

# **SPECIFICATION**

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## **INTERIOR RENOVATIONS**

**NORMAN WELLS  
NORTHWEST TERRITORIES  
PROJECT NO. 14-025-01-30**

**TENDER**

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**Part 1            General**

**1.1                WORK COVERED BY CONTRACT DOCUMENTS**

- .1        Work of this Contract comprises the interior renovations of the Facility Building Located in Norman Wells, Northwest Territories. The work will be done in a single phase. This work includes; labour, materials and shipping of materials, in accordance with the contract documents and as further described herein.

**1.2                SCOPE OF WORK**

.1        EXTERIOR RENOVATIONS

- .1        Scrape and re-paint existing stairs and ramp.

.2        OFFICE/OPERATIONS AREA

- .1        New paint throughout office area of the detachment.
- .2        New safety-t flooring floor in detachment commander's office, main hallway, exercise room and coffee room.
- .3        New toilets in washroom.
- .4        New shelving at back door area.
- .5        New Sound Panels in existing front office

.3        GARAGE BAY

- .1        Install new guard rails on ramp.
- .2        Install new floor finish on floor of secure bay.
- .3        Supply new vehicle stops.
- .4        Install new 10'-0" wide coat rack on wall across from the ramp

.4        CELL AREA - RENOVATION

- .1        Install new cell toilets
- .2        Install new guard desk c/w new monitors stand for CCTV
- .3        Paint entire cell block
- .4        Install new fold down prisoner seat on wall
- .5        Supply and install new latch for cell feeding port
- .6        Install new door viewers on all doors into cell area
- .7        Drill hole in latch area to allow for viewing door latch when locked
- .8        Upgrade cell windows (Add Polycarbonate sheet)
- .9        Add new grills to all cells
- .10       Add new door to shower
- .11       Remove and install new shower head, re-finish shower and wrap shower in stainless steel.
- .12       Replace exhaust fans
- .13       Update existing cell and upgrade cell to current standard.
- .14       Create new breath test room off of corridor. This will require the following

- .1 Reversal of the door from the secure bay to the cell block
  - .2 Installation of new wall
  - .3 New millwork and bench for breath test station
  - .4 New exhaust fan above the breath test station
  - .5 Power, lighting and communications for future live scan unit.
  - .6 New flooring and painting of walls.
  - .7 New heater
  - .8 Install new CCT camera housing and conduit
- .5 Existing Garage/Shed
- .1 Remove and Replace all doors
  - .2 Repaint
  - .3 Repair notched beam with C-Channel Reinforcement on Each Side.
  - .4 Install new rubber flooring in gym area

### **1.3 WORK SEQUENCE**

- .1 Building will remain occupied during the renovation.
- .2 Co-ordinate Progress Schedule with Departmental Representative and consultant.
- .3 Maintain fire access/control
- .4 The work will be done in phases one phase being completed and certified prior to the second phase being started.

### **1.4 PROTECTION OF REMAINING FIXTURES AND CABINERY**

- .1 The contractor is to document photo the condition of the existing cabinetry and fixtures at takeover of the area of work and supply a digital copy to the consultant.
- .2 The contractor is responsible for the protection of all damage caused during the construction process and it will be the responsibility of the contractor to make good to the acceptance of the Project Manager and Consultant.

### **1.5 CONTRACTOR USE OF PREMISES**

- .1 Limit use of premises for storage, and for access to allow:
  - .1 Owner Occupancy
  - .2 Work by other Contractors
  - .3 Public Usage
- .2 Keep clear products or equipment which may **interfere** with operation of Building or other contractors.
- .3 Assume responsibility for the protection and safekeeping of products under this contract.
- .4 Co-ordinate use of premises under direction of Consultant and Departmental Representative.
- .5 Obtain and pay for use of additional storage or work areas needed for operations under this Contract as required.

- .6 Ensure safe practices and work area to prevent injury or damage to portions of existing work which remain.
- .7 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Consultant.

**1.6 OWNER OCCUPANCY**

- .1 Owner will partially occupy premises during entire construction period for execution of normal operations
- .2 Co-Operate with Owner in scheduling operations to minimize conflict and to facilitate owner usage.

