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# SECTION 21 13 13

# WET PIPE FIRE SPRINKLER SYSTEMS

# Corrosion Management DESIGN CRITERIA

**PART 1 GENERAL**

1.01 DESCRIPTION OF WORK

1. Provide all required labor, materials, equipment and services necessary for a complete and operational Corrosion Management Program for the fire protection system(s) (FPS) as hereinafter described [and as indicated on the drawing(s)].
2. Basis of Design: Engineered Corrosion Solutions.
3. Corrosion Management Work may include the following listed products and services:
	1. Corrosion Management Products must be as specified herein:
4. Automatic Air Vent (mechanical)
5. Automatic Air Vent – Supervised (mechanical)
6. Automatic Air Vent (electric)
7. Nitrogen Inerting Vent
8. Nitrogen Inerting Vent - Supervised
9. Remote Inerting Station
10. In-Line Corrosion Detector
11. Nitrogen Inerting Start-up Kit
12. Handheld Gas Analyzer
	1. Installation of corrosion management products.
	2. Miscellaneous piping, fittings, couplings, valves, etc. as required.
	3. Coordination of work and schedules with other trades.
	4. System pressure testing.
	5. System commissioning.

1.02 REFERENCES

1. All corrosion management work must be designed, installed, inspected, tested and maintained in accordance with all applicable codes, referenced standards, documents listed herein, the manufacturer’s instructions and the provisions of this specification:
2. NFPA 13, Standard for Installation of Sprinkler Systems
3. NFPA 25, Standard for the Inspections, Testing, and Maintenance of Water-Based Fire Protection Systems
4. All corrosion Monitoring Devices must be provided to achieve compliance with Section 23.1.5.2 (4) of the 2010 Edition [24.1.5.2 (4) of the 2013 / 2016 Edition] [5.1.5.2 of the 2019 Edition] of NFPA 13, Standard for the Installation of Sprinkler Systems and shall be U.L. 2987 listed for monitoring corrosion in fire sprinkler systems.

1.03 QUALITY ASSURANCE

1. Equipment and components not specifically specified must be FM Approved or listed by Underwriter's Laboratories, Inc. for FPS installation.
2. All fire sprinkler system components must be installed free of rust/corrosion or visible damage. All items not complying with this requirement shall be replaced without cost to the Owner.

1.04 REGULATORY REQUIREMENTS

1. All work must meet the requirements of Section 1.02, References.
2. The fire sprinkler contractor must not pursue any interpretations of the Corrosion Management Program except through the Engineer.

1.05 PERFORMANCE CRITERIA

1. Automatic Air Vent Requirements (mechanical) [**NOTE:** Select either automatic air vent (mechanical), automatic air vent (electric), or nitrogen inerting vent]:
2. Automatic air vent must be FM 1344 Approved with 175 psi rated working pressure.
3. Provide at least one automatic air vent per automatic fire sprinkler system.
4. Install vent at or near the remote high point of the FPS piping.
5. Piping between FPS and automatic air vent must not create a water trap.
6. The automatic air vent must have redundant float valves to prevent leakage from the device in the event that the primary float valve fails.
7. Automatic air vent must not require plumbing to drain.
8. Vents with drip pan or water collection device to prevent water discharge in the event that the primary float valve fails are not permitted.
9. Automatic air vent must have pressure indicating element indicating functionality of the primary float valve that is visible from the floor or below the device.
10. Automatic air vent must be in a location that provides a clear view of the pressure indicating element.
11. [**NOTE:** Include if supervised automatic air vent are included] Supervised automatic air vents must be connected to the building fire alarm system or building management system to monitor the pressure indicating element downstream of the primary float. The connection will provide notification if the device has failed.
12. Automatic Air Vent Requirements (electric) [**NOTE**: Select either automatic air vent (mechanical), automatic air vent (electric), or nitrogen inerting vent]:
13. Electric automatic air vent must be capable of operating with 175 psi rated working pressure.
14. Provide at least one (1) vent per automatic fire sprinkler system.
15. Install vent at or near the remote high point of the FPS piping.
16. Piping between FPS and automatic air vent must not create a water trap.
17. Automatic air vent with drip pan or water collection device to prevent water discharge in the event that the primary float valve fails are not permitted
18. Automatic air vent must be compatible with nitrogen inerting.
19. Automatic air vent must include pressure relief device rated at 40 psi to prevent loss of nitrogen gas during nitrogen inerting.
20. Vent must be equipped with a solenoid valve and separate electric control box.
21. Vent needs to include a nitrogen injection port when used with nitrogen inerting.
22. [**NOTE**: Include when nitrogen inerting FPS] Install nitrogen injection port at the riser on the system side of the control valve.
23. Nitrogen Inerting Vent [**NOTE:** Select either automatic air vent (mechanical), automatic air vent (electric), or nitrogen inerting vent]:
	1. Nitrogen inerting vent must be FM 1344 Approved with 175 psi rated working pressure.
	2. Provide at least one (1) nitrogen inerting vent per automatic fire sprinkler system.
	3. Install nitrogen inerting vent at or near the remote high point of the FPS piping.
	4. Piping between FPS and nitrogen inerting vent must not create a water trap.
	5. Nitrogen inerting vent must have redundant float valves to prevent leakage from the device in the event that the primary float valve fails.
	6. Nitrogen inerting vent must not require plumbing to drain.
	7. Nitrogen inerting vent with drip pan or water collection device to prevent water discharge in the event that the primary float valve fails are not permitted.
	8. Nitrogen inerting vent must have pressure indicating element indicating functionality of the primary float valve that is visible from the floor or below the device.
	9. Nitrogen inerting vent must be in a location that provides a clear view of the pressure indicating element.
	10. Nitrogen inerting vent must include pressure relief device rated at 40 psi to prevent loss of nitrogen gas during nitrogen inerting.
	11. Nitrogen inerting vent includes a nitrogen injection port to allow nitrogen delivery to the FPS.
	12. Install nitrogen injection port at the riser on the system side of the control valve.
	13. [**NOTE:** Include if supervised nitrogen inerting vent is required and automatic monitoring is specified.] The supervised model must be connected to the building fire alarm system or building management system to monitor the pressure indicating element downstream of the primary float to notify if the device has failed.
24. Remote Inerting Station: [**NOTE**: Only for use with nitrogen inerting vent]
	* + 1. Furnish and install a remote inerting station that allows for nitrogen inerting functions of the nitrogen inerting vent to be provided at an easily accessible location.
			2. Install inerting station on a wall or vertical surface near the vent assembly at an accessible location.
			3. The remote inerting station must include connections for system exhaust gas, gas purity sampling, and y-strainer purging from the nitrogen inerting vent.
			4. The connection for the y-strainer purge line must be rated to operate under normal system pressure.
25. Corrosion Activity Monitoring Equipment - ILD [**NOTE:** Include this section if corrosion monitoring equipment is included in this project] [**NOTE:** Select either ILD or CMS and CMP corrosion monitoring option]
26. Corrosion monitoring must be integral to the wet pipe piping system, i.e. installed as a part of the piping network where trapped water is most likely to exist.
27. The ILD must be U.L. 2987 listed for use in a fire sprinkler system.
28. Corrosion monitoring equipment must not create any obstruction within the wet pipe piping system.
29. System must provide for an in-situ “early warning” corrosion monitoring system that provides a signal alert to indicated that the corrosion activity within the wet pipe system piping has exceeded the acceptable limits.
30. Corrosion monitoring equipment must provide measure of corrosion activity that matches the wet pipe system piping for composition and schedule (e.g. black steel or galvanized steel, schedule 10 or schedule 40).
31. Early warning signal must communicate in one of the following ways:
	* + - 1. Signal to the fire alarm panel
				2. Signal to the building management system
				3. Local signal (LED or audible) alarm
32. Nitrogen Inerting Start-up Kit: [**NOTE:** Only for use with Nitrogen Inerting Vent]
	1. Provide nitrogen inerting start-up kit per building or as directed by design engineer.
	2. Nitrogen inerting start-up kit includes a nitrogen cylinder pressure regulator, 300 psi rated gas delivery hose, and quick-connect fittings for hose attachment to the nitrogen injection port.
33. Handheld Gas Analyzer:
	1. Handheld gas analyzer must be equipped with a quick connect fitting compatible with gas sampling ports on nitrogen generation equipment.
	2. Sensing element in the handheld gas analyzer must have a minimum useful life of two (2) years.

