

**Part 1        General**

**1.1            SUBMITTALS**

- .1        Submittals: in accordance with Section 01 33 00 – Submittal Procedures.
- .2        Shop drawings to show:
  - .1        Mounting arrangements.
  - .2        Operating and maintenance clearances.
- .3        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.
- .4        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 component.
    - .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 HVAC.

- .6 Approvals:
  - .1 Submit 1 copy 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 daily 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.

## **1.2 QUALITY ASSURANCE**

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

## **1.3 MAINTENANCE**

- .1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals as follows:
  - .1 One set of packing for each pump.

- .2 One casing joint gasket for each size pump.
- .3 One head gasket set for each heat exchanger.
- .4 One glass for each gauge glass.
- .5 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.
- .6 Spare solenoids and push button actuators as specified for secure plumbing fixtures. 10% of installed quantity, minimum one.
- .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.

#### **1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Construction/Demolition Waste Management and Disposal: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

#### **Part 2 Products**

Not Used.

#### **Part 3 Execution**

##### **3.1 PAINTING REPAIRS AND RESTORATION**

- .1 Prime and touch up marred finished paintwork to match original.
- .2 Restore to new condition, finishes which have been damaged.

##### **3.2 CLEANING**

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

##### **3.3 FIELD QUALITY CONTROL**

- .1 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.

### **3.4 DEMONSTRATION**

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Trial usage to apply to following equipment and systems:
  - .1 HVAC Systems:
    - .1 Air handler units
    - .2 Building heating
  - .2 Controls Systems
    - .1 EMCS building HVAC control and monitoring system
- .3 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.
- .4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .5 Instruction duration time requirements as specified in appropriate sections.
- .6 Departmental Representative will record these demonstrations on video tape for future reference.

### **3.5 PROTECTION**

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

**3.6 BREAKDOWN OF MECHANICAL PRICE & STANDARD FORM OF PROGRESS CLAIM**

Contractors Name, Address, Phone No., Fax No.

Contractors Project Manager Name, E-mail Address

**Regional Psychiatric Centre – Bow Unit Redevelopment**  
 WSP Project No. 171-04394-00

		Contract	Complete to Date	Previous Claim	Current Claimed
Plumbing	Labour				
	Material				
Ventilation	Labour				
	Material				
	Custom Outdoor Air Handling Units				
	Packaged Outdoor Rooftop Equipment				
	Ductwork Supply				
	Exhaust Fans				
Heating & Air Conditioning	Labour				
	Material				
	Equipment				
Commissioning (Cx)					
Insulation					
Controls					
T.A.B					
<b>Sub-Total</b>					
Contract Revisions					
PR#	Co#				
<b>TOTAL</b>					
% of TOTAL	100%				

**END OF SECTION 21 05 01**

**Part 1      General**

**1.1          SUBMITTALS**

- .1      Submittals: in accordance with Division 01 – General Requirements.
- .2      Shop drawings; submit drawings stamped and signed by professional engineer registered or licensed in Saskatchewan, Canada.
- .3      Submit complete plans to Authority of Jurisdiction for review and approval before commencement of work.
- .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 Division 01 – General Requirements
  - .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.
    - .2      Description of systems and their controls.
    - .3      Description of operation of systems at levels.
    - .4      Operation instruction for systems and component.
    - .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 HVAC.
- .6 Approvals:
  - .1 Submit 1 copy 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 daily 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.

## 1.2 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Division 01 – General Requirements.

- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Division 01 – General Requirements.

### **1.3 MAINTENANCE**

- .1 Furnish spare parts in accordance with Division 01 – General Requirements as follows:
  - .1 One set of packing for each pump.
  - .2 One casing joint gasket for each size pump.
  - .3 One glass for each gauge glass.
- .2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Division 01 – General Requirements.

### **1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Construction/Demolition Waste Management and Disposal: separate waste materials in accordance with Division 01 – General Requirements.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Section not used.

## **Part 3 Execution**

### **3.1 PAINTING REPAIRS AND RESTORATION**

- .1 Prime and touch up marred finished paintwork to match original.
- .2 Restore to new condition, finishes which have been damaged.

### **3.2 CLEANING**

- .1 Clean all systems including heads and other equipment.

### **3.3 DEMONSTRATION**

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Trial usage to apply to following equipment and systems:
  - .1 Fire extinguisher systems

- .3 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.
- .4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .5 Instruction duration time requirements as specified in appropriate sections.

**3.4 PROTECTION**

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

**END OF SECTION 21 05 05**

**Part 1 General**

**1.1 REFERENCES**

- .1 American National Standards Institute/National Fire Prevention Association (ANSI/NFPA)
  - .1 ANSI/NFPA 13-2017, Installation of Sprinkler Systems.
- .1 National Fire Prevention Association (NFPA)
  - .1 NFPA 13-2007, Standard for the Installation of Sprinkler Systems.

**1.2 SHOP DRAWINGS AND PRODUCT DATA**

- .1 Submit shop drawings and product data in accordance with Division 01 – General Requirements and in accordance with ANSI/NFPA 13, working plans and design requirements.

**1.3 SAMPLES**

- .1 Submit samples in accordance with Division 01 – General Requirements.
- .2 Submit samples of following:
  - .1 Each type of sprinkler head.
  - .2 Signs.

