

1. GENERAL**1.1 INTENT OF SPECIFICATIONS**

This specification outlines the requirements for a total flooding clean agent fire extinguishing system comprising Kidde Fire Systems equipment employing Argonite inert gas with a Kidde Aegis alarm and releasing panel. All requirements outlined in this specification must be completed in their entirety. These requirements, which are in accordance with the items listed in Section 1.3, combined with good engineering practices shall be followed in order to produce a safe and effective clean agent fire extinguishing system.

1.2 GENERAL DESCRIPTION

The clean agent fire extinguishing system shall perform as outlined in the following sub-sections.

- A. Achieve a 37.9% (v/v) extinguishing concentration for Class A (Surface Type Fires) hazards.
- B. Achieve a 37.9% (v/v) extinguishing concentration for Class C (Energized Electrical Equipment) hazards.
- C. Within 60 seconds, the clean agent fire extinguishing system shall discharge 95% of the required suppression agent mass.
- D. The clean agent fire extinguishing system shall consist of one or more Kidde Fire Systems agent cylinders and related equipment. The cylinders may be either connected to a discharge pipe arrangement separately or connected to a common manifold and discharge pipe arrangement. The agent cylinders shall be filled with 50% Nitrogen and 50% Argon to a working pressure of 2900 PSIG at 70°F (200 bar gauge at 21°C).
- E. The Fire Alarm-Suppression Control System shall consist of a Control Panel that provides control for all devices that make up the complete system. All Kidde Aegis System control units shall be of a single board design and construction and must be factory equipped with all required controls as described in subsequent sections for one suppression hazard.
- F. The Kidde Aegis system shall perform fire alarm, supervisory, and trouble event initiation; occupant notification; event annunciation; local control functions; fire extinguishing system release, and off premises transmission.
- G. The control unit shall be listed to be compatible with Conventional point-type Ionization and Photoelectric Detectors, Normally Open contact type Thermal Detectors and switches, Kidde Solenoid operated Control Heads, Factory Mutual Sprinkler Solenoid Valves and Audio-Visual Notification Appliances.
- H. The control unit shall have dual release capabilities, where each release circuits shall be capable to fully operate independently with different time delay and abort function.
- I. All System components provided with a key-lock feature shall be keyed alike.

1.3 CODES AND COMPLIANCE

- A. The design, installation, testing and maintenance of the clean agent fire extinguishing system, shall be in accordance with the following codes, standards and regulatory bodies:
 - 1. NFPA 2001: Clean Agent Fire Extinguishing Systems
 - 2. NFPA 70: National Electrical Code (NEC)
 - 3. NFPA 72: National Fire Alarm Code
 - 4. NFPA 75: Protection of Electronic Computer/Data Process Equipment
 - 5. NFPA 76: Fire Protection for Telecommunications Systems
 - 6. NFPA 92A: Recommended Practice for Smoke Control Systems
 - 7. UL 864, 9th ed: Control Units and Accessories for Fire Alarm Systems
 - 8. UL 2166: Halocarbon Clean Agent Extinguishing System Units
 - 9. UL 268: Standard for Smoke Detectors for Open Areas
 - 10. UL 268A: Standard for Smoke Detectors for Duct Application
 - 11. ANSI B1.20.1: Standard for Pipe Threads, General Purpose
 - 12. Factory Mutual
 - 13. Requirements of the Local Authority Having Jurisdiction
 - 14. Manufacturer's Design, Installation, Operation & Maintenance Manual

- B. The complete system shall have the applicable following listings and approvals:
 - 1. Factory Mutual Global
 - 2. Underwriters Laboratories of Canada (ULC)
 - 3. California State Fire Marshal (CSFM)
 - 4. Materials and Equipment Acceptance Division of New York City (MEA)
 - 5. Within Canada the listings shall include cUL or ULC
- C. The manufacturer shall meet ISO 9001 requirements for the design, production and distribution of the Argonite fire suppression system.
- D. All components of the clean agent fire extinguishing system shall be the products of the same manufacturer or listed by that manufacturer as compatible with those devices, components and equipment.

