

PART 1 - GENERAL

<u>1.1 RELATED SECTIONS</u>	.1	Section 21 13 14 - Nitrogen Generation Corrosion Inhibiting System.
<u>1.2 REFERENCE STANDARDS</u>	.1	National Fire Protection Association (NFPA) .1 NFPA 13-2016, Standard for the Installation of Sprinkler Systems. .2 NFPA 25-2017, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.
<u>1.3 ACTION AND INFORMATIONAL SUBMITTALS</u>	.1	Product Data: .1 Provide manufacturer's printed product literature and data sheets for equipment and systems, applicable series designation or style and include product characteristics, performance criteria, physical size, finish and limitations.
	.2	Shop Drawings: .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Newfoundland and Labrador.
	.3	Test reports: .1 Test hydrostatically to meet requirements of fire protection system to which it will be connected.
	.4	Certificates: .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
	.5	Manufacturers' Instructions: .1 Instructions: provide manufacturer's installation instructions.
	.6	Field Quality Control Submittals: .1 Manufacturer's Field Reports: submit manufacturer's field reports specified.

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| <u>1.4 CLOSEOUT
SUBMITTALS</u> | .1 | Provide detailed hydraulic calculations including: summary sheet, Contractor's Material and Test Certificate for aboveground piping, as well as other deliverables for incorporation into manual in accordance with NFPA 13. |
| <u>1.5 QUALITY
ASSURANCE</u> | .1 | Qualifications:
.1 Installer: company or person specializing in dry sprinkler systems with documented experience. |
| | .2 | Supply grooved joint couplings, fittings, valves, grooving tools and specialties from a single manufacturer. Use date stamped castings for coupling housings, fittings, valve bodies, for quality assurance and traceability. |
| <u>1.6 MAINTENANCE
MATERIAL SUBMITTALS</u> | .1 | Extra Materials:
.1 Provide spare sprinklers and tools in accordance with NFPA 13. |
| <u>1.7 DELIVERY,
STORAGE AND
HANDLING</u> | .1 | Delivery and Acceptance Requirements:
.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address. |

PART 2 - PRODUCTS

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| <u>2.1 ENGINEERING
DESIGN CRITERIA</u> | .1 | Design automatic dry pipe fire suppression sprinkler systems in accordance with required and advisory provisions of NFPA 13, by hydraulic calculations for uniform distribution of water over design area. Design shall incorporate a 34 kPa (5 PSI) safety factor for all calculations. |
| | .2 | Include with each system materials, accessories, and equipment inside and outside building to provide each system complete and ready for use. |
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2.1 ENGINEERING
DESIGN CRITERIA
(Cont'd)