**1.7 EXISTING SERVICES**

- .1 Notify Consultant and utility companies of intended interruption of services and obtain required permission. Pay fees and obtain certificates and permits required.
- .2 Where Work involves breaking into or connecting to existing services, give 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian, vehicular traffic and tenant operations.
- .3 Provide alternative routes for personnel and vehicular traffic (if required).
- .4 Establish location and extent of service lines in area of work before starting Work. Notify Consultant of findings.
- .5 Submit schedule to and obtain approval from Consultant and building operations for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .6 Provide temporary services when directed by Consultant or as required to maintain critical building and tenant systems.
- .7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .8 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .9 Protect, relocate or maintain existing active services. When inactive services are encountered, inform consultant and owner prior to capping off in manner approved by authorities having jurisdiction.
- .10 Record locations on as-built drawings of maintained, re-routed and abandoned service lines.
- .11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures

**1.8 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.

- .3 Addenda.
- .4 Reviewed Shop Drawings.
- .5 List of Outstanding Shop Drawings.
- .6 Change Orders.
- .7 Other Modifications to Contract.
- .8 Field Test Reports.
- .9 Copy of Approved Work Schedule.
- .10 Health and Safety Plan and Other Safety Related Documents.
- .11 Other documents as specified.

**1.9 CODES AND STANDARDS**

- .1 Materials shall be new and work shall conform to the minimum applicable standards of the Canadian General Standards board, the Canadian Standards Association, The National Building Code of Canada 2010, and all applicable Territorial and Municipal codes, and all standards listed below. In the case of conflict or discrepancy the most stringent requirement shall apply.
- .2 Meet or exceed requirements of contract documents, specified standards, codes and referenced documents.

**Part 2 Products****2.1 NOT USED**

- .1 Not used.

**Part 3 Execution****3.1 NOT USED**

- .1 Not used.

**END OF SECTION**



**Part 1          General**

**1.1            ACCESS AND EGRESS**

- .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

**1.2            USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Closures: protect work temporarily until permanent enclosures are completed.

**1.3            ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1 Execute work with least possible interference or disturbance to building operations occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

**1.4            EXISTING SERVICES**

- .1 Notify, utility companies, Consultant, of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

**1.5            SPECIAL REQUIREMENTS**

- .1 Submit schedule in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANNT) Chart.
- .2 Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .3 Keep within limits of work and avenues of ingress and egress.

**1.6            SECURITY CLEARANCES**

- .1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.

**1.7 BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions. Smoking is not allowed on the property.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1        Project Supplementary Conditions

**1.2                CASH ALLOWANCES**

- .1        Include in Contract Price specified cash allowances.
- .2        Cash allowances, unless otherwise specified, cover net cost to Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage installation and other authorized expenses incurred in performing Work.
- .3        Contract Price, and not cash allowance, includes Contractor's Contractor's overhead and profit in connection with such cash allowance.
- .4        Contract Price will be adjusted by written order to provide for excess or deficit to each cash allowance.
- .5        Where costs under a cash allowance exceed amount of allowance, Contractor will be compensated for excess incurred and substantiated plus allowance for overhead and profit as set out in Contract Documents.
- .6        Include progress payments on accounts of work authorized under cash allowances in Consultant's monthly certificate for payment.
- .7        Amount of each allowance, for Work specified in respective specification Sections is as follows:
  - .1        Include an allowance of \$25,000.00 for unforeseen conditions.
  - .2        Include an allowance of \$15,000.00 for a Fire Alarm Technician.

**Part 2            Products**

**2.1                NOT USED**

- .1        Not Used.

**Part 3            Execution**

**3.1                NOT USED**

- .1        Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                ON-SITE DOCUMENTS**

- .1    Contract Documents
- .2    Specifications
- .3    Addenda
- .4    Reviewed shop drawings
- .5    Change orders
- .6    Other modifications in contract
- .7    Field test reports
- .8    Copy of approved Work Schedule
- .9    Manufacturers installation and application instructions
- .10   Labour conditions and wage schedules
- .11   Project Record Documents (for as-built purposes)
- .12   Codes and Standards listed in 01 11 00

**1.2                ADMINISTRATIVE**

- .1    Attend project meetings throughout the progress of the work at the call of Consultant.
- .2    Provide physical space and make arrangements for meetings.
- .3    Consultant will record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .4    Consultant will reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants, affected parties not in attendance, Project Manager, and Contractor.
- .5    Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

**1.3                PRECONSTRUCTION MEETING**

- .1    After award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities. Meeting will be held at the location and time designated by the departmental representative

- .2 Departmental Representative, Engineer and Consultant, Contractor, major Subcontractors, will be in attendance. Others may be in attendance at the discretion of the departmental representative or the Contractor. Representatives of the local Building Manager may also be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 2 days before meeting.
- .4 Agenda to include:
  - .1 Appointment of official representative of participants in the Work.
  - .2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.
  - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
  - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.
  - .5 Delivery schedule of specified equipment.
  - .6 Site security in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
  - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
  - .8 Owner provided products.
  - .9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures
  - .10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals
  - .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
  - .12 Monthly progress claims, administrative procedures, photographs, hold backs.
  - .13 Appointment of inspection and testing agencies or firms.
  - .14 Insurances, transcript of policies.
- .5 Comply with Departmental Representative's allocation of mobilization areas of site; for field offices and sheds, for access, traffic and parking facilities.
- .6 During construction coordinate use of site and facilities through Departmental Representatives procedures for intra-project communications: submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.
- .7 Comply with instruction of consultant for use of Temporary utilities and construction facilities.
- .8 Coordinate field engineering and layout work with consultant.