1.4 SYSTEM DESIGN CRITERIA

- A. A total flooding clean agent fire extinguishing system, employing Argonite inert gas, shall be installed to meet a minimum design concentration of _____% by volume in all designated spaces to be protected.

1.5 QUALIFICATIONS

- A. Manufacturer
 - 1. The manufacturer/supplier of the system hardware and components shall have a minimum of fifteen (15) years experience in the design and manufacture of systems of similar type
 - 2. The manufacturer/supplier of the systems shall be certified to ISO 9001 for a minimum period of five (5) years for the design, production and distribution of fire detection, fire alarm and fire suppression systems.
 - 3. The name of the manufacturer/supplier and manufacturer part numbers shall appear on all major components.
 - 4. All devices, components and equipment shall be the products of the same manufacturer/supplier.
 - 5. The system manufacturer/supplier shall have the ability to provide multiple suppression system arrangements to accommodate the performance criteria required by the project.
 - 6. All devices, components and equipment shall be listed by the standardizing agencies (ULC and/or FM).
- B. Contractor
 - 1. The distributor shall be trained by the manufacturer to calculate/design, install, test and maintain the clean agent fire extinguishing system employing Argonite inert gas and shall be able to produce a certificate stating such on request.
 - 2. The installing contractor shall employ a person who can show proficiency at least equal to a NICET level III certification in special hazards design.
 - 3. The Contractor shall confirm in writing that he stocks a full complement of spare parts and offers 24-hour emergency service for all equipment being furnished.

1.6 WARRANTY

- A. Mechanical components provided by the manufacturer shall carry a warranty of thirty-six (36) months from date of shipment or one (1) full year from the date of installation. Kidde Aegis Control Unit for sixty (60) months from date of shipment.

1.7 SUBMITTALS

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- A. The architect will review all submittals for conformance to the drawings and specifications. The contractor shall be required to resubmit any materials, with appropriate modifications, that are found to be in non-conformance with the requirements of the drawings and these specifications after review by the architect. Approval of the submittals by the architect shall not relieve the Contractor of their responsibility to meet the requirements of the drawings and specifications.
- B. Engineered Design Drawings: The Contractor shall provide all required documents that shall include the following details:
1. Plan and riser drawings showing the location of the Kidde Aegis Control Unit and the locations and necessary installation and mounting details of all field devices such as smoke detectors, manual-release stations and notification appliances. Conduit routings shall be shown, with number of conductors, type of wire, and wire sizes indicated for each conduit segment.
 2. Point-to-point wiring diagram showing the termination points for all field-wiring circuits to the internal Kidde Aegis PCB. All internal wiring and communications cabling shall be shown.
 3. A primary-power calculation that details the power requirements for the Kidde Aegis Control Unit and all field devices such as smoke detectors, notification appliances and releasing solenoids. Include the required capacity of the main AC power-line feed from the commercial power and light company.
 4. A secondary power calculation that shows the quiescent and alarm power requirements for the Kidde Aegis Control Unit and all field devices. Include the periods of time for which the quiescent and alarm power requirements shall be supported in order to determine the necessary standby battery capacity.
 5. The factory-authorized Kidde Protection Systems Distributor shall provide all required installation drawings per NFPA 2001.
- C. Flow Calculation Reports
1. The distributor shall provide the following information in the flow calculation report.
 - i. Customer information and project data
 - ii. Hazard information. At a minimum, hazard information is to include minimum design concentration, minimum enclosure ambient temperature, maximum enclosure ambient temperature, minimum agent required and volume of enclosures, and identify discharge nozzles by quantity and style
 - iii. Cylinder information. At a minimum, cylinder information shall include cylinder capacity and stored pressure and quantity of cylinders
 - iv. Pipe network information. At a minimum, pipe network information shall include pipe type, pipe diameter, pipe length, change in elevation, pipe equivalent length and any added accessory equivalent length. In addition, the following nozzle information shall be provided; number of nozzles and identification of enclosure location, flow rate of associated nozzle, nozzle nominal pipe size, nozzle type and nozzle orifice area.
 - v. Pipes and pipe fittings. A detailed list of pipe, by schedule, nominal diameter and length, and fittings, by Class Rating, nominal diameter and quantity.
 2. OPTIONAL: Directional Ball Valve Information. A calculation shall be completed for each directional valve in the piping network. Modeling of the Directional Ball Valve shall be shown in the pipe network
- D. Commissioning Equipment List: The Contractor shall provide a commissioning equipment list for each installed system. The equipment list shall identify all installed equipment and configurations. The Contractor shall submit the following:
1. Four (4) sets of installation drawings for each installed system and one (1) set of calculation reports, owner's manuals and product data sheets.
 2. A description of system functionality and a detailed matrix of all the initiating points, control modules, and field circuits that identifies the labeling of all components and shows