**1.4 ENGINEERING DESIGN CRITERIA**

- .1 Design system in accordance with ANSI/NFPA 13, using following parameters:
  - .1 Hazard:
    - .1 Light hazard.
  - .2 Pipe size and layout:
    - .1 Hydraulic design.
    - .2 Sprinkler head layout: to ANSI/NFPA 13 and as directed by authorities having jurisdiction.
  - .3 Water supply:
    - .1 Conduct flow and pressure test of water supply in vicinity of project to obtain criteria for bases of design in accordance with ANSI/NFPA 13.
  - .4 Zoning:
    - .1 System zoning as indicated.

**1.5 CLOSEOUT SUBMITTALS**

- .1 Provide maintenance data for incorporation into manual specified in Division 01 – General Requirements.

## 1.6 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Division 01 – General Requirements.
- .2 Provide spare sprinklers and tools as required by ANSI/NFPA 13. For secure area sprinkler heads only – increase quantities of spare heads to minimum of 30 of each type.

## 1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance 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:
  - .1 Store materials indoors.
  - .2 Store and protect materials from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
- .4 Packaging Waste Management: in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## Part 2 Products

### 2.1 PIPE, FITTINGS AND VALVES

- .1 Pipe:
  - .1 Ferrous: to ANSI/NFPA 13. All pipe shall be Schedule 40 wall thickness.
- .2 Fittings and joints to ANSI/NFPA 13:
  - .1 Ferrous: screwed, welded, flanged or roll grooved.
- .3 Valves:
  - .1 ULC listed for fire protection service.
  - .2 Up to NPS 2: bronze, screwed ends, OS & Y; gate, or ball type as permitted.
  - .3 NPS 2 1/2 and over: cast iron, flanged or roll grooved ends, indicating butterfly valve.
  - .4 Swing check valves.
  - .5 Ball drip.

- .4 Pipe hangers:
  - .1 ULC listed for fire protection services.

## **2.2 SPRINKLER HEADS**

- .1 General: to ANSI/NFPA 13 and ULC listed for fire services.

## **2.3 INSTITUTIONAL SECURE PENDANT HEAD – QUICK RESPONSE**

- .1 Acceptable material: Tyco Raven 5.6K Institutional Sprinkler.

## **2.4 STANDARD - UPRIGHT**

- .1 Upright bronze, with or without guard as indicated.

## **2.5 STANDARD – CONCEALED PENDANT**

- .1 Concealed pendant with coverplate – white.

## **2.6 SUPERVISORY SWITCHES**

- .1 General: to ANSI/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.

## **2.7 PRESSURE GAUGES**

- .1 ULC listed and to Section 20 10 09 – Mechanical Gauges.
- .2 Shall have maximum limit of not less than twice normal working pressure at point where installed.

## **2.8 SIGNS**

- .1 Signs for control drain and test valves: to ANSI/NFPA 13.

**2.9 SPARE PARTS CABINET**

- .1 For storage of maintenance materials, spare sprinkler heads and special tools.
- .2 Construct to sprinkler head manufacturer's standard.
- .3 Turn over spare heads in excess of those stored in cabinet to Departmental Representative. Record turnover with transmittal.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Install, inspect and test to acceptance in accordance with ANSI/NFPA 13 and other applicable standards.
- .2 Testing to be witnessed by Fire Commissioner of Canada.

**END OF SECTION 23 13 13**

**Part 1        General**

**1.1            SHOP DRAWINGS AND PRODUCT DATA**

- .1        Submit shop drawings and product data in accordance with Division 01 – General Requirements.

**1.2            CLOSEOUT SUBMITTALS**

- .1        Provide maintenance data for incorporation into manual specified in Division 01 – General Requirements.

**1.3            WASTE MANAGEMENT AND DISPOSAL**

- .1        Separate and recycle waste materials in accordance with Division 01 – General Requirements.
- .2        Remove from site and dispose of all packaging materials at appropriate recycling facilities.

**Part 2        Products**

**2.1            MULTI-PURPOSE DRY CHEMICAL EXTINGUISHERS**

- .1        Stored pressure rechargeable type with hose and shut-off nozzle, ULC labelled for A, B and C class protection. Sizes as indicated.
  - .1        Acceptable product: National Fire Protection ABC-10G, Pyrene, Flag.

**2.2            CARBON DIOXIDE EXTINGUISHER**

- .1        Aluminum cylinder stored pressure rechargeable type with hose and shut-off nozzle. ULC labelled for B and C class protection. Sizes as indicated.
  - .1        Acceptable product: National Fire Protection C02-10H, Pyrene, Flag.

**2.3            EXTINGUISHER BRACKETS**

- .1        Medium duty aviation bracket with strap and clamp.

**2.4            CABINETS**

- .1        Flush surface or semi-recessed type as indicated, constructed of 1.6 mm thick steel, 180° opening door of 2.5 mm thick steel with latching device.
- .2        Cabinet door: with 6 mm full plexiglass panel. All metal door latch.
- .3        Finish:

- .1 Tub: prime coated.
- .2 Door and frame: primer finish ready for final finish.
  
- .4 Acceptable product: National Fire Equipment CE-950-3, Pyrene, Flag.

**2.5 IDENTIFICATION**

- .1 Identify extinguishers in accordance with recommendations of ANSI/NFPA 10.
- .2 Attach tag or label to extinguishers, indicating month and year of installation. Provide space for service dates.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Install or mount extinguishers in cabinets or on brackets as indicated.
- .2 Provide initial inspection signature and date on inspection tag.

**END OF SECTION 21 20 00**