**1.4****PROGRESS MEETINGS**

- .1 During course of Work at the discretion of the Consultant and Departmental Representative.

- .2 Representatives of the Contractor, major Subcontractors involved in the work and other as required and decided upon by the Departmental Representative or Contractor are to be in attendance. Contractor to notify all sub-contractors.
- .3 Consultant will notify contractor min 5 days prior to meetings
- .4 Consultant to record minutes of meetings and circulate to attending parties and affected parties not in attendance within 5 days after meeting.
- .5 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .3 Field observations, problems, conflicts.
  - .4 Problems which impede construction schedule.
  - .5 Review of off-site fabrication delivery schedules.
  - .6 Corrective measures and procedures to regain projected schedule.
  - .7 Revision to construction schedule.
  - .8 Progress schedule, during succeeding work period.
  - .9 Review submittal schedules: expedite as required.
  - .10 Maintenance of quality standards.
  - .11 Review proposed changes for affect on construction schedule and on completion date.
  - .12 Other business.

**Part 2 Products****2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution****3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                DEFINITIONS**

- .1      Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2      Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3      Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4      Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5      Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6      Master Plan: summary-level schedule that identifies major activities and key milestones.
- .7      Milestone: significant event in project, usually completion of major deliverable.
- .8      Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9      Project Planning, Monitoring and Control System: overall system operated by RCMP to enable monitoring of project work in relation to established milestones.

**1.2                REQUIREMENTS**

- .1      Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2      Construction Progress Schedule to be Completed in Microsoft Project or Similar Software.
- .3      Plan to complete Work in accordance with prescribed milestones and time frame.
- .4      Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

- .5 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

### **1.3 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures .
- .2 Submit to Consultant within 5 working days of Award of Contract as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Consultant within 5 working days of receipt of acceptance of Master Plan.

### **1.4 PROJECT MILESTONES**

#### **1.5 MASTER PLAN**

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Consultant will review and return revised schedules within 5 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

#### **1.6 PROJECT SCHEDULE**

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
  - .1 Award.
  - .2 Shop Drawings, Samples.
  - .3 Permits.
  - .4 Mobilization.
  - .5 Interior Architecture (Walls, Floors and Ceiling).
  - .6 Plumbing.
  - .7 Lighting.
  - .8 Electrical.
  - .9 Piping.
  - .10 Controls.
  - .11 Heating, Ventilating, and Air Conditioning.
  - .12 Millwork.
  - .13 Fire Systems.



- .14 Testing and Commissioning.
- .15 Supplied equipment long delivery items.
- .16 Engineer supplied equipment required dates.

**1.7 PROJECT SCHEDULE REPORTING**

- .1 Update Project Schedule on weekly basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

**1.8 PROJECT MEETINGS**

- .1 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**Part 1            General**

**1.1                ADMINISTRATIVE**

- .1        Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2        Do not proceed with Work affected by submittal until review is complete.
- .3        Present shop drawings, product data, samples and mock-ups in imperial units.
- .4        Where items or information is not produced in imperial units converted values are acceptable.
- .5        Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6        Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7        Verify field measurements and affected adjacent Work are co-ordinated.
- .8        Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's, Consultant's review of submittals.
- .9        Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .10      Keep one reviewed copy of each submission on site.

**1.2                SHOP DRAWINGS AND PRODUCT DATA**

- .1        The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2        Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in the Province of Manitoba, Canada.
- .3        Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which

adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

- .4 Allow 14 days for Consultant's review of each submission.
- .5 Adjustments made on shop drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .6 Make changes in shop drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .8 Submissions include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
  - .5 Details of appropriate portions of Work as applicable:
    - .1 Fabrication.
    - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
    - .3 Setting or erection details.
    - .4 Capacities.
    - .5 Performance characteristics.
    - .6 Standards.
    - .7 Operating weight.
    - .8 Wiring diagrams.
    - .9 Single line and schematic diagrams.
    - .10 Relationship to adjacent work.
- .9 After Property Manager's, Engineer's, Consultant's review, distribute copies.