the relationships and activation sequences among the various initiating points and the control modules and/or field circuits.

3. The Contractor shall submit a test plan that describes how the system shall be tested. This shall include a step-by-step description of all tests and shall indicate type and location of test apparatus to be used. Tests shall not be scheduled or conducted until the engineer of record approves the test plan. At a minimum, the tests to be conducted shall be per the relevant referenced codes and any additional supplemental tests required by the AHJ. Tests shall not be scheduled or conducted until the engineer of record approves the test plan.
 4. Upon completion of installation and commissioning acceptance, two (2) sets of "As-Built" installation drawings and One (1) set of the calculation report for each installed system.
- E. Test Plan
1. The distributor shall submit a test plan that describes how the system equipment and room integrity shall be tested. This shall include a step-by-step description of all tests and shall indicate type and location of test apparatus to be used. At a minimum, the tests to be conducted shall be per NFPA 2001 and any additional supplemental tests required by the AHJ. Tests shall not be scheduled nor conducted until the engineer of record approves the test plan.
- F. Operation and Maintenance Manuals
1. Two (2) copies of the Kidde Protection Systems Design, Installation, Operation and Maintenance Manual for the clean agent fire extinguishing system employing Argonite inert gas shall be submitted after complete installation.
 2. Two (2) copies of the Aegis Installation, Operation and Maintenance Manual shall be submitted after complete installation.

2. SUPPRESSION SYSTEM REQUIREMENTS

2.1 GENERAL

- A. The clean agent fire extinguishing system shall consist of Argonite inert gas, cylinder(s), Kidde actuation hardware and Kidde discharge nozzle(s) attached to a pipe network.

2.2 SYSTEM PERFORMANCE

A. System Discharge

1. The discharge time required to achieve 95% of the minimum design concentration for flame extinguishment shall not exceed 60 seconds.

B. Duration of Protection

1. 85% of the minimum design concentration shall be maintained for 10-minutes or a sufficiently longer period of time to allow effective emergency action by trained personnel. A level 1 certification in room integrity testing, provided by a recognized manufacturer of room integrity testing equipment, is required.

C. Minimum System Design Limits

1. Nozzles

- i. Nozzles shall be listed and approved for a maximum ceiling height of 16 feet (4.88 m) and a minimum ceiling height of 1 foot (0.31 m).
- ii. Nozzle area coverage for both 360- and 180-degree nozzles shall be a maximum of 35.6 ft. x 35.6 ft. square (10.85 m x 10.85 m).
- iii. System Nozzles shall be listed and approved for a minimum of 445 PSIG (30.6 bar gauge) nozzle pressure.

2.3 PIPE AND FITTINGS

- A. Distribution piping, and fittings, shall be installed in accordance with NFPA 2001, approved piping standards and the engineered fire suppression system manufacturer's requirements.

