

DIVISION 21

FIRE SUPPRESSION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Entire Specification – All areas of common work.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit shop drawings in electronic (PDF) format for review by designer. Drawings shall be reviewed and stamped accordingly by the General Contractor prior to submission to the designer for review.
- .3 As specifically required elsewhere in this specification, shop drawings shall be stamped and signed by a Professional Engineer registered or licensed in Province of Manitoba, Canada.
- .4 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .5 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
- .6 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
 - .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
 - .3 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and components.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valves schedule and flow diagram.
 - .7 Colour coding chart.
 - .4 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.

- .2 Data to include schedules of tasks, frequency, tools required and task time.
- .5 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
 - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for Mechanical.
- .6 Approvals:
 - .1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
 - .2 Make changes as required and re-submit as directed by Departmental Representative.
- .7 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .8 Site records:
 - .1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.
- .9 As-built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Departmental Representative for approval and make corrections as directed.
 - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .10 Submit copies of as-built drawings for inclusion in final TAB report.

1.3 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

1.4 MAINTENANCE

- .1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals and as required by specific sections within this specification.
- .2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.
- .3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading in accordance with manufacturer's written instructions.
- .2 Refer to Section 01 61 00 - Common Product Requirements.
- .3 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

1.6 WARRANTY

- .1 Furnish a written guarantee stating that all work executed in this contract will be free from defective workmanship and materials for a period of one (1) year from the date of substantial performance of work. The Contractor shall repair and replace any work which fails or becomes defective during the term of the guarantee/warranty, providing the operating and maintenance instructions have been complied with. The period of guarantee specified shall not, in any way, supplant any other guarantees of a longer period provided by Manufacturers or as called for in the project documents.
- .2 Refer to Section 01 78 00 - Closeout Submittals.
- .3 Purchaser requirements during warranty:
 - .1 Unless specified otherwise the Purchaser shall be responsible for all routine maintenance requirements as required in the manufacturers' instructions.

1.7 COORDINATION OF WORK

- .1 Cooperate and coordinate with other trades on the project.
- .2 Make reference to electrical, mechanical, structural and architectural drawings when setting out work. Consult with respective Divisions in setting out locations for ductwork, equipment, and piping, so that conflicts are avoided and symmetrical even spacing is maintained. Jointly work out all conflicts on site before fabricating or installing any materials or equipment.
- .3 Where dimensional details are required, work with the applicable architectural and structural drawings.

1.8 METRIC CONVERSION

- .1 Units in this division expressed in SI units shall be interpreted using soft metric conversions.
- .2 Equivalent Nominal Diameters of Pipes - Metric and Imperial
 - .1 Where pipes are specified with metric dimensions and only Imperial sized pipes are available, provide equivalent nominal Imperial sized pipe as indicated in the table, and provide adapters to ensure compatible connections to all metric sized fittings, equipment and piping.
 - .2 When CSA approved SI Metric pipes are available and are provided, the contractor shall provide adapters to ensure compatible connections between the SI Metric pipes and all new and existing pipes, fittings, and equipment.
 - .3 Record accurately on "as-built" drawings the type of pipe (i.e., Metric or Imperial) installed.
 - .4 **EQUIVALENT NOMINAL DIAMETERS OF PIPES**

mm	Inches		mm	Inches		mm	Inches
3	1/8		65	2-1/2		375	15
6	1/4		75	3		450	18
10	3/8		100	4		500	20
15	1/2		125	5		600	24
20	3/4		150	6		750	30
25	1		200	8			
30	1-1/4		250	10			
40	1-1/2		300	12			
50	2						

- .1 Metric Duct Sizes
- .5 The metric duct sizes are expressed as 25 mm = 1 inch.

1.9 DRAWINGS AND SPECIFICATIONS

- .1 Drawings and specifications are complementary each to the other, and what is called for by one shall be binding as if called for by both.
- .2 Should any discrepancy appear between drawings and specifications which leaves the Contractor in doubt as to the true intent and meaning of the plans and specifications, obtain a ruling from the Contract Administrator in writing or by Addendum, before submitting Bid. If this is not done, it will be assumed that the most expensive alternate has been included.
- .3 Prior to construction start, examine all contract documents, including all drawings and specifications, and work of other trades to ensure that work can be satisfactorily carried out without changes to building.

