron Fittings: ASME B16.3, Class 300.
 - b. Flanges and Flanged Fittings: ASME B16.5, Class 300, unless Class 600 is indicated.
 2. Grooved-End Fittings: FMG approved and NRTL listed, ASTM A47 malleable iron or ASTM A536 ductile iron, with dimensions matching steel pipe and ends factory grooved according to AWWA C606.

2.4 VALVES

- A. General: Brass; suitable for intended operation.



- B. Container Valves: With rupture disc or solenoid and manual-release lever, capable of immediate and total agent discharge and suitable for intended flow capacity.

2.5 EXTINGUISHING-AGENT CONTAINERS

- A. Description: Steel tanks complying with ASME Boiler and Pressure Vessel Code: Section VIII, for unfired pressure vessels. Include minimum working-pressure rating that matches system charging pressure, valve, pressure switch, and pressure gage.
 - 1. Finish: Red and white enamel or epoxy paint.
 - 2. Storage-Tank Brackets: Factory- or field-fabricated retaining brackets consisting of steel straps and channels; suitable for container support, maintenance, and tank refilling or replacement.
 - 3. Each cylinder shall have a low-pressure switch to provide visual and electrical supervision of the container pressure. The low-pressure switch shall be wired to the control panel to provide an audible and visual "Trouble" alarm in the even the container pressure drops below 272 psi.
 - 4. Each cylinder shall be fitted with a liquid level device to determine the clean agent quantity without removing the cylinder from its mounting bracket, disconnecting the distribution piping, or removing the clean agent system from service. (35 lb. and 60 lb. cylinders are excluded).

2.6 FIRE-EXTINGUISHING CLEAN AGENT

- A. Manufacturers:
 - 1. **Fike Corporation.**
 - 2. **Ansul.**
 - 3. **Viking.**
- B. Clean Agent: HFC-227ea, heptafluoropropane.

2.7 DISCHARGE NOZZLES

- A. Equipment manufacturer's standard one-piece brass or aluminum alloy of type, discharge pattern, and capacity required for application.
 - 1. Deflector plates shall be used with the nozzles when sensitive ceiling tiles must be protected.
 - 2. A maximum nozzle flow rate of 17 lbs./sec shall be designed for all areas with false ceilings or delicate operations. Higher flow rates may dislodge objects, which could damage or affect equipment and/or process.

2.8 FIRE SUPPRESSION RELEASING CONTROL PANEL

- A. Control panel and its components shall be listed and approved type.



- B. The addressable control panel shall be UL listed and Factory Mutual Global (FMG) approved for use as a local fire alarm system, and/or releasing clean agent, deluge and pre-action sprinkler fire suppression systems.
- C. Control panels shall be capable of networking with similar panels to allow for internal and external NOC communications.
- D. Power Requirements: 120-Vac; with electrical contacts as described in manufacturers data.
- E. The control-panel shall include the following features:
 - 1. Electrical contacts for shutting down fans, activating dampers, and operating system electrical devices.
 - 2. Automatic switchover to standby power at loss of primary power.
 - 3. Storage container, low-pressure indicator.
 - 4. Service disconnect to interrupt system operation for maintenance with visual status indication on the control panel.
- F. Standby Power: Lead-acid or nickel-cadmium batteries with capacity to operate system for 24 hours and alarm for minimum of 5 minutes. Include automatic battery charger, with varying charging rate between trickle and high depending on battery voltage that is capable of maintaining batteries fully charged.

2.9 DETECTION DEVICES

- A. These shall include ionization detectors and remote air-sampling detector system. Including air-sampling pipe network, a laser-based photoelectric detector, a sample transport fan, and a control unit.

2.10 MANUAL STATIONS WITH DIGITAL COUNTDOWN TIMER

- A. General Description: A manual release shall also consist of a digital countdown timer and abort switch combined as one unit.
- B. Manual Release: “AGENT RELEASE” caption, and red finish. Unit shall have a metal housing with a dual action release configuration to prevent accidental system discharge.
- C. Abort Switch: “ABORT” caption, momentary contact, with yellow button.
- D. Countdown Timer: The countdown timer provides a digital readout, indicating the number of seconds remaining until the clean agent discharges. There shall be a label stating “Seconds Remaining to Discharge” at the digital readout.
- E. Each manual release and abort station shall include a contact monitor module to provide for a custom message and device location at the control panel.