2.4 ACTUATION HARDWARE

- A. The agent cylinders shall be actuated in accordance with the applicable design manual.
- B. The suppression panel shall be UL Listed per UL 864, 9th Edition with the interfacing electric actuators.

2.5 NOZZLES

- A. Total flooding clean agent extinguishing system nozzles shall be made of brass.
- B. Each nozzle shall be located in the space per the manufacturer's guidelines. Nozzles shall have a 360-degree discharge pattern.
- C. Discharge nozzles shall be available in ½-in, ¾-in, 1-in and 1-½-in NPT sizes.
- D. Within each nozzle size, the manufacturer shall offer multiple different orifice areas (minimum of 15).
- E. Nozzles shall be FM Approved and ULC Listed for use with the manufacturer's clean agent extinguishing system employing Argonite inert gas

2.6 AGENT STORAGE CONTAINER ASSEMBLIES

- A. Argonite inert gas shall be stored in containers manufactured and marked in accordance with US Department of Transportation (DOT) specification 3AA-3000 and Transport Canada (TC) specification 3AAM-229. The agent storage containers shall be conditioned to 2900 PSIG @ 70°F (200 bar gauge @ 21°C). The system manufacturer shall be able to provide US DOT documentation that the registration number marked on the agent cylinders corresponds to a manufacturing location at a US address.
 - 1. The agent used in Argonite cylinders shall be filled with 50% +0/-2% Argon and 50% +2%/-0% Nitrogen. The purity of the gases shall adhere to the requirements outlined by the manufacturer's manual. The manufacturer shall be able to provide a certificate of purity for the bulk gases and a certificate of composition and purity for each cylinder.
 - 2. Argonite inert gas cylinders shall be equipped with a pressure gauge to display internal pressures. The gauge shall be an integral part of the equipment and shall be color-coded for fast referencing of pressure readings.
 - 3. A low-pressure switch shall be provided as standard equipment on the Argonite inert gas cylinders. A decrease in pressure will cause the normally open contacts to close, indicating a trouble condition at the control panel. The low-pressure switch shall be field removable/replaceable while the container is still fully charged

2.7 OPTIONAL EQUIPMENT

- A. When protecting multiple hazard areas from a single supply of Argonite inert gas, Kidde Directional Ball Valves shall be used.
 - 1. The Directional Ball Valves shall be rated to a working pressure of 3000-psig @ 70°F (200-barg @ 21°C).
 - 2. The Directional Ball Valves shall be available in ½-in through 2-in NPT sizes.
 - 3. A maximum pressure of 120-psig (8-barg) shall be required to actuate the Directional Ball Valves.
 - 4. Each Directional Ball Valve shall be fitted with a manual operator.
 - 5. The Directional Ball Valves shall be installed and located in the piping network per the manufacturer's guidelines and design manual

2.8 Control Panel:

- 1. The single hazard Control Panel shall consist of a single Printed Circuit Board with the main microprocessor and an integral operator interface Module, a primary Power Supply Unit, a 24 VDC Battery backup complete with Battery Charger capable of charging 68 AH batteries, in an 18 gauge painted NEMA 1 steel enclosure with door. The enclosure size shall be capable of housing the Printed Circuit Board, the Power Supply Unit and a Battery of capacity 12 AH at 24 VDC. Enclosures intended for use in Canada shall be