- .10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Consultant and Engineer may reasonably request.
- .11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Consultant and Engineer.
  - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
  - .2 Testing must have been within 3 years of date of contract award for project.
- .13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Consultant and Engineer
  - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
  - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit electronic or 6 copies of manufacturers instructions for requirements requested in specification Sections and as requested by Consultant and Engineer.
  - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit 6 copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Consultant and Engineer.
  - .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .16 Submit 6 copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Consultant and Engineer
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Consultant and Engineer, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .20 The review of shop drawings by and Consultant is for sole purpose of ascertaining conformance with general concept.

- .1 This review shall not mean that Consultant approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
- .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

**1.3 SAMPLES**

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Consultants business address.
- .3 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .6 Make changes in samples which Consultant may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

**1.4 NOT USED**

- .1 Not Used.

**Part 2 Execution**

**2.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1        Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2        Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1        Material Safety Data Sheets (MSDS).
- .3        Manitoba
  - .1        The Workers Compensation Act latest edition.

**1.2                SUBMITTALS**

- .1        Make submittals in accordance with Section 01 33 00 - Submittal Procedures .
- .2        Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1        Results of site specific safety hazard assessment.
  - .2        Results of safety and health risk or hazard analysis for site tasks and operation found in work plan .
- .3        Submit copies of Contractor's authorized representative's work site health and safety inspection reports to Consultant or authority having jurisdiction, as required.
- .4        Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5        Submit copies of incident and accident reports.

**1.3                SAFETY ASSESSMENT**

- .1        Perform site specific safety hazard assessment related to project.

**1.4                MEETINGS**

- .1        Schedule and administer Health and Safety meeting with Consultant prior to commencement of Work.

**1.5                REGULATORY REQUIREMENTS**

- .1        Do Work in accordance with Section 01 41 00 - Regulatory Requirements .

**1.6                GENERAL REQUIREMENTS**

- .1        Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

- .2 Consultant may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

### **1.7 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

### **1.8 COMPLIANCE REQUIREMENTS**

- .1 Comply with The Workers Compensation Act, Workplace Safety Regulation, Province of Manitoba Regulation.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

### **1.9 UNFORSEEN HAZARDS**

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise RCMP verbally and in writing.

### **1.10 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Consultant.

### **1.11 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Consultant.
- .2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

### **1.12 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

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**Part 2            Products**

**2.1                NOT USED**

.1                Not used.

**Part 3            Execution**

**3.1                NOT USED**

.1                Not used.

**END OF SECTION**



**Part 1           General**

**1.1           REFERENCES AND CODES**

- .1 Perform Work in accordance with National Building Code of Canada (NBC) including amendments up to tender closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:
  - .1 Contract documents.
  - .2 Specified standards, codes and referenced documents.

**1.2           HAZARDOUS MATERIAL DISCOVERY**

- .1 Asbestos: demolition of spray or trowel-applied asbestos is hazardous to health. Stop work immediately when material resembling spray or trowel-applied asbestos is encountered during demolition work. Notify consultant and Project Manager.
- .2 PCB: Polychlorinated Biphenyl: stop work immediately when material resembling Polychlorinated Biphenyl is encountered during demolition work. Notify Consultant and Project Manager.
- .3 Mould: stop work immediately when material resembling mould is encountered during demolition work. Notify Consultant and Project Manager.

**1.3           BUILDING SMOKING ENVIRONMENT**

- .1 No smoking permitted.

**Part 2           Products**

**2.1           NOT USED**

- .1 Not Used.

**Part 3           Execution**

**3.1           NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                INSPECTION**

- .1     Allow Consultant access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2     Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Consultant, instructions, or law of Place of Work.
- .3     If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4     Consultant will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.

**1.2                INDEPENDENT INSPECTION AGENCIES**

- .1     Independent Inspection/Testing Agencies will be engaged by consultant for purpose of inspecting and/or testing portions of Work.
- .2     Provide equipment required for executing inspection and testing by appointed agencies.
- .3     Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4     If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Property Manager or Consultant at no cost to Property Manager or Consultant. Pay costs for retesting and reinspection.

**1.3                ACCESS TO WORK**

- .1     Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2     Co-operate to provide reasonable facilities for such access.

**1.4                PROCEDURES**

- .1     Notify appropriate agency and Consultant in advance of requirement for tests, in order that attendance arrangements can be made.
- .2     Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

#### **1.5 REJECTED WORK**

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Consultant as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Consultant.

#### **1.6 REPORTS**

- .1 Submit electronic copies of inspection and test reports to Consultant.
- .2 Provide copies to subcontractor of work being inspected or tested.

#### **1.7 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.
- .2 Construct in locations acceptable to Consultant.
- .3 Prepare mock-ups for Consultant's review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

#### **1.8 MILL TESTS**

- .1 Submit mill test certificates as requested.

#### **1.9 EQUIPMENT AND SYSTEMS**

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

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Quality Control

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**Part 2          Products****2.1              NOT USED**

.1          Not Used.