Part 2 Products

2.1 MATERIALS

- .1 Materials and products to be in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Materials and equipment installed shall be new, full weight and of quality specified. Use same brand or manufacturer and model for each specific application.
- .3 Each major component of equipment shall bear manufacturer's name, address, catalog and serial number in a conspicuous place.
- .4 Replace materials or workmanship below specified quality and relocate work wrongly placed to satisfaction of the Contract Administrator and at no cost to the Purchaser.
- .5 Install materials and equipment in a quality manner providing good workmanship by competent tradesmen.

2.2 AVAILABILITY OF EQUIPMENT AND MATERIALS

- .1 Make known in writing to the Contract Administrator ten (10) days prior to the Bid Opportunity closing date any materials specified that are required to complete the work which are not currently available or will not be available for use as called for herein. Failing to do so, it will be assumed that the most expensive alternate has been included in the Bid price.

2.3 ALTERNATE MATERIALS AND EQUIPMENT

- .1 The price submitted for this contract shall be based on the use of materials and equipment as specified or as contained within the acceptable equivalent manufacturers listed in each section.
- .2 Approved equivalents for specified products shall be in accordance with B7 and be equal to or better in every respect than the one specified, which includes materials and performance to meet the space, capacity, and noise requirements outlined in schedules on drawings and specifications.
- .3 Requests for approval for Bidding purposes of equivalent materials or equipment shall be submitted in electronic (PDF) format, to the Contract Administrator no later than ten (10) working days prior to the closing date of Bid for mechanical trade. Requests for approval shall contain appropriate levels of detail to confirm performance characteristics of proposed material or equipment and conformance with the specifications. Approval of requests shall only be given by addendum.
- .4 The Contractor shall be fully responsible for all costs for work or materials required by the trades or other contractors to accommodate use of other than specified materials or equipment.

Part 3 Execution

3.1 CUTTING AND PATCHING

- .1 Provide inserts, holes and sleeves, cutting and fitting required for mechanical work. Relocate improperly located holes and sleeves.

- .2 Provide inserts or drill for expansion bolts, hanger rods, brackets, and supports.
- .3 Obtain written approval from Contract Administrator before drilling, coring, cutting or burning structural members. Ensure post tensioned or pre-stressed strands are located accurately and avoid with an adequate margin of safety.
- .4 Provide openings and holes required in precast concrete members for mechanical work. Cast holes larger than 100 mm (4") in diameter. Field-cut holes smaller than 100 mm (4") if location is approved.
- .5 Patch and make good building where damaged from equipment installation, improperly located holes etc. Work to be performed by the trade or contractor responsible for that type of work.

3.2 PAINTING REPAIRS AND RESTORATION

- .1 Do painting in accordance with Section 09 90 00 – Painting.
- .2 Prime and touch up marred finished paintwork to match original.
- .3 Restore to new condition, finishes which have been damaged.

3.3 ACCESS DOORS

- .1 Provide access doors for maintenance or adjustment purposes for all mechanical system components including:
 - .1 Valves
 - .2 Volume and splitter dampers
 - .3 Fire dampers
 - .4 Cleanouts and traps
 - .5 Controls, coils and terminal units
 - .6 Expansion joints
 - .7 Filters
 - .8 Strainers
- .2 Steel frame access panel with stainless steel piano-type hinge, channel reinforced steel door panel, three "Symmons" fasteners per door. Door panel recessed to receive ceiling or wall material to give finished appearance showing only hinge and fasteners. Provide acoustic gasket between door panel perimeter and steel frame. Rated access doors shall be UL-listed.
- .3 Sizes to be 200 mm x 200 mm for cleanout, 300 mm x 300 mm for hand
600 mm x 600 mm for body access minimum.
- .4 Provide ULC-listed fire rated access doors installed in rated wall and ceilings.