- provided an additional steel dead-front plate. Battery cabinets shall be available to accommodate batteries of capacity 17 to 68 AH at 24 VDC.
2. The power-supply / charger assembly shall be configurable to accept either 120 or 240 VAC input voltage, and shall provide 5.4 A at 24 VDC of filtered and regulated power to operate the system and charge the system's standby battery. The charger assembly shall be capable of charging batteries of capacities up to 68 AH.
 3. The Control Panel shall provide two resettable Auxiliary Outputs rated at 2 Amp total at 24 VDC for external use.
 4. The battery backup system shall consist of 24 VDC, maintenance free, sealed lead acid batteries of capacity such as to provide for 24 to 90 hours of Standby operation followed by 5 to 10 minutes of Alarm operation in case of AC Mains failure. The battery charger shall be capable of charging a fully discharged battery within 48 hours.
 5. The Control Panel shall supervise and control the overall system operation, including the execution of the site-specific configuration. Its printed circuit board shall contain the hazard-specific input and output circuits.
 6. The control unit operator interface Module shall provide a digital display, system control switches, and Light emitting diodes (LED's) to indicate the status of individual input and output circuits and a summary of Alarm, Supervisory and Trouble events.
 7. The digital display shall also provide a countdown timer to indicate the time remaining prior to an impending suppression system release. Panels that do not display releasing countdown shall not be acceptable.
 8. The operator interface Module shall be provided Light Emitting Diodes (LED) to indicate Power ON, Alarm, Pre-Release, Releasing, Post-Release, Trouble, Supervisory and Signal Silenced.
 9. The operator interface module shall have control keys for system operation and shall allow System Diagnostics, Lamp Test, and System Configuration Menu Controls. All access to the Menu System shall be password protected.
 10. A system buzzer shall annunciate each Alarm, Supervisory, or Trouble event.
 11. The Control panel shall be provided 3 Class A/B Detection Initiating Device Circuits
 - i. The Initiating Device Circuits shall all be power limited, and shall be field-configurable in either style of supervision without the use of any converter boards, wiring jumpers, or dip switches. Panels that require the use of Class A/Class B converter boards shall not be permitted.
 - ii. Each circuit shall be capable of supporting Normally Open contact-type alarm devices as well as a minimum of 25 Kidde Conventional point-type smoke detectors in any combination.
 - iii. The Initiating Device Circuits shall be configurable to activate the Suppression System on the occurrence of any of the alarm and supervisory combination as described in subsequent paragraphs.
 - iv. The contractor shall only utilize Kidde smoke or electronic heat detectors that have been UL listed for compatibility with the Kidde Aegis panel.
 - v. The Waterflow/Detection Circuit shall be field-configurable in either a water flow or general alarm detection in a style B or style D of supervision without the use of any converter boards, wiring jumpers, or dip switches. .
 12. The Control panel shall be provided 1 Class A/B Manual Release Circuit
 - i. The circuit shall be power limited and shall be capable of supporting Kidde Manual Pull Stations. The release of Agent subsequent to the operation of the Manual Release shall be configurable to be either instantaneous or delayed. If delayed, the time delay shall be 10 seconds, 20 seconds, or 30 seconds. The operation of the Manual Release shall override any existing Abort Station input.
 - ii. The contractor shall only utilize Kidde Pull Stations that have been UL listed for compatibility with the Kidde Aegis panel.
 13. The Control panel shall be provided 1 Class A/B Abort Circuit.