2.11 SWITCHES

- A. Listed and approved type, 120-Vac or low voltage compatible with controls. Include contacts for connection to control panel.
 - 1. Low-Agent Pressure Switches: Pneumatic operation.
 - 2. Door Closers: Magnetic retaining and release device or electrical interlock to cause the door operator to drive the door closed.

2.12 ALARM DEVICES

- A. Low voltage and surface mounting, unless otherwise indicated.
- B. Bell: Minimum 6-inch diameter.
- C. Horns: 90 to 94 dBA.
- D. Strobe Lights: Translucent lens, with “AGENT” or similar caption.

2.13 AUXILIARY PANELS

- A. Maintenance By-Pass Switch/Panel: Shall be located adjacent to the clean agent releasing control panel. The maintenance by-pass switch/panel shall have a key-switch which, when operated, will place the clean agent control panel in a “TEST” mode without affecting the detection system.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with hazard-area leakage requirements, installation tolerances, and other conditions affecting work performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verification of existing conditions before starting work.

3.2 PIPING APPLICATIONS

- A. Flanged pipe and fittings and flanged joints may be used to connect to specialties and accessories and where required for maintenance.
- B. Fitting Working Pressure: 620 psig minimum.
- C. Flanged Joints: Class 300 minimum.



- D. NPS 2 and Smaller: ASTM B88, Type L, ASTM B88M, Type B, copper tube; copper, solder-joint fittings; and brazed joints.
- E. NPS 2 and Smaller: Schedule 40, steel pipe; malleable-iron threaded fittings; and threaded joints.
- F. NPS 2-1/2 and NPS 3: ASTM B88, Type L, ASTM B88M, Type B, copper tube; copper, solder-joint fittings; and brazed joints.
- G. NPS 2-1/2 and NPS 3: Schedule 40, steel pipe; forged-steel welding fittings; and welded joints.
- H. NPS 2-1/2 and NPS 3: Schedule 40, steel pipe; steel, grooved-end fittings; steel, keyed couplings; and grooved joints.
- I. NPS 4 and Larger:
 - 1. Schedule 40, steel pipe; steel, grooved-end fittings; keyed couplings; and grooved joints.
 - 2. Schedule 40, steel pipe; forged-steel welding fittings; and welded joints.
- J. Piping between Storage Containers and Orifice Union:
 - 1. Flanged pipe and fittings and flanged joints may be used to connect to specialties and accessories and where required for maintenance.
 - 2. Fittings Working Pressure: 2175 psig minimum.
 - 3. Flanged Joints: Class 600 minimum.
 - 4. All sizes: Schedule 80, steel pipe; forged-steel welding fittings; and welded joints.
- K. Piping Downstream from Orifice Union:
 - 1. Flanged pipe and fittings and flanged joints may be used to connect to specialties and accessories and where required for maintenance.
 - 2. Fittings Working Pressure: 1000 psig minimum.
 - 3. Flanged Joints: Class 300 minimum.
 - 4. All sizes: Schedule 40, steel pipe; forged-steel welding fittings; and welded joints.

3.3 CLEAN-AGENT EXTINGUISHING PIPING INSTALLATION

- A. Install clean-agent extinguishing piping and other components level and plumb.
- B. Install pipe and fittings, valves, and discharge nozzles as required.
- C. Support piping shall include required seismic restraints.



3.4 CONNECTIONS

- A. Install control panels, detection system components, alarms, and accessories, complying with requirements of NFPA 2001, Section “Detection, Actuation, and Control Systems”, as required for supervised system application.
- B. Install piping adjacent to extinguishing-agent containers to allow service and maintenance.
- C. Connect electrical devices to control panel and for interfacing to building’s fire alarm system.

3.5 LABELING AND SIGNS

- A. Provide as required per NFPA.

3.6 PROTECTION OF INSTALLED CONSTRUCTION

- A. Apply masking tape or paper cover to protect discharge nozzle head not receiving field paint. Remove after painting. Replace painted discharge nozzle head with new.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Prepare test and inspection reports.
- C. Clean Agent System will be considered defective if it does not pass tests and inspections.

3.8 CLEANING

- A. Flush entire piping system of foreign matter.
- B. Remove and replace discharge nozzle head with paint other than factory finish.

3.9 TRAINING

- A. Train LAWA Maintenance personnel to adjust, operate, and maintain clean-agent extinguishing systems.
- B. Provide minimum of 12 hours (3shifts) of classroom and hands on training to LAWA Maintenance personnel.

END OF SECTION 21 22 00