**Part 3          Execution****3.1              NOT USED**

.1          Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SUBMITTALS**

- .1        Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

**1.2                INSTALLATION AND REMOVAL**

- .1        Provide temporary utilities controls in order to execute work expeditiously.
- .2        Remove from site all such work after use.

**1.3                WATER SUPPLY**

- .1        Water is available for use by the contractor provided by the Building Owner

**1.4                TEMPORARY HEATING AND VENTILATION**

- .1        Provide temporary heating as required during construction period, including attendance, maintenance and fuel.
- .2        Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.
- .3        Provide temporary heat and ventilation in enclosed areas as required to:
  - .1        Facilitate progress of Work.
  - .2        Protect Work and products against dampness and cold.
  - .3        Prevent moisture condensation on surfaces.
  - .4        Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
  - .5        Provide adequate ventilation to meet health regulations for safe working environment.
- .4        Maintain temperatures of minimum 21 degrees C in areas where construction is in progress.
- .5        Ventilating:
  - .1        Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.
  - .2        Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
  - .3        Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
  - .4        Ventilate storage spaces containing hazardous or volatile materials.
  - .5        Ventilate temporary sanitary facilities.

- .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.
- .6 Permanent heating system of building, to be used when available. Be responsible for damage to heating system if use is permitted.
- .7 On completion of Work for which permanent heating system is used, replace filters, clean furnaces and power vacuum all ductwork inform Consultant of completion.
- .8 Ensure Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is certified by Consultant.
- .9 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
  - .1 Conform with applicable codes and standards.
  - .2 Enforce safe practices.
  - .3 Prevent abuse of services.
  - .4 Prevent damage to finishes.
  - .5 Vent direct-fired combustion units to outside.
- .10 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

**1.5 TEMPORARY POWER AND LIGHT**

- .1 Power is available for use by the contractor provided by the Building Owner.
- .2 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of consultant provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

**1.6 TEMPORARY COMMUNICATION FACILITIES**

- .1 Contractor to furnish own Temporary phone, Fax and e-mail.

**1.7 FIRE PROTECTION**

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1 Canadian Green Building Council (CaGBC)
  - .1 LEED Canada-NC Version 1.0-December 2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System For New Construction and Major Renovations.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
  - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA-0121-M1978(R2003), Douglas Fir Plywood.
  - .3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.
  - .4 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.
- .4 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

**1.2                SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

**1.3                INSTALLATION AND REMOVAL**

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by contractor, number of trailers used, avenues of ingress/egress to fenced area and details of fence installation
- .2 Indicate use of supplemental or other staging area.
- .3 Provide construction facilities in order to execute work expeditiously.
- .4 Remove from site all such work after use.

**1.4                SITE STORAGE/LOADING**

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

**1.5 CONSTRUCTION PARKING**

- .1 Parking will be permitted on site provided it does not disrupt performance of Work or impede the operation of the detachment.
- .2 Adequate parking must be maintained for public and building occupant access. This area is already defined and is not to be used for contractor parking.
- .3 Provide and maintain adequate access to project site.

**1.6 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

**1.7 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

**1.8 CLEAN-UP**

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Remove materials resulting from demolition as soon as possible from site.
- .4 Stack stored new or salvaged material not in construction facilities.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.



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**Part 3          Execution**

**3.1                NOT USED**

.1          Not Used.

**END OF SECTION**

**Part 1****General****1.1****REFERENCES**

- .1 Canadian General Standards Board (CGSB)
  - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
  - .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
  - .1 CSA-O121-M1978(R2003), Douglas Fir Plywood.
- .3 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as Of: May 14, 2004.

**1.2****INSTALLATION AND REMOVAL**

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

**1.3****DUST TIGHT SCREENS**

- .1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.

**1.4****ACCESS TO SITE**

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

**1.5****FIRE ROUTES**

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles

**1.6****PROTECTION OF BUILDING FINISHES**

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with property manager and detachment commander locations and installation schedule 3 days prior to installation.

- .4 Be responsible for damage incurred due to lack of or improper protection.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1        Within text of each specifications section, reference may be made to reference standards.
- .2        Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3        If there is question as to whether products or systems are in conformance with applicable standards, Project Manager and/or Consultant reserves right to have such products or systems tested to prove or disprove conformance.
- .4        Cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

**1.2                QUALITY**

- .1        Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2        Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3        Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4        Should disputes arise as to quality or fitness of products, decision rests strictly with Project Manager based upon requirements of Contract Documents.
- .5        Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6        Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

**1.3                AVAILABILITY**

- .1        Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

- .2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

#### **1.4 STORAGE, HANDLING AND PROTECTION**

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Consultant.
- .9 Touch-up damaged factory finished surfaces to Consultants satisfaction. Use touch-up materials to match original. Do not paint over name plates.