- i. The circuit shall be power limited and shall be capable of being user-configurable to abort either a single release output, or both. In applications where the Aegis control unit dually controls a clean agent system and a water based system, activation of the abort circuit shall not affect the release of the water based system.
 - ii. The abort circuit shall be capable of supporting Kidde Abort Stations. When enabled, the abort circuit shall be configurable to operate in up to five modes including UL and disabled.
 - iii. The contractor shall only utilize Kidde Abort Stations that have been UL listed for compatibility with the Kidde Aegis panel.
14. The Control panel shall be provided 2 Class A/B Supervisory Circuits
- i. The supervisory Circuit shall be field-configurable in either style of supervision without the use of any converter boards, wiring jumpers, or dip switches. Panels that require the use of Class A/Class B converter boards shall not be permitted.
 - ii. Each circuit shall be power limited.
 - iii. The supervisory circuit shall be configurable to allow for Supervisory input and Detection input to be cross zoned, to release the suppression system.
15. The Control panel shall be provided 3 Class A/B Notification Circuits.
- i. The Notification Circuits shall be field-configurable in either style of supervision without the use of any converter boards, wiring jumpers, or dip switches. Panels that require the use of Class A/Class B converter boards shall not be permitted.
 - ii. Each NAC circuit shall be capable of delivering an output of 1.5 Amps at 24 VDC.
 - iii. All circuits shall be individually programmable and configurable to activate on one or more of the conditions of General Alarm, First Alarm, Waterflow, Pre-Discharge, and Discharge.
 - iv. In the event of the occurrence of any of the above conditions, the circuits shall be configurable to generate the sound pattern of:
 - a. Silent
 - b. Pulse at 60 beats per minute Silenceable or Non-Silenceable
 - c. Pulse at 120 beats per minute Silenceable or Non-Silenceable
 - d. Temporal Silenceable or Non-Silenceable
 - e. Steady.
 - v. Synchronization of the notification appliance circuit shall be achieved without the use of external Sync Modules.
 - vi. It shall be possible to configure more than one circuits to activate for the same alarm condition
 - vii. It shall be possible to override one master code (tone) with another depending on the state (i.e., first alarm, prerelease, or release) of the particular suppression zone. No supplemental equipment shall be required to perform this functionality.
 - viii. The contractor shall only utilize Alarm Signals that have been UL listed for compatibility with the Kidde Aegis panel.
16. The Control panel shall be provided 2 Class B Agent Release Circuits
- i. The releasing circuits shall be protected against inadvertent activation by a Triple-Failure-Redundancy safeguard system. This system shall require the main microprocessor to issue two release commands, of opposite polarity and via separate signaling channels, combined with a signal from the control unit's watchdog timer confirming proper microprocessor operation, in order to activate a release circuit.
 - ii. It shall be possible to configure each release circuit for activation based on the following configuration criteria of inputs:
 - a. Manual Release
 - b. Single zone
 - c. Crossed zone

- iii. Each Agent Release Circuits shall be capable of operating the following 24 VDC Release Devices in the listed configurations:
 - a. 1 or 2 Kidde Control Heads
 - b. 1 FM Sprinkler Solenoid (Group A, B, D, E, G, F, I, J and K)
 - iv. The contractor shall only utilize release devices that have been UL listed/FM approved for compatibility with the Kidde Aegis panel:
 - v. The circuit design shall be such that no additional module(s) or interface circuitry is required to be wired between the Control Panel Release Circuit output terminals and the Release Devices listed above for proper operation of the Suppression System.
 - vi. The circuit shall be configurable so as to provide activation power to Control Heads for 90 seconds and to Deluge Solenoids for 10 minutes, 15 minutes or On-Until-Reset.
 - vii. The circuit shall be configurable so that release of agent in the affected area may either be instantaneous or delayed by a maximum of 60 seconds. The site-specific time delay shall be configurable up to the maximum allowed in steps of 10 seconds.
17. The Control panel shall be provided 3 Independently Programmable Relays.
- i. The Programmable Relays shall be normally de-energized and shall have Form-C contacts rated 3 Amps at 120 VAC / 30 VDC.
 - ii. The contacts shall be programmable to transfer and latch on any one of the following conditions:
 - a. General Alarm Condition
 - b. First Alarm Condition
 - c. Pre-Discharge Condition
 - d. Discharge Condition
 - e. Waterflow Input
 - f. Manual Release
 - g. Global Abort Input
 - h. Global Supervisory Input
18. The Control panel shall be provided 1 System Trouble Relay.
- i. The Trouble Relay shall be normally energized and shall have Form-C contacts rated 3 Amps at 120 VAC / 30 VDC.
 - ii. The relay shall be non-latching and shall transfer on any trouble in the system.
19. All Input and Outputs shall be provided appropriate numbers of terminals of capacity suitable for 18 to 12 AWG wiring.
20. Kidde Aegis Menu System
- i. The Kidde Aegis control panel Menu System shall only be accessible from the user interface keypad. It shall be pass code protected to prevent unauthorized access and shall provide the following functions:
- B. CPD-7054 and CPD-7054D Electronic Ionization Detectors
- 1. The Ionization Detector shall be a dual chamber, low profile, conventional type that senses both visible and invisible products of combustion.
 - 2. The sensing chamber shall permit a full 360 degree smoke entry.
 - 3. The Detector shall mount to a twist-to-lock, vandal resistant base, Model 2WB.
 - 4. The Detector shall be suitable for open-air velocities up to 300 fpm and shall have a nominal sensitivity of 1.3% obscuration per foot.
 - 5. It shall be possible to perform a sensitivity check on the detector without the need for generating smoke.
 - 6. It shall be possible to remotely check the detector sensitivity without removing the device from service and without interrupting its operability.
 - 7. The strength of the Americium 241 radioactive source shall not exceed 0.8 microcurie. Detectors with higher radioactive strengths shall not be acceptable.

