DESIGN ENGINEER & ARCHITECT SPECIFICATION

AMEREX CORPORATION

CPS FM-200® WATERLESS FIRE SUPPRESSION SYSTEM

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VERSION 3.5 – July 2014

DESIGN ENGINEER AND ARCHITECT SPECIFICATION FOR

AMEREX CORPORATION CPS (Clean Agent Pre-Engineered System)
WATERLESS FIRE SUPPRESSION Featuring FM-200®

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SECTION 1 - GENERAL

1.1 SCOPE

This specification outlines the requirements for the design and installation of a pre-engineered AMEREX CPS total flooding fire suppression system with automatic detection and control. The work described in the specification includes design, labor, materials, equipment, and services required to install and test the suppression system.

1.2 APPLICABLE STANDARDS AND PUBLICATIONS

The design, installation, testing and maintenance of the CPS Waterless Fire Suppression Systems shall be in accordance with the requirements set forth in the current editions of the following codes and standards. The standards listed, as well as all other applicable codes, standards, and good engineering practices, shall be used as “minimum” design standards.

(1) NFPA 2001 - Standard for Clean Agent Fire Extinguishing Systems
(2) NFPA 70 - National Electrical Code
(3) NFPA 72 - National Fire Alarm Code
(4) UL 2166 - Standard for Halocarbon Clean Agent Extinguishing System Units
(5) Factory Mutual Approval Guide
(6) Requirements of the Authority Having Jurisdiction (AHJ)

1.3 REQUIREMENTS

The CPS suppression system installation shall be made in strict accordance with the CPS Design, Installation, Maintenance, and Recharge Manual; drawings; specifications; and applicable standards.

1.4 QUALITY ASSURANCE

1.4.1. HARDWARE MANUFACTURER

a) The manufacturer of the suppression system hardware and detection components shall be ISO 9001 and ISO 14001 registered.

b) All devices, components and equipment shall be the products of the same manufacturer.

c) All devices and equipment employed shall be Underwriters Laboratories (UL) listed and/or Factory Mutual (FM) approved.

d) The waterless fire suppression system shall meet the criteria for credit under the US Green Building Council's Leadership in Energy and Environmental Design (LEED®) rating system and the criteria for the greening of healthcare facilities under the guidelines of the Green Guide for Health Care program (GGHC).

1.4.2 INSTALLER

a) The installing contractor shall be trained by the suppression system hardware manufacturer to design, install, test and maintain the fire suppression systems and shall submit a copy of a current and valid Certificate of Training issued by the suppression system manufacturer to the system Owner, the architect/engineer and all authorities having jurisdiction before commencing installation.

1.5 SUBMITTALS

1.5.1 The installing contractor shall submit the following design information and drawings for approval prior to commencing work on this project:

a) Installation layout drawings detailing the quantity, location, and marking of all system components, including, but not limited to, agent storage tanks, nozzles, pipe runs including pipe sizes and lengths, control panel(s), detectors, manual pull stations, abort stations, audible and visual alarms.

b) Electrical layout drawings shall show the location of all devices and include point-to-point wiring schematic and a description of the method(s) used for detector mounting.

c) A complete sequence of operation shall be submitted detailing all alarm devices, remote signaling, time delay and agent discharge for each zone or system.

f) Information outlining the operation and maintenance procedures required of the system Owner.

1.5.2 The installing contractor shall submit drawings and system components data sheets for approval to the system Owner and all authorities having jurisdiction before commencing installation. Approved plans should be submitted to the architect/engineer for record.

SECTION 2 - SYSTEM REQUIREMENTS

2.1 SYSTEM DESCRIPTION AND OPERATION

2.1 .1 The system shall be a total flooding AMEREX CPS waterless fire suppression system.

2.1.2 The system shall provide an FM-200® agent minimum design concentration of 7% by volume for Class A hazards in all areas and/or protected spaces, at the minimum anticipated temperature within the protected area. System designs shall not exceed 10.5% for normally occupied spaces, adjusted for maximum space temperature anticipated, with provisions for room evacuation prior to agent release.

2.1.3 The system discharge time shall not exceed 10 seconds in accordance with the NFPA 2001 Standard for Clean Agent Fire Extinguishing Systems.

2.1.4 The CPS suppression system shall include a detection and control system with provision for both pre-alarm and automatic agent release.