#### **1.5 TRANSPORTATION**

- .1 Pay costs of transportation of products required in performance of Work.

#### **1.6 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Project Manager will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re-installation at no increase in Contract Price or Contract Time.

**1.7 QUALITY OF WORK**

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Consultant reserves the right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with the Consultant, whose decision is final.

**1.8 CO-ORDINATION**

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

**1.9 CONCEALMENT**

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform Consultant if there is interference. Install as directed by Consultant.

**1.10 REMEDIAL WORK**

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

**1.11 LOCATION OF FIXTURES**

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Engineer of conflicting installation. Install as directed.

**1.12 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.

- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**1.13 FASTENINGS - EQUIPMENT**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

**1.14 PROTECTION OF WORK IN PROGRESS**

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Engineer.

**1.15 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

**Part 2 Products****2.1 NOT USED**

- .1 Not Used.

**Part 3          Execution**

**3.1              NOT USED**

.1          Not Used.

**END OF SECTION**



**Part 1            General**

**1.1                REFERENCES**

- .1        Identification of existing survey control points and property limits.

**1.2                LOCATION OF EQUIPMENT AND FIXTURES**

- .1        Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2        Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3        Inform Consultant of impending installation and obtain approval for actual location.
- .4        Submit field drawings to indicate relative position of various services and equipment when required by Consultant.

**1.3                RECORDS**

- .1        Maintain a complete, accurate log of control and survey work as it progresses.
- .2        On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
- .3        Record locations of maintained, re-routed and abandoned service lines.

**1.4                SUBMITTALS**

- .1        On request of Departmental Representative or Consultant, submit documentation to verify accuracy of field engineering work.

**Part 2            Products**

**2.1                NOT USED**

- .1        Not Used.

**Part 3            Execution**

**3.1                NOT USED**

- .1        Not Used.

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**END OF SECTION**

**Part 1          General**

**1.1            SUBMITTALS**

- .1      Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Submit written request in advance of cutting or alteration which affects:
  - .1          Structural integrity of elements of project.
  - .2          Integrity of weather-exposed or moisture-resistant elements.
  - .3          Efficiency, maintenance, or safety of operational elements. Note: Fire panel will alarm when hot cutting is done. Owner and building tenants requires notice when shutting down fire alarm system to do work. When alarm is off, contractor will provide fire watch.
  - .4          Visual qualities of sight-exposed elements.
  - .5          Work of Owner or separate contractor.
- .3      Include in request:
  - .1          Identification of project.
  - .2          Location and description of affected Work.
  - .3          Statement on necessity for cutting or alteration.
  - .4          Description of proposed Work, and products to be used.
  - .5          Alternatives to cutting and patching.
  - .6          Effect on Work of Owner or separate contractor.
  - .7          Written permission of affected separate contractor.
  - .8          Date and time work will be executed.

**1.2            MATERIALS**

- .1      Required for original installation.
- .2      Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - Submittal Procedures.

**1.3            PREPARATION**

- .1      Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2      After uncovering, inspect conditions affecting performance of Work.
- .3      Beginning of cutting or patching means acceptance of existing conditions.
- .4      Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

**1.4 EXECUTION**

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .11 At penetration of fire rated wall, ceiling or floor construction, completely seal voids with firestopping material in accordance with Section 07 8400 – Firestopping, full thickness of the construction element
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

**END OF SECTION**

**Part 1            General**

**1.1                PROJECT CLEANLINESS**

- .1        Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2        Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site, unless approved by Consultant.
- .3        Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4        Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5        Dispose of waste materials and debris off site.
- .6        Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .7        Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .8        Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .9        Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .10      Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

**1.2                FINAL CLEANING**

- .1        When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2        Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .3        Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4        Remove waste products and debris including that caused by Owner or other Contractors.
- .5        Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site, unless approved by Consultant.

- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
- .11 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .14 Remove dirt and other disfiguration from exterior surfaces.
- .15 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .16 Sweep and wash clean paved areas.
- .17 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .18 Clean roofs, downspouts, and drainage systems.
- .19 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

**1.3 WASTE MANAGEMENT AND DISPOSAL**

- .1 Dispose of waste and separate waste materials for recycling as per requirements of local authorities.