8. The Detector shall be provided with 2 response LED's. These LED's shall flash to indicate power and shall light up steady with full brilliance on alarm.
 9. It shall be possible to view the operational status of the detector from a 360 degrees viewing angle
 10. All field wire connections shall be made to the base through the use of a clamping plate and screw.
- C. PSD-7157 and PSD-7157D Electronic Photoelectric Detectors
1. The Photoelectric Detector shall be a light-scattering, low profile, conventional type that senses a broad range of smoldering and flaming-type fires.
 2. The sensing chamber shall permit a full 360 degree smoke entry.
 3. The Detector shall mount to a twist-to-lock, vandal resistant base, Model 2WB.
 4. The PSD-7157 and PSD-7157D detectors shall be suitable for open air velocities up to 300 fpm and shall have a nominal sensitivity of 1.78 to 3.25% obscuration per foot.
 5. It shall be possible to perform a sensitivity check on the detector without the need for generating smoke.
 6. It shall be possible to remotely check the detector sensitivity without removing the device from service and without interrupting its operability.
 7. The Detector shall be provided a response LED. This LED shall flash to indicate power and shall light up steady with full brilliance on alarm.
 8. All field wire connections shall be made to the base through the use of a clamping plate and screw.
- D. THD-7052 and THD-7053 Heat Electronic Detectors
1. The THD-7157 and THD-7053 Detectors shall be a thermistor-based heat sensor with 135F (57C) set point. The THD-7052 shall have a Rate-Of-Rise temperature detection feature rated at 150 F (8.30C) per minute
 2. All field wire connections shall be made to the base through the use of a clamping plate and screw.
 3. The Detector shall be provided a response LED. This LED shall flash to indicate power and shall light up steady with full brilliance on alarm.
 4. The Detector shall mount to a twist-to-lock, vandal resistant base, Model 2WB.

2.9 SYSTEM CONFIGURATION

- A. Activation of the extinguishing system shall be via crossed-zoned smoke detection, or single zone heat detection, or a combination of smoke detection and supervisory inputs. In case of cross zoned smoke detection, one half of the crossed-zoned smoke detection system shall consist of PSD-7157 or PSD-7157D Photoelectric Detectors and the other half of CPD-7054 or CPD-7054D Ionization Detectors.
- B. Systems that use multi-criteria detectors that cannot be programmed to respond to the various stages of fire development, or systems that do not use different smoke detection principles to confirm the presence of a flaming fire, shall not be considered as equivalent or as meeting the intent of this specification.
- C. Activation of any smoke detector in the suppression zone shall:
1. Cause a pre-alarm (First Alarm) condition
 2. Create an audible and visible indication on the control unit display and any associated remote display
 3. Display the zone of the detector in alarm
 4. Activate audible pre-alarm notification appliances (e.g., bells) in the affected area
 5. Perform any necessary control functions such as HVAC equipment shutdown and activate any safety procedures such as closing doors
 6. Transmit an off-premises report to a Listed central or remote station, or directly to the local fire department.
- D. Activation of a smoke detector from each of the two crossed zones shall:
1. Cause a pre-release (Second Alarm) condition

