

PART 1 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 28 31 00 - Fire Detection and Alarm.

1.2 REFERENCES

- .1 National Building Code of Canada 2015.
- .2 National Fire Code (NFC) 2016
- .2 National Fire Protection Association (NFPA)
 - .1 NFPA 13-2016, Standard for the Installation of Sprinkler Systems.
 - .2 NFPA 415-2016, Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Product Data:
 - .1 Provide manufacturer's printed product literature and data sheets, and include product characteristics, performance criteria, physical size, finish and limitations, delete information not applicable to the project from the shop dwgs.
 - .3 Manufacturer's catalog data, including specific model, type, and size for:
 - .1 Pipe and fittings.
 - .2 Sprinklers.
 - .3 Pipe hangers and supports (including seismic brace and anchors).
 - .4 Mechanical couplings.
 - .5 Control valves and check valves.
 - .6 Tamper switch.
 - .4 Drawings:
 - .1 Sprinkler and piping system layout stamped and signed by a professional Engineer registered in the province of Newfoundland and Labrador.
 - .5 Design Data:
 - .1 Hydraulic calculations of sprinkler system design and seismic bracing.
 - .2 Calculations shall be sealed by a professional Engineer licensed in the province of Newfoundland and Labrador.
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1.4 CLOSEOUT SUBMITTALS

- .1 Provide operation, maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Field Test Reports:
 - .1 Preliminary tests on piping system.
- .3 Records:
 - .1 As-built drawings of each system.
 - .1 After completion, but before final acceptance, submit complete set of as-built drawings of each system for record purposes.
 - .2 Submit electronic drawings with title block similar to full size contract drawings.
- .4 Operation and Maintenance Manuals:
 - .1 Provide detailed hydraulic calculations including summary sheet, and Contractors Material and Test Certificate for aboveground piping and other documentation for incorporation into manual in accordance with NFPA 13.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company or person specializing in wet 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.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Provide spare sprinklers and tools in accordance with NFPA.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
 - .2 Delivery and Acceptance Requirements:
 - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
 - .3 Storage and Protection:
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- .1 Store materials indoors and in dry location.
- .2 Store and protect materials from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
- .4 Packaging Waste Management: perform in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

- .1 Design automatic wet 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 following design criteria for following hazard areas:
 - Ordinary Hazard Group I – Passenger handling areas
 - Ordinary Hazard Group II – Baggage, Package
- .2 Include with each system materials, accessories, and equipment inside and outside building to provide each system complete and ready for use.
- .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 sprinklers in consistent pattern with ceiling grid, lights, and air supply diffusers.
- .5 Devices and equipment for fire protection service: ULC approved for use in wet pipe sprinkler systems.
- .6 Design systems for earthquake protection. Power-actuated fasteners and drop-in anchors shall not be used for tension loads.
- .7 Location of Sprinklers:
 - .1 Locate sprinklers in relation to ceiling and spacing of sprinklers not to exceed that permitted by NFPA 13 for ordinary hazard Group I and ordinary hazard Group II 12.1 m² per sprinkler.
 - .2 Uniformly space sprinklers on branch.
- .8 Water Distribution:
 - .1 Make distribution uniform throughout the area in which sprinklers will open.
 - .2 Discharge from individual sprinklers in hydraulically most remote area to be 100% of specified density.
- .9 Density of Application of Water:
 - .1 Size pipe to provide specified density when system is discharging

specified total maximum required flow.

.2 Application to horizontal surfaces below sprinklers shall be 4.1 lpm per m² for light hazard occupancy and 6.1 lpm per m² for ordinary hazard group I. And 8.1 for Ordinary Hazard Group II.

.10 Sprinkler Discharge Area.

.1 Area: hydraulically most remote 139 m² area as defined in NFPA 13.

.11 Friction Losses:

.1 Calculate losses in piping in accordance with Hazen-Williams formula with 'C' value of 120 for steel piping and 140 for cement-lined ductile-iron piping.

.12 Water Supply:

.1 Base hydraulic calculations on most recent water supply data. Test to be performed no more than 12 months prior to submittal.

2.2 ABOVE GROUND PIPING SYSTEMS

.1 Provide fittings for changes in direction of piping and for connections.

.1 Make changes in piping sizes through tapered reducing pipe fittings, bushings will not be permitted.

.2 Perform welding in shop; field welding will not be permitted.

.3 Conceal piping in areas with suspended ceiling.

2.3 PIPE, FITTINGS AND VALVES

.1 Pipe:

.1 Ferrous: to NFPA 13.

.2 Piping shall be either Schedule 10 or 40.

.2 Fittings and joints to NFPA 13:

.1 Ferrous: threaded (Schedule 40 only), welded, flanged or roll grooved.