**Part 2 Products****2.1 NOT USED**

- .1 Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1           General**

**1.1               INSPECTION AND DECLARATION**

- .1 Contractor's Inspection: Contractor and Subcontractors: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
  - .1 Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  - .2 Request Inspection.
- .2 Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.
- .3 Completion: submit written certificate that following have been performed:
  - .1 Work has been completed and inspected for compliance with Contract Documents.
  - .2 Defects have been corrected and deficiencies have been completed.
  - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
  - .4 Certificates required by Fire Commissioner, Utility companies HRDC Labour Programs-Fire Protection, Engineering Services and Local Authorities have been submitted.
  - .5 Operation of systems have been demonstrated to Owner's personnel.
  - .6 Work is complete and ready for final inspection.
- .4 Final Inspection: when items noted above are completed, request final inspection of Work by Consultant and Contractor. If Work is deemed incomplete by Consultant, complete outstanding items and request reinspection.

**1.2               CLEANING**

- .1 In accordance with Section 01 74 11 – Cleaning.
- .2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with local authorities.

**Part 2           Products**

**2.1               NOT USED**

- .1 Not Used.



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**Part 3            Execution**

**3.1                Not Used**

.1                Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SUBMITTALS**

- .1        Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .3        Copy will be returned after final inspection, with Consultant comments.
- .4        Revise content of documents as required prior to final submittal.
- .5        Two weeks prior to Substantial Performance of the Work, submit to the Consultant, four final copies of operating and maintenance manuals in English.
- .6        Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .7        Furnish evidence, if requested, for type, source and quality of products provided.
- .8        Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
- .9        Pay costs of transportation.
- .10      Supply one electronic and 5 copies of equipment manuals for all new items installed under this project

**1.2                FORMAT**

- .1        Organize data as instructional manual.
- .2        Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3        When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4        Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5        Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6        Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7        Text: manufacturer's printed data, or typewritten data.

- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide scaled CAD files in dwg format on CD.

### **1.3 CONTENTS - EACH VOLUME**

- .1 Table of Contents: provide title of project;
  - .1 Date of submission; names.
  - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .6 Training: refer to Section 01 79 00 - Demonstration and Training.

### **1.4 AS-BUILTS AND SAMPLES**

- .1 Maintain, at site for Consultant one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 All copies of the documents must be turned over to consultant, **NO** copies may be maintained by the General Contractor or Trades.

## **1.5 EQUIPMENT AND SYSTEMS**

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control.
- .15 Additional requirements: as specified in individual specification sections.

**1.6 MATERIALS AND FINISHES**

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: as specified in individual specifications sections.

**1.7 SPARE PARTS**

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

**1.8 SPECIAL TOOLS**

- .1 Provide special tools, in quantities specified in individual specification sections.
- .2 Provide items with tags identifying their associated faction and equipment.
- .3 Deliver to site; place and store
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listing in Maintenance Manual

**1.9 MAINTENANCE MATERIALS**

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

- .5 Obtain receipt for delivered products and submit prior to final payment.

**1.10 SPECIAL TOOLS**

- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

**1.11 STORAGE, HANDLING AND PROTECTION**

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

**1.12 WARRANTIES AND BONDS**

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Property Manager and Consultant for approval.
- .3 Warranty management plan to include required actions and documents to assure that Property Manager receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Property Manager for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:
  - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- .4 Verify that documents are in proper form, contain full information, and are notarized.
- .5 Co-execute submittals when required.
- .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Include information contained in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
  - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps.
  - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
    - .1 Name of item.
    - .2 Model and serial numbers.
    - .3 Location where installed.
    - .4 Name and phone numbers of manufacturers or suppliers.
    - .5 Names, addresses and telephone numbers of sources of spare parts.
    - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
    - .7 Cross-reference to warranty certificates as applicable.
    - .8 Starting point and duration of warranty period.
    - .9 Summary of maintenance procedures required to continue warranty in force.
    - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
    - .11 Organization, names and phone numbers of persons to call for warranty service.
    - .12 Typical response time and repair time expected for various warranted equipment.
  - .4 Contractor's plans for attendance at 10 month post-construction warranty inspections.
  - .5 Procedure and status of tagging of equipment covered by extended warranties.
  - .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .9 Respond in a timely manner to oral or written notification of required construction warranty repair work.

- .10 Written verification will follow oral instructions. Failure to respond will be cause for the property manager to proceed with action against Contractor.

**1.13 PRE-WARRANTY CONFERENCE**

- .1 Meet with Consultant, to develop understanding of requirements of this section. Schedule meeting prior to contract completion, and at time designated by Consultant.
- .2 Consultant will establish communication procedures for:
  - .1 Notification of construction warranty defects.
  - .2 Determine priorities for type of defect.
  - .3 Determine reasonable time for response.
- .3 Provide name, telephone number and address of licensed and bonded company that is authorized to initiate and pursue construction warranty work action.
- .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

**1.14 WARRANTY TAGS**

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Property Manager or Consultant.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
  - .1 Type of product/material.
  - .2 Model number.
  - .3 Serial number.
  - .4 Contract number.
  - .5 Warranty period.
  - .6 Inspector's signature.
  - .7 Construction Contractor.

