


<p>July 1, 2010</p>	<p><b>SANTA ROSA FIRE DEPARTMENT</b>  <b>FIRE PREVENTION BUREAU STANDARD</b></p>
	<p><b>CLEAN AGENT FIRE EXTINGUISHING SYSTEM</b>  <b>NFPA 2001</b></p>

**PURPOSE**

This standard outlines the general requirements for the installation and maintenance of Clean Agent Fire Extinguishing Systems – NFPA 2001. Information contained herein applies to typical instances and may not address all circumstances.

Certain hazards within office, industrial, commercial and institutional facilities require special attention. These hazards include computer rooms, clean rooms, telephone switches, art and historical applications and any facility where water damage from sprinklers must be avoided. Unlike water, the clean agents are nonconductive, meaning they can be used without damaging electronic components. A variety of approaches and chemicals are available to provide a custom solution to these special hazards.

There are several clean agents on the market that are referenced by National Fire Codes. Clean Agent Fire Extinguishing Systems are designed to extinguish fires in their incipient stage, well before enough heat builds up in a room to activate a sprinkler system. Extinguishing a blaze before sprinklers are activated not only limits fire and smoke damage, but also avoids unnecessary water damage to sensitive materials or equipment.

**CODE REFERENCES**

- 2007 California Building Code (CBC)
- 2007 California Fire Code (CFC)
- NFPA 72, 2007
- NFPA 2001, 2008

**PERMIT(S) REQUIRED**

For the installation of a Clean Agent Fire Extinguishing System there are two permits that are required: One for a Fixed Extinguishing System and One for a Fire Alarm System Installation (Minor Fire Alarm Modification and Repair). Categories and fee amounts are found at:

<http://ci.santa-rosa.ca.us/doclib/Documents/IB%20018.pdf>

**ATTACHMENTS**

- 1) Plan Review Checklist – Clean Agent Fire Extinguishing System NFPA 2001
- 2) Inspection Checklist – Clean Agent Fire Extinguishing System NFPA 2001

**REQUIRED INSPECTIONS**

- 1) Review Mechanical Components – nozzle and piping placement, support of nozzles and piping, agent storage tank placement, support for tank, pressure testing of piping and a flow test with nitrogen or another inert gas to insure the piping and nozzles are unobstructed – NFPA 2001 Ch. 7 – section 7.7.2.2.

Standard  
Clean Agent Suppression System

- 2) Review Enclosure Integrity – Test to ensure system is capable of holding the designed agent concentration levels for the specified holding period and correct any significant air leaks that could result in a failure of the enclosure – NFPA 2001 Ch. 7 – section 7.7.2.3.
- 3) Review Electrical Components – verification all wiring systems are installed properly and in compliance with local codes and drawings, back up power supply with minimum of 24 hour stand-by energy, verification of shut down of air-handling units, alarm sounding or displaying devices, and power shut down shall be checked. Verification of proper detector and manual pull station placement. Manual pull stations shall require two separate and distinct actions for operation. Abort switches are tested and verified for operation to monitoring panel. The control unit shall be properly installed and readily accessible – NFPA 2001 Ch. 7 – section 7.7.2.4.
- 4) Preliminary Functional Testing – test the fire alarm monitoring equipment to verify dispatch notification, verify the release mechanism activates the release circuit – take care not to release the agent, check each detector for proper response, check for polarity and auxiliary relays, check that end of line resistors have been installed across the alarm bell circuit where required and check all supervised circuits for proper trouble response – NFPA 2001 Ch. 7 – section 7.7.2.5.1.
- 5) System Functional Operational Test – operate detection initiating circuit(s) and verify all alarm functions occur according to design, operate a second alarm circuit to verify all second alarm functions occur according to design, operate manual release, operate the abort switch circuit and confirm that audible and visual supervisory signals are received at the control panel, if possible without damaging equipment or releasing agent test all valves and test all pneumatic equipment – NFPA 2001 Ch. 7 – section 7.7.2.5.2.
- 6) Remote Monitoring Operation – test input devices while on stand-by power and verify that an alarm signal is received at remote panel after device is operated. Operate each type of alarm condition on each signal circuit and verify receipt of trouble condition at the remote station.
- 7) Control Panel Primary Power Source – verify that the control panel is connected to a dedicated circuit and labeled properly. The panel should be readily accessible, yet restricted from unauthorized personnel. Test a primary power failure in accordance with the manufacture’s specification with the system fully operated on stand-by power.
- 8) Return of System to Operational Condition – Upon completion of all pre-discharge testing systems shall be returned to their fully operational design condition.

