1. GENERAL SPECIFICATION

1.1 A total flooding, ADS FM-200 fire suppression system with separate nitrogen storage used for a propellant shall be installed to meet the appropriate design concentration in all designated spaces to be protected. (For marine applications, concentration is typically 8.7% for diesel fuel hazards and varies for other Class B flammable liquid hazards. Class A & Class C hazards are typically require a concentration of 7.6%)

1.2 The system shall protect the following hazard(s): main machinery room, auxiliary machinery room, paint locker, pump room, purifier room, etc.

2. CODES/STANDARDS COMPLIANCE

2.1 The design, installation, testing and maintenance of the above stated FM-200 fire suppression system shall be in accordance to the following codes, standards and regulatory bodies:

A. NFPA 2001 – Standard for Clean Agent Fire Extinguishing Systems – 2004 edition.

B. US Coast Guard

C. UL 2166 – Standard for Halocarbon Clean Agent Extinguishing System Units

D. SOLAS

E. Applicable ship classification society (i.e. American Bureau of Shipping, Det Norske Veritas , Lloyds Register, etc.)

F. Design and installation practices set forth by system manufacturer

G. Requirements of the Local Authorities Having Jurisdiction (AHJ)

2.2 The Fire suppression system must have the following listings and approvals:

A. US Coast Guard Certificate of Approval

B. UL 2166 Listed for marine use – Underwriters Laboratories Inc.

2.3 The manufacturer shall meet ISO 9001 requirements for the design, production and distribution of the FM-200 fire suppression systems.

3. EQUIPMENT DESCRIPTION

3.1 Complete FM-200 systems shall be provided to protect the following spaces:

A. Main Machinery Room

B. Auxiliary Machinery Room

C. Paint Locker/Flammable Liquid Storage Room

4. SYSTEM DESCRIPTION

4.1 All FM-200, fire suppression equipment and accessories shall be manufactured by:

Kidde Fire Systems
400 Main Street
Ashland, MA 01721
U.S.A.
phone: (508) 881-2000
URL: http://www.kiddefiresystems.com

4.2 The manufacturer shall warrant all FM-200, fire suppression system products for 36 months from date of shipment or one (1) full year from the date of installation.

4.3 The system shall be supplied and installed by a factory-authorized, Kidde Fire Systems distributor. The distributor / Installer shall be trained by the manufacturer to calculate / design, install, test and maintain the FM-200 Fire suppression system and shall be able to produce a certificate stating such on request.

4.4 The ADS system shall consist of a Kidde FM-200 Agent Storage Cylinder, Kidde Nitrogen Driver Cylinder, Kidde Nitrogen Transfer hardware, Kidde actuation hardware and Kidde ADS system distribution nozzles attached to a pipe network.

4.5 (OPTIONAL EQUIPMENT): The FM-200 agent cylinders shall have the option of a liquid level indicator (LLI). Each LLI device will provide a reliable means other than weighing for determining the agent quantity within the storage container during normal routine servicing.

5. COMPONENTS

5.1 FM-200 Cylinder and Valve Assembly

A. FM-200 shall be stored in Kidde ADS series Cylinders. Operating pressure of the FM-200 shall be at 44 psig @ 70°F.

B. FM-200 Agent cylinders can be actuated pneumatically with Kidde P/N 878737.

C. The FM-200 Agent cylinder shall be provided with a safety rupture disc.

5.2 Nitrogen Driver Cylinder and Valve Assembly

A. Nitrogen shall be stored in a Kidde ADS series Nitrogen driver cylinder P/N 90-10XXX0-001 for use with agent storage cylinder.

B. Operating Pressure for Nitrogen driver cylinders, P/N 90-10XXX0-001 shall be 1800 psig @ 70°F.

C. Nitrogen driver cylinders shall be equipped with a discharge head, Kidde P/N 8724XX and shall be actuated as the primary cylinder using a Kidde electric control head, electric / cable control head or lever operated control head.

D. (OPTIONAL EQUIPMENT): Pneumatic actuation of Nitrogen driver cylinders can be accomplished by using a nitrogen pilot cylinder, available in 108 and 1040 cu. in. sizes. Pilot cylinders equipped with optional supervisory pressure switches are available.

5.3 Nitrogen Driver Transfer Hardware

A. Nitrogen shall be transferred from the Nitrogen Driver Cylinder to the FM-200 Agent cylinder by using a ¾" Outlet, flexible transfer hose. Kidde P/N 06-118207-00X.

B. Nitrogen Transfer to the FM-200 Agent cylinder shall be regulated by an Orifice fitting, Kidde P/N 90-194129-XXX. Size of Orifice restrictor plate to be determined using Kidde ADS flow calculation software P/N 90-190002-302.

5.4 Distribution Nozzles

A. Engineered discharge nozzles, P/N 90-1944XX-XXX, are for use only with the Kidde ADS series system.

B. Each nozzle shall be located in the space per the manufacturer's guidelines, Nozzles can have either a 180 or a 360-degree discharge pattern.