- .3 Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts and other construction and equipment in accordance with detailed shop drawings.
 - .4 Locate sprinkler heads in consistent pattern with ceiling grid, lights, and air supply diffusers.
 - .5 Devices and equipment for fire protection service: ULC approved for use in dry pipe sprinkler systems.
 - .6 Location of Sprinkler Heads:
 - .1 Locate heads in relation to ceiling and spacing of sprinkler heads not to exceed that permitted by NFPA 13.
 - .2 Uniformly space sprinklers on branch.
 - .7 Water Distribution:
 - .1 Make distribution uniform throughout the area in which sprinkler heads will open.
 - .2 Discharge from individual heads in hydraulically most remote area to be 100% of specified density.
 - .8 Density of Application of Water:
 - .1 Size pipe to provide specified density when system is discharging specified total maximum required flow.
 - .9 Sprinkler Discharge Area:
 - .1 Area: hydraulically most remote area as defined in NFPA 13.
 - .10 Outside Hose Allowance:
 - .1 Include allowance in hydraulic calculations of for outside hose streams as defined in NFPA 13.
 - .11 Friction Losses:
 - .1 Calculate losses in piping in accordance with Hazen-Williams formula with "C" value of 100 for steel piping.
 - .12 Design system in accordance with NFPA 13, using following parameters:
 - .1 Hazard:
 - .1 Ordinary group 1.
 - .2 Pipe size and layout:
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- 2.1 ENGINEERING DESIGN CRITERIA
(Cont'd)
- .12 (Cont'd)
- .2 (Cont'd)
- .1 Hydraulic design.
- .2 Sprinkler head layout: to NFPA 13.
- .3 Water Supply:
- .1 Static Pressure:503 kPa (73 psi).
- .2 Water Flow:3630 LPM (959 GPM).
- .3 Residual Pressure: 400 kPa (58 psi).
- .4 Hydrant flow test to verify water supply shall be performed in accordance with NFPA 291. Report findings to Departmental Representative.
- 2.2 PIPE, FITTINGS AND VALVES
AND VALVES
- .1 Pipe:
- .1 Ferrous: to NFPA 13.
- .2 Copper tube: to NFPA 13.
- .2 Fittings and joints to NFPA 13:
- .1 Ferrous: screwed or roll grooved.
- .1 Grooved joints designed with two ductile iron housing segments, flush seal gasket for dry service, and zinc-electroplated steel bolts and nuts. Cast with offsetting angle-pattern bolt pads for rigidity and visual pad-to-pad offset contact.
- .2 Copper tube: screwed, soldered, grooved.
- .3 Auxiliary valves:
- .1 ULC listed for fire protection service.
- .2 Up to NPS 2: bronze, screwed ends, grooved, OS & Y gate.
- .3 NPS 2 1/2 and over: cast or ductile iron, flanged or roll grooved ends, indicating butterfly valve.
- .4 Swing or spring-actuated check valves.
- .5 Tamper devices wired back to fire alarm panel.
- .4 Pipe hangers:
- .1 ULC listed for fire protection services.
- 2.3 SPRINKLER HEADS
- .1 General: to NFPA 13 and ULC listed for fire services.
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2.4 SPRINKLER HEAD TYPE A .1 Recessed, concealed pendent glass bulb type.
Paint: white.

2.5 AUXILIARY SUPERVISORY SWITCHES .1 General: to NFPA 13 and ULC listed for fire service.

.2 Valves:
.1 Mechanically attached to valve body, with normally open and normally closed contacts and supervisory capability.

.3 Flow switch type:
.1 With normally open and normally closed contacts and supervisory capability.

.4 Pressure alarm switch:
.1 With normally open and normally closed contacts and supervisory capability.

2.6 SIGNAGE .1 To NFPA 13.

.2 Caution:
.1 Mechanically attached to all valves controlling sprinklers.

.3 General:
.1 Mechanically attached to system riser.

2.7 DRY PIPE VALVE .1 ULC listed.

.2 Cast or ductile iron, flanged or grooved end type, sized to suit water main.

.3 Components:
.1 Accelerator.
.2 Air maintenance device with low pressure alarm. (Supplied with Nitrogen Generating Corrosion System).
.3 Alarm pressure switch with supervisory capability.
.4 Pressure gauges.
.5 Drain valve.
.6 Test valve with associated piping.
.7 Shut off valve - OS & Y with tamper-proof device wired back to fire alarm panel.

- 2.7 DRY PIPE VALVE .3 (Cont'd)
(Cont'd) .8 Minimum required air pressure 90 kPa (13 psi).
- .4 Provide valve complete with internal components that are replaceable without removing valve from installed position.
- 2.8 COMPRESSED AIR .1 Automatic Air Compressor.
SUPPLY .2 ULC listed.
- .3 Capacity:
.1 To restore normal air pressure in system within 30 minutes.
.2 To provide air pressure in accordance with instruction sheet furnished with dry pipe valve.
- .4 Piping: ferrous, NPS 3/4 screwed joints and fittings, to NFPA 13.
- 2.9 PRESSURE .1 ULC listed.
GAUGES .2 Maximum limit of not less than twice normal working pressure at point where installed.
- 2.10 RELIEF VALVE .1 ULC listed.
- 2.11 SPARE PARTS .1 For storage of maintenance materials, spare
CABINET sprinkler heads and special tools.
- .2 Construct to sprinkler head manufacturers standard.
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PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION .1 Install, inspect and test to acceptance in accordance with NFPA 13 and NFPA 25.