2. Create an audible and visible indication on the control unit display and any associated remote display
 3. Display the zones of the detectors in alarm
 4. Initiate a programmable time delay, and indicate the time remaining prior to extinguishing-system discharge
 5. Display the time countdown to system discharge on the user interface display
 6. Activate audible and visual notification appliances (e.g., horns and strobes) in the affected area
 7. Perform any necessary control functions such as the closure of dampers and activate any safety procedures such as closing doors.
- E. The system shall, upon expiration of the time delay,
1. Cause a release condition and energize the control head to discharge the extinguishing agent into the protected area
 2. Create an audible and visible indication on the control unit display and any associated remote display
 3. Display the attainment of the discharge condition
 4. Continue to activate the audible and visual notification appliances (i.e., strobes) in the affected area
 5. Perform any necessary control functions such as the emergency power off of all electrical equipment except for lighting and circuits required for life safety.
- F. The extinguishing system shall be capable of manual activation by Dual Action Manual Release Stations. Operation of a Manual Release Station shall cause all alarm and shutdown devices to operate as if the system had operated automatically and shall cause an immediate activation of the fire extinguishing system. Operation of a Manual Release Station shall override the operation of all Abort switches.
- G. Abort Stations shall, when operated, interrupt the countdown delay for the activation of the extinguishing system and prevent the operation of any alarms and control functions associated with the discharge of the extinguishing agent. The abort switches shall be momentary, dead-man type devices that require a constant force to remain engaged and active. Manual Release Stations shall override the operation of any Abort Station. Abort Station shall be configured for operation according to the requirements of the authority having jurisdiction.

3. EXECUTION

3.1 CLEAN AGENT FIRE EXTINGUISHING SYSTEM INSTALLATION

- A. The system shall be supplied and installed by a factory-authorized, Kidde Protection Systems Distributor. The Distributor shall be trained and certified by Kidde Protection Systems to design, install and maintain the Kidde fire suppression system. The distributor shall install the system in accordance with the manufacturer's design, installation, operation and maintenance manual.

3.2 ELECTRICAL SYSTEM INSTALLATION

- A. All electrical enclosures, raceways, and conduits shall be provided and installed in accordance with applicable codes and intended use, and shall contain only those electrical circuits associated with the fire-detection and control system. No circuit or circuits that are unrelated to the fire alarm or suppression system shall be routed through the enclosures, raceways, and conduits dedicated to the fire alarm or suppression system.
- B. Splicing of circuits shall be kept to a minimum, and is only permitted in an electrical box suitable for the purpose. Appropriate hardware shall be used to make the wire splices. Wires that are spliced together shall have the same color insulation.
- C. White colored wire shall be used exclusively for the identification of the neutral conductor of an alternating-current circuit. Green colored wire shall be used exclusively for the

- identification of the earth-ground conductor of an AC or DC circuit. Appropriate color-coding shall be utilized for all other field wiring.
- D. All electrical circuits shall be numerically tagged with suitable markings at each terminal point. All circuits shall correspond with the installation draw.

3.3 ROUTINE MAINTENANCE

- A. Routine maintenance on equipment shall be performed as recommended by the manufacturer's installation, operation and maintenance manual. At a minimum the routine maintenance will include the following by a certified Kidde Protection System Distributor:
1. Visual Check of Pipe network and distribution nozzles per the operation and maintenance manual.
 2. Weight and pressure of the Kidde Engineered System cylinders per the operation and maintenance manual.
 3. Inspect all cylinders and equipment for damage per the operation and maintenance manual.
 4. Pneumatic operation of the Directional Ball Valve. Routine maintenance on the suppression system as a whole shall be performed as recommended by NFPA 2001, current edition.