A. Each Nozzle discharge pattern shall be available in sizes ranging from ½" NPT to 2" NPT.

C. (OPTIONAL EQUIPMENT): Nozzle escutcheon plates can be used to conceal pipe entry through ceiling, Kidde P/N 06-23613X-001

5.5 Pipe Network

A. Distribution piping, and fittings, shall be installed in accordance with NFPA 2001,

approved piping standards and FM-200 system manufacturer's requirements.

5.6 (OPTIONAL EQUIPMENT) 3-Way Cross-Over Valves

A. For selector suppression systems were multiple hazard manifold arrangements are used, a Kidde 3-Way cross-over valve for use with the ADS series system shall be used. P/N 90-30000X-000.

B. When multiple cylinders are used, each cylinder must have the same orifice fitting and drill size and be of the same cylinder size and fill density to ensure proper regulated flow of agent and nitrogen.

C. The 3-way cross-over valves shall be installed and located in the piping network per the manufacturer's guidelines and design manual.

5.7 Kidde Actuation hardware

A. The FM-200 Cylinder valve assembly shall be actuated using a Kidde cable control head or lever operated control heads.

B. Pneumatic actuation of the FM-200 Cylinder valve will be accomplished by using nitrogen pilot Cylinders. All pilot actuation of systems shall be accomplished using nitrogen pressure. No carbon dioxide shall be used to actuate any system.

5.8 Ancillary Equipment

A. Discharge delays shall be provided for each separate system. Use of delays of a nominal 30 or 60 seconds shall be per owner or regulatory requirements.

B. Pressure switches shall be provided for tie-in to ventilation/auxiliary alarm systems and equipment shutdown.

C. Pressure operated siren(s) shall be located in the protected space(s) to provide a pre-discharge alarm. The location and quantity of sirens shall be sufficient to provide distinct notification of system actuation while shipboard equipment is operating.

D. All discharge delays, pressure switches and sirens shall be operated by dry nitrogen only.

5.9 Pipe Network

A. Distribution piping and fittings shall be installed in accordance with, approved marine piping standards and FM-200 system manufacturer's requirements. Welding procedures and welders must be certified to applicable marine standards.

6. SUBMITTALS

6.1 Engineered Design Drawings

A. The factory-authorized Kidde Fire Systems Distributor shall provide all required installation drawings per NFPA 2001 and any applicable marine regulatory body.

6.2 Flow Calculation Reports

A. The contractor shall provide the following information in the flow calculation report.

1. Customer Information and Project Data
2. Enclosure Information – at a minimum enclosure information is to include Minimum and adjusted design concentrations, Minimum and maximum enclosure temperatures, minimum agent required and volume of enclosures, including non-permeable volume if applicable.
3. Agent information – at a minimum, agent information is to include Cylinder size and part number, quantity of cylinders, main and / or reserve cylinders, pipe take off direction.
4. Pipe network information – at a minimum, pipe network information is to include pipe type, pipe diameter, pipe length, change in direction or 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 size, nozzle type and nozzle orifice area.
5. Detailed list of all Pipes and Pipe Fittings designed in the pipe network**.**

7. SYSTEM INSTALLATION AND COMMISSIONING

7.1 FM-200 Fire Suppression System Equipment

A. The contractor shall install the system in accordance with the manufacturer's installation, operation and maintenance manual. and those indicated on the system drawings. Integrity of the protected spaces shall be verified as part of the installation process. The contractor shall be responsible for the acceptance of the system by the owner, owner's representative and any applicable marine inspector/surveyor. All program management shall be supervised by NICET IV Special Hazards certificate holder.

7.2 Training Requirements

A. The contractor shall be certified and trained by the manufacturer on installation, design and maintenance of the Kidde ADS, FM-200 fire suppression systems.

7.3 Routine Maintenance

A. Routine maintenance shall be performed as recommended by the manufacturer's installation, operation and maintenance manual. At a minimum the routine maintenance will include the following:

1. Visual Check of Pipe network and distribution nozzles per the operation and maintenance manual.
2. Weight and pressure of the FM-200 Agent cylinder per the operation and maintenance manual.
3. Inspect all cylinders and equipment for damage per the operation and maintenance manual.

8. CONTRACTOR RESPONSIBILITY

8.1 The contractor will be responsible for the total supply, installation for the FM-200 System. The "turn key" approach will require the contractor to provide at a minimum the following:

A. Procure all system hardware.

B. Procure all installation materials, i.e.: pipe, fittings, hangers, clamps, wire/cable.

C. Provide all bulkhead / deck penetrations and foundations.

D. Provide all needed installation services - freight, storage on site, lifts, water, air, fire watch, electrical service and electrical tie-ins for pressure switches.

E. Provide all installation labor to install, train and test to satisfaction of owner and regulatory bodies.

F. Contractor will maintain all work areas in an orderly / clean manner. Debris removal by contractor.