.2 Testing to be witnessed by authority having jurisdiction.

.3 Install spare parts cabinet in sprinkler/mechanical room.

.4 Pressure gauges:

.1 Location:

.1 On water side and air side of dry pipe valve.

.2 At air receiver.

.3 In each independent pipe from air supply to dry pipe valve.

.4 At exhausters and accelerators.

.2 Install to permit removal.

.3 Locate so as not subjected to freezing.

.5 Valve identification:

.1 Identify drain valve, by-pass valves and main shut-off valve and all auxiliary valves as per NFPA 13.

3.3 PIPE INSTALLATION .1 Install piping straight and true to bear evenly on hangers and supports. Do not hang piping from plaster ceilings.

.2 Keep interior and ends of new piping and existing piping thoroughly cleaned of water and foreign matter.

.3 Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping to prevent entry of water and foreign matter.

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| 3.3 PIPE
INSTALLATION
<u>(Cont'd)</u> | .4 | Inspect piping before placing into position. |
| | .5 | Slope all piping so that no trapped sections exist. All piping shall drain either to the dry pipe valve or to one auxiliary drain. |
| 3.4 ELECTRICAL
CONNECTIONS
<u></u> | .1 | Coordinate all electrical work associated with this work under Section 26 05 00 - Common Work Results for Electrical. |
| 3.5 FIELD PAINTING
<u></u> | .1 | Clean, pretreat, prime and paint exposed piping systems. Colour: red to match existing. |
| | .2 | Apply coatings to clean, dry surfaces, using clean brushes. |
| | .3 | Clean surfaces to remove dust, dirt, rust, and loose mill scale. |
| | .4 | Immediately after cleaning, provide metal surfaces with 1 coat of pretreatment primer applied to minimum dry film thickness of 0.3 ml, and one coat of zinc chromate primer applied to minimum dry film thickness of 1.0 ml. |
| | .5 | Provide primed surfaces with following:
.1 Piping in Exposed Areas:
.1 Provide primed surfaces with 2 coats of paint
.2 Provide valves and operating accessories with 1 coat of red alkyd gloss enamel applied to minimum dry film thickness of 1.0 mil.
.3 Provide piping with 50 mm wide self-adhering red plastic bands spaced at maximum of 6m intervals throughout piping systems. |
| 3.6 FIELD QUALITY
CONTROL
<u></u> | .1 | Site Test, Inspection:
.1 Perform test to determine compliance with specified requirements in presence of Departmental Representative.
.2 Test, inspect, and approved piping before covering or concealing. |
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- 3.6 FIELD QUALITY CONTROL
(Cont'd)
- .1 (Cont'd)
- .3 Preliminary Tests:
- .1 Hydrostatically test each system at 200 psig for a 2 hour period with no leakage or reduction in pressure.
- .2 Flush piping with potable water in accordance with NFPA 13.
- .3 Piping above suspended ceilings and soffits: tested, inspected, and approved before installation of ceilings and soffits.
- .4 Test alarms and other devices.
- .5 Test water flow alarms by flowing water through inspector's test connection. When tests have been completed and corrections made, submit signed and dated certificate in accordance with NFPA 13.
- .4 Formal Tests and Inspections:
- .1 Do not submit request for formal test and inspection until preliminary test and corrections are completed and approved.
- .2 Submit written request for formal inspection at least 15 days prior to inspection date.
- .3 Repeat required tests as directed.
- .4 Correct defects and make additional tests until systems comply with contract requirements.
- .5 Furnish equipment, instruments, connecting devices, and personnel for tests.
- .6 Departmental Representative will witness formal tests and approve systems before they are accepted.

- 3.7 CLEANING
- .1 Remove surplus materials, excess materials, rubbish, tools and equipment.