2.1.5 The system shall be actuated by photoelectric smoke detectors. The detection system shall employ cross-zoned detection as specified by the hardware manufacturer and the appropriate authority having jurisdiction. A single detector activation shall cause an alarm signal to be generated; a second detector activation shall generate a pre-discharge signal and start the pre-discharge condition.

2.1.6 The FM-200® extinguishing agent shall be stored in modular or central storage steel alloy containers compliant with DOT Specification 4BW-500. The storage containers shall be equipped with safety rupture disks and each container shall have a pressure gauge to provide visual supervision of the container pressure and a factory installed low pressure supervisory switch.

2.2 MATERIALS AND EQUIPMENT

2.2.1 GENERAL REQUIREMENTS

All components of the AMEREX CPS system shall be UL listed and FM approved as compatible components of a system.

2.2.3 AMEREX CPS AGENT STORAGE AND DISTRIBUTION

a) The fire suppression agent shall be FM-200®, supplied by DuPont (previously Chemtura Corporation, formerly Great Lakes Chemical) and shall meet the requirements of UL Component Recognition and the requirements of NFPA 2001.

b) FM-200® shall be stored in modular or central storage steel alloy containers compliant with DOT Specification 4BW-500, and shall be equipped with safety rupture disks. Containers shall be super-pressurized with dry nitrogen to an operating pressure of 360 psig at 70°F.

c) Each system shall have its own supply of clean agent.

d) Each supply shall be located within the hazard area, or as near as possible, to reduce the amount of pipe and fittings required to install the system.

e) Each tank will be piped to its nozzle or nozzle set independently of any other tank and tanks will not be connected to a common manifold.

f) Discharge nozzles shall be installed within the manufacturer's guidelines to distribute the FM-200® agent throughout the protected space(s). The nozzles shall be designed to provide proper agent

quantity and distribution and shall have a UL Listed and FM Approved nozzle range (radius) of 44 feet from each nozzle orifice. Nozzle spacing shall be in accordance with the UL listing and FM approval.

g) All discharge nozzle configurations; corner, sidewall and center must have the ability to be installed in either upright or pendent positions depending on system design.

h) Distribution piping and fittings shall be installed in accordance with the manufacturer's requirements, NFPA 2001, and approved piping standards and guidelines. Pipe and fittings shall meet the requirements of the AMEREX CPS UL listings. All distribution piping shall be installed by qualified individuals using accepted practices and quality procedures. All piping shall be adequately supported and anchored at all directional changes and nozzle locations.

i) All piping shall be thoroughly reamed after cutting, and all oil and/or chips shall be removed. Pipe threads shall be coated with Teflon tape or an appropriate joint compound applied to the male thread only.

j) All pilot agent containers shall be activated by either, an electrical manual discharge station, an automatic device or devices, or by direct mechanical actuation.

k) Any additional agent containers shall be actuated pneumatically using the pressure from the pilot tank.

2.2.4 CONTROL SYSTEM

a) The control system and its components shall be UL Listed and/or FM approved, and shall conform to the specifications of the control panel manufacturer.

b) The control panel shall be cross listed for use with the Amerex Supervised Electric Actuator.

c) When the supervised electric actuator is removed from the discharge valve the supervisory switch will activate an audible and visual notification on the control panel.

d) The control panel shall be programmable such that an adequate alarm pre-discharge and manual release pre-discharge period can be set.

e) The control system shall perform all functions necessary to operate the system detection, actuation and auxiliary functions.

f) The control system shall include battery standby power to support a minimum 24 hours in standby and 5 minutes in alarm.

g) The control system shall be capable of supporting cross-zone detection.

h) The control system shall offer two releasing circuits.

2.2.5 SMOKE DETECTORS

The smoke detectors shall be spaced and installed in accordance with the manufacturer's specifications and the guidelines of NFPA 72.

a) The detection system shall employ cross-zoned detection as specified by the hardware manufacturer and the appropriate authority having jurisdiction.

b) Detector area of coverage shall be 250 square feet or less.

c) A single detector activation shall cause an alarm signal to be generated; a second detector activation shall generate a pre-discharge signal and start the pre-discharge condition.