**PART 3 EXECUTION**

3.01 COORDINATION WITH OTHER TRADES

1. Coordinate closely with the General Contractor, other trades and the Owner to expedite construction, commissioning and treatment and avoid interference.

3.02 SUPERVISION AND TRAINING

1. [**NOTE:** Include when nitrogen inerting is included in the project] Provide on-site Commissioning Services Package from the equipment manufacturer. Commissioning Services Package shall include a manufacturer’s certified representative on-site for a minimum of one (1) day to verify the installation of the equipment and provide training to the Owner and Owner’s Representative.
2. Provide one (1) printed copy and an electronic file of the Owner’s Operation and Maintenance Manual for all corrosion control equipment. Owner’s Manual must include protocols for operation and maintenance of all equipment installed as part of this scope of work.

3.02 CORROSION PRODUCTS/SYSTEM COMMISSIONING PROTOCOL

1. Wet Pipe FPS [**NOTE**: Select applicable statements based on scope of work]:
2. All venting devices must be connected to the FPS using a piping arrangement that will not create a water trap. The devices and the connecting piping must drain when the FPS is drained.
3. [**NOTE:** Include if Automatic Air Vent is included in the project]The fire sprinkler contractor must confirm the automatic air vent is installed at the location indicated by the approved shop drawings (at a remote high point of the FPS). The pressure indicating element must be clearly in view from directly below
4. [**NOTE:** Include if Nitrogen Inerting Vent is included in the project]The fire sprinkler contractor must confirm the nitrogen inerting vent is installed at the location indicated by the approved shop drawings (at a remote high point of the FPS). The pressure indicating element must be clearly in view from directly below.
5. [**NOTE:** Include if Nitrogen Inerting Vent is included in the project] The fire sprinkler contractor must confirm the nitrogen injection port has been installed at the fire sprinkler riser and the ball valve has been left in the closed position.
6. [**NOTE:** Include if Nitrogen Inerting Vent is included and plant nitrogen is not available in the project]The fire sprinkler contractor must supply nitrogen gas for the purpose of nitrogen inerting.
7. [**NOTE:** Include if In-Line Corrosion Detector is included in the project]The fire sprinkler contractor must confirm the in-line corrosion detector is installed correctly and the pressure switch has been wired to the specified monitoring system.
8. The fire sprinkler contractor, before the final filling of the FPS with water, shall open the isolation ball valve on the vent devices to ensure as much trapped gas is released from the system as possible. Upon filling the FPS with water the isolation ball valve shall remain in the open position.
9. [**NOTE:** Include when nitrogen inerting is included in the project] The fire sprinkler contractor must coordinate with the equipment manufacturer to schedule the on-site commissioning package at a time that has been coordinated with the General Contractor, Owner and Owner’s Representative.
10. [**NOTE:** Include when nitrogen inerting is included in the project] Complete nitrogen inerting protocol must be provided as part of equipment manufacturer’s Consulting Services Package.

**END CORROSION MANAGEMENT SPECIFICATION INSERTS**