.1 Grooved joints designed with two ductile iron housing segments, pressure responsive gasket, and zinc-electroplated steel bolts and nuts. Cast with offsetting angle-pattern bolt pads for rigidity and visual pad-to-pad offset contact.

.2 Provide 25 mm threaded fittings into which sprinkler riser nipples, or drop nipples are threaded. Threaded hard pipe drops and arm-overs are permitted to be substituted with listed flexible sprinkler fittings.

.3 Plain-end fittings with mechanical couplings and fittings which use steel gripping devices to bite into pipe when pressure is applied will not be permitted.

.4 Rubber gasketed grooved-end pipe and fittings with mechanical couplings are permitted in pipe sizes 32 mm and larger.

- .5 Fittings: ULC approved for use in wet pipe sprinkler systems.
- .6 Ensure fittings, mechanical couplings, and rubber gaskets are supplied by same manufacturer.
- .3 Valves:
 - .1 ULC listed supervised indicating control valves for fire protection service.
 - .2 Double check valve Backflow preventer ULC listed for fire protection service to be installed supervised indicating control valves, and as per CAN/CSA-B64.10.11 c/w test header.
 - .3 Provide rising stem OS & Y valve beneath each alarm valve in each riser when more than one alarm valve is supplied from same water supply pipe.
- .4 Pipe hangers:
 - .1 ULC listed for fire protection services in accordance with NFPA.

2.4 SPRINKLERS

- .1 General: to NFPA 13 and ULC listed for fire services.
- .2 Sprinkler Type:
 - .1 Type A: upright bronze.
 - .2 Type D: recessed chrome, glass bulb type.
 - .3 Type F: side wall chrome, glass bulb type.
- .3 Provide nominal 1.2 cm orifice sprinklers.
 - .1 Release element of each sprinkler to be of ordinary temperature rating or higher as suitable for specific application.
 - .2 Provide corrosion-resistant sprinklers and sprinkler guards in accordance with NFPA 13.
 - .3 Deflector: not more than 50 mm below suspended ceilings.

2.5 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 Pressure or flow switch type:
 - .1 With normally open and normally closed contacts and supervisory capability.
 - .2 Provide switch with circuit opener or closer for automatic transmittal of alarm over facility fire alarm system.
 - .3 Connect into building fire alarm system.

- .4 Connection of switch: Section 28 31 00 - Fire Detection and Alarm.

2.6 PRESSURE GAUGES

- .1 Liquid filled 100mm in diameter, Maximum limit of not less than twice normal working pressure at point where installed.

2.7 ESCUTCHEON PLATES

- .1 Provide one piece or split hinge type metal plates for piping passing through walls and ceilings in exposed spaces.
- .2 Provide chromium-plated finish plates in finished spaces.

2.8 INSPECTOR'S TEST CONNECTION

- .1 Locate inspector's test connection as shown on drawing for each sprinkler system equipped with alarm device.
- .2 Provide discharge orifice of same size as corresponding sprinkler orifice.

2.9 SIGNS

- .1 Attach properly lettered and approved metal signs to each valve and alarm device to NFPA 13.
- .2 Permanently fix hydraulic design data nameplates to riser of each system.

2.10 SPARE SPRINKLERS

- .1 Provide metal cabinet with extra sprinklers and sprinkler wrench adjacent to each alarm valve. Number and types of extra sprinklers as specified in NFPA 13.

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
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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.
- .4 Inspect piping before placing into position.

3.4 CONNECTIONS TO EXISTING WATER SUPPLY SYSTEMS

- .1 Notify Contracting Officer in writing at least 15 days prior to connection date.

3.5 FIELD QUALITY CONTROL

- .1 Site Test, Inspection:
 - .1 Perform test to determine compliance with specified requirements in presence of Departmental Representative.
 - .2 Test, inspect, and approve piping before covering or concealing.
 - .3 Preliminary Tests:
 - .1 Hydrostatically test each system at 1380kPa 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: tested, inspected, and approved before installation of ceilings.
 - .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.
 - .6 Test backflow preventer
 - .4 Formal Tests and Inspections: by certified technician.
 - .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 appliances, equipment, instruments, connecting devices, and personnel for tests.
- .6 contractor to provide testing certificate within 48 hours of successful testing.

3.6 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management.

3.7 SHUTDOWN / BYPASS

- .1 The contractor is responsible for all required shutdowns and/or bypass which may be required for this project. Coordinate with Wabush airport personnel and the authority having jurisdiction.
- .2 All fire protection systems, including Fire Alarm must be returned to their normal operation condition upon completion and at the end of each work shift.

END OF SECTION