3.4 FIRE-STOPPING AND SEALING

- .1 Fire-stop all pipe, duct, conduit and wire penetrations through floors and walls, designated as fire and/or smoke separations. The contractor is required to coordinate with the architectural drawings to contractual rated wall types and installation details.
- .2 Refer to Section 07 92 00 - Joint Sealing.

3.5 PIPE SLEEVES

- .1 Pipe sleeves through exterior walls shall be of Schedule 40 316L stainless steel pipe and shall be, unless detailed otherwise, one size larger than the penetrating pipe for 100 mm and larger pipe, and two sizes larger for pipe smaller than 100 mm.
- .2 Pipes passing through concrete walls shall be Schedule 40 316L stainless steel with a diameter equal to the penetrating pipe. These sleeves shall be puddle flanged and be flanged for a bolted pipe connection each end as indicated on the Drawings.
- .3 Pipe sleeves shall have a 50 mm by 10 mm thick steel ring continuously welded all around the middle of the pipe length.
- .4 Special sleeves shall be as shown on the drawings.

3.6 PIPES THROUGH FLOORS AND WALLS

- .1 Provide stainless steel pipe sleeves where pipes pass through floors and walls (PVC, tin, or blocked out sleeves are only acceptable where indicated on the drawing).
- .2 Install sleeves flush at walls and projecting at floors as detailed or 50 mm above floor surfaces and flush with bottom.
- .3 Provide continuously welded rings on pipes passing through walls below grade or where walls are watertight. The thrust/seepage rings shall be as detailed on the drawings.
- .4 Coat surfaces of stainless steel in contact with concrete with bitumastic.
- .5 Where electrical insulation from concrete rebar is required, use link seals with pipe sleeves where shown on drawings.
- .6 Where thrust restraint is required design according to AWWA Manual M11 or as detailed.
- .7 There shall be no direct contact between structural steel and stainless steel.
- .8 Seal space between sleeves and pipes with non-hardening mastic -Daraseal-A or approved alternative in accordance with B7.

3.7 ESCUTCHEONS AND PLATES

- .1 Provide escutcheons and plates on piping and ductwork passing through finished walls, floors and ceilings.
- .2 Escutcheons shall be split type, stainless or chrome plated steel.

3.8 SITE UTILITY SERVICES

- .1 Maintain liaison with the Purchaser to interrupt, re-route or connect to water, sewer, heating, or gas systems, with minimum interruption of services.
- .2 Contractor shall confirm all elevations and locations of existing services prior to and during excavation.
- .3 Contractor shall provide as-builts of site services. As-builts to be dimensioned to grid lines or building exterior walls.

3.9 CLEANING

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.10 FIELD QUALITY CONTROL

- .1 Site Tests: conduct tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - SUBMITTALS.
- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.11 DEMONSTRATION

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.
- .5 Departmental Representative may record these demonstrations on video tape for future reference.

3.12 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system. Leave factory covers in place prior to start-up.

END OF SECTION

Part 1 General

1.1 SCOPE

- .1 Fire extinguishers.

1.2 GENERAL REQUIREMENTS

- .1 Provide portable hand extinguishers where indicated on drawings and specified herein.

1.3 QUALITY ASSURANCE

- .1 Fire protection equipment and installation shall be approved by local Fire Commissioner.
- .2 Equipment and installation shall meet the requirements of NFPA No. 10 Portable Fire Extinguishers.

1.4 SUBMITTALS

- .1 Submit shop drawings for review.

Part 2 Products

2.1 ACCEPTABLE MANUFACTURERS

- .1 Fire extinguishers: National, Flag, Kidde, CFH.
- .2 Fire extinguisher cabinets: Williams Brothers, National Fire Equipment

2.2 PORTABLE HAND FIRE EXTINGUISHERS

- .1 Multi-purpose Dry Chemical ABC (Type 1): Stored pressure with hose and shut-off nozzle or integral shut-off nozzle and mounting brackets, 9 .0 kg/20 lb capacity rating 10A:80BC.

Part 3 Execution

3.1 INSTALLATION

- .1 Use extinguisher mounting hardware appropriate to the fire extinguisher

END OF SECTION