2.2.6 MANUAL RELEASE

a) A manual release station shall be located at each exit from the protected hazard.

b) The manual release switch or manual pull station shall be a dual action device requiring two distinct operations to initiate a system actuation.

2.2.7 ABORT STATION

a) An abort switch shall be provided at a primary path of egress.

b) Operation of the abort station shall send a "system aborted" indication to the control panel and offer a minimum reset discharge countdown of ten seconds.

c) Abort station should be placed in close proximity to the Control Panel.

2.2.8 RELEASE DISABLE SWITCH

a) Each releasing circuit shall have a Keyed Release Disable Switch to allow system maintenance and test without discharge.

b) Switches should be placed in close proximity to the Control Panel.

2.2.9 AUDIBLE AND VISUAL ALARMS

a) Electrically actuated fire alarms, both audible and visible, shall be furnished and installed. All alarm devices shall be UL listed and/or FM approved.

b) Alarms device shall be adequate to alert personnel located in the protected areas.

c) A horn/strobe device shall be placed outside of the protected space above each exit door.

2.2.10 CAUTION AND ADVISORY SIGNS

a) Caution and advisory signs are required at each entrance/exit to a protected space.

2.2.11 SYSTEM AND CONTROL WIRING

a) AMEREX CPS fire suppression systems wiring shall be installed by the contractor.

b) All wiring shall be installed by qualified individuals to conform to the National Electric Code, Article 725, and Article 760, except as otherwise permitted for limited energy circuits, as described in NFPA 72. Wiring installation shall meet all local, state, province and/or country codes.

c) Power limited 24 VDC circuits shall be wired using factory provided assemblies consisting of 4-conductor 18 AWG CMP cables and non-power limited circuits shall be wired using factory assemblies consisting of 2-conductor 18 AWG NPLF cables. All cable assemblies shall have a keyed locking male connector on one end and a keyed locking female connector on the other end. The connector housing shall have a flammability rating of 94V-0 and gold plated terminals.

d) The complete system electrical installation, and all auxiliary components, shall be connected to earth ground in accordance with the National Electric Code.

SECTION 3 - **SEQUENCE OF OPERATION**

The system shall be designed and installed such that it is activated by two detectors in alarm. The automatic operation of each protected area shall be as follows:

3.1 CROSS-ZONE DETECTION

In the case of cross-zone detection,

(1) Actuation of any one detector shall:
   a) Illuminate an “ALARM” indicator on control panel face.
   b) Energize an alarm bell.
   c) Perform necessary control functions such as HVAC equipment shutdown.
   d) Close all doors leading into the protected area.

(2) Actuation of a second detector shall:
   a) Illuminate a “PREDISCHARGE” indicator on control panel face.
   b) Energize a pre-discharge alarm.
   c) Perform necessary control functions such as HVAC equipment shutdown.
   d) Actuate a time delay sequence and enable the system abort sequence.
   e) After completion of the time-delay sequence, discharge the agent.

SECTION 4 - **TESTING AND DOCUMENTATION**

4.1 SYSTEM INSPECTION AND CHECKOUT

The final test and acceptance shall be conducted in the presence of the system Owner’s representative and governing authorities.

a) Tests shall demonstrate that the entire control system functions as intended. Automatic discharge, manual discharge, equipment shutdown, and alarm devices shall be tested.

b) All containers and distribution piping shall be checked for proper mounting and installation.

c) All electrical wiring shall be tested for proper connection, continuity and resistance to earth.

d) An inspection shall be made to ensure that all required dampers, door bottom seals, weather-stripping, caulking and foam sealant have been installed and that the areas protected shall contain the FM-200® for 10 minutes or until emergency response arrives on site.

4.2 TRAINING REQUIREMENTS

Prior to final acceptance, the installing contractor shall provide operational training to each shift of the owners personnel. The training shall address emergency procedures, abort functions, control panel operation, troubleshooting and safety requirements.

4.3 OPERATION AND MAINTENANCE

Prior to final acceptance, the installing contractor shall provide the CPS System Owner's Manual to the system Owner.

4.4 AS-BUILT DRAWINGS

Upon completion of each system, the installing contractor shall provide copies of the system "as-built" drawings to the system owner.

4.5 SYSTEM INSPECTIONS

The installing contractor shall meet with the system Owner to discuss future required maintenance inspections, as per National and local code requirements, of each system installed under this contract.