Inspections shall be scheduled a minimum of 48 hours in advance. Directions for scheduling are found at: <http://ci.santa-rosa.ca.us/news/Pages/AutomatedFireInspectionRequestSystem.aspx>

**PERMIT INFORMATION**

Clean Agent Fire extinguishing Systems shall be designed and installed in accordance with NFPA 2001, 2008 Edition.

Working plans shall be submitted for approval to the Santa Rosa Fire Department before any equipment is installed. A completed Permit and Plan Review Application Form and fee shall be submitted along with not less than three (3) sets of plans and calculations as required. A Santa Rosa Tax Certificate, current appropriate contractor's license and proof of worker's compensation insurance shall be provided or shall be on file at the time of application.

Any deviation from plans as submitted during the installation requires Fire Department approval. Plans shall include the information specified below and failure to provide all of the required information may result in the plans

Standard  
Clean Agent Suppression System

being rejected. Rejected plans will be returned with a Plan Review Correction Form. Review the form and make the required additions/changes which shall be clouded for identification. Provide a legend to describe the addition or change. Allow ten (10) working days for review of submitted plans.

Working plans shall be drawn to an indicated scale, on sheets of uniform size, with a plan of each floor and shall show the following data:

- Name of owner and occupant.
- Location, including street address.
- Point of compass and symbol legend.
- Location and construction of protected enclosure walls and partitions.
- Location of fire walls
- Enclosure cross section, full height of schematic diagram, including location and construction of building floor/ceiling assemblies above and below, raised access floor and suspended ceiling.
- Agent being used.
- Design extinguishing or inerting concentrations.
- Description of occupancies and hazard being protected, designating whether or not the enclosure is normally occupied.
- For an enclosure protected by a clean agent fire extinguishing system an estimate of the maximum positive and negative pressure, relative to ambient pressure, expected to be developed upon the discharge of agent.
- Description of exposures surrounding the enclosure.
- Description of the agent storage containers used including internal volume, storage pressure, and volume at standard conditions of temperature and pressure.
- Description of nozzles used including size, orifice port configuration and equivalent orifice area.
- Description of pipe and fittings used including material specifications, grade and pressure rating.
- Description of wire or cable used including classification, gauge, shielding, number of strands in conductor, conductor material, and color coding schedule. Segregation requirements of various system conductors shall be clearly indicated. The required method of making wire termination shall be detailed.
- Description of the method of detector mounting.
- Equipment schedule or bill of materials for each piece of equipment or device showing name, manufacture, model or part number, quantity and description.
- Plan view of protected area showing enclosure partitions (full and partial height); agent distribution system including agent storage containers, piping and nozzles; type of pipe hangers and rigid pipe supports;

Standard  
Clean Agent Suppression System

detection, alarm, and control system including all devices and schematic of wiring interconnection between them; end of line device locations; location of controlled devices such as dampers and shutters; and instructional signage.

- Isometric view of agent distribution system showing the length and diameter of each pipe segment; node reference numbers relating to the flow calculations; fittings including reducers and strainers; and orientation of tees, nozzles including size, orifice port configuration, flow rate and equivalent orifice area.
- Scale drawing showing the layout of the annunciator panel graphics.
- Detail of each unique rigid pipe support configuration showing method of securement to the pipe and the building structure.
- Detail of the method of container securement showing method of securement to the container and the building structure.
- Complete step-by-step description of the system sequence of operations, including functioning of abort and maintenance switches, delay timers, and emergency power shut down.
- Point-to-point wiring schematic diagrams showing all circuit connections to external or add-on relays.
- Complete calculations to determine enclosure volume, quantity of clean agent, and size of backup batteries and method used to determine number and location of audible and visual indicating devices, and number and location of detectors.
- Details of any special features.
- Pressure relief vent area, or equivalent leakage area, for the protected enclosure to prevent development, during system discharge, of a pressure difference across the enclosure boundaries that exceeds a specified enclosure pressure limit.