**Part 2 Products****2.1 NOT USED**

- .1 Not Used.



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**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1    Equipment and systems.
- .2    Materials and finishes.
- .3    Spare parts.
- .4    Maintenance manuals.
- .5    Special tools.
- .6    Storage, handling and protection.

**1.2                RELATED SECTIONS**

- .1    Section 017800 - Closeout Submittals.
- .2    Section 014500 - Quality Control.

**1.3                EQUIPMENT AND SYSTEMS**

- .1    Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2    Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3    Include installed colour coded wiring diagrams.
- .4    Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5    Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6    Provide servicing and lubrication schedule, and list of lubricants required.
- .7    Include manufacturer's printed operation and maintenance instructions.
- .8    Include sequence of operation by controls manufacturer.

- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Include test and balancing reports.
- .15 Additional requirements: As specified in individual specification sections.

#### **1.4 MATERIALS AND FINISHES**

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Building Envelope: include copies of drawings of building envelope components, illustrating the interface with similar or dissimilar items to provide an effective air, vapour and thermal barrier between indoor and outdoor environments. Include an outline of requirements for regular inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.
- .5 Additional Requirements: as specified in individual specifications sections.

#### **1.5 SPARE PARTS**

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

**1.6 MAINTENANCE MATERIALS**

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.

**1.7 SPECIAL TOOLS**

- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Deliver to site; place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Consultant. Include approved listings in Maintenance Manual.

**1.8 STORAGE, HANDLING AND PROTECTION**

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Consultant.

**END OF SECTION**

**Part 1            General**

**1.1                DESCRIPTION**

- .1     Demonstrate operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of final inspection.
- .2     Owner will provide list of personnel to receive instructions, and will co-ordinate their attendance at agreed-upon times.

**1.2                QUALITY CONTROL**

- .1     When specified in individual Sections require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

**1.3                SUBMITTALS**

- .1     Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2     Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Consultant approval.
- .3     Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .4     Give time and date of each demonstration, with list of persons present.

**1.4                CONDITIONS FOR DEMONSTRATIONS**

- .1     Provide copies of completed operation and maintenance manuals for use in demonstrations and instructions.

**1.5                PREPARATION**

- .1     Verify that conditions for demonstration and instructions comply with requirements.
- .2     Verify that designated personnel are present.

**1.6                DEMONSTRATION AND INSTRUCTIONS**

- .1     Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the designated location.
- .2     Instruct personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
- .3     Review contents of manual in detail to explain aspects of operation and maintenance.

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- .4 Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instructions.

**Part 2 Products****2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution****3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SUMMARY**

- .1    Section Includes:
  - .1    This section is limited to portions of the Building Management Manual (BMM) provided to Departmental Representative by Contractor.
- .2    Acronyms:
  - .1    BMM - Building Management Manual.
  - .2    HVAC - Heating, Ventilation and Air Conditioning.
  - .3    PI - Product Information.
  - .4    PV - Performance Verification.
  - .5    TAB - Testing, Adjusting and Balancing.
  - .6    WHMIS - Workplace Hazardous Materials Information System.

**1.2                GENERAL REQUIREMENTS**

- .1    Standard letter size paper 216 mm x 279mm.
- .2    Binders: vinyl hard covered, 3” “D” ring,(not “O” ring) loose leaf sized, with spine pocket. Identify contents of each binder on spine
- .3    Methodology used to facilitate updating.
- .4    Drawings, diagrams and schematics to be professionally developed.
- .5    Electronic copy of data to be in a format accepted and approved by Property Manger (PDF).

**1.3                APPROVALS**

- .1    Prior to commencement, co-ordinate requirements for preparation, submission and approval with Property Manager.

**1.4                GENERAL INFORMATION**

- .1    Provide Consultant the following for insertion into appropriate Part and Section of BMM:
  - .1    Complete list of names, addresses, telephone and fax numbers of contractor, sub-contractors that participated in delivery of project - as indicated in Section 1.2 of BMM.
  - .2    Summary of architectural, structural, fire protection, mechanical and electrical systems installed and commissioned - as indicated in Section 1.4 of BMM.
    - .1    Including sequence of operation as finalized after commissioning is complete as indicated in Section 2.0 of BMM.

- .3 Description of building operation under conditions of heightened security and emergencies as indicated in Section 2.0 of BMM.
- .4 System, equipment and components Maintenance Management System (MMS) identification - Section 2.1 of BMM..
- .5 Information on operation and maintenance of architectural systems and equipment installed and commissioned - Section 2.0 of BMM.
- .6 Information on operation and maintenance of fire protection and life safety systems and equipment installed and commissioned - Section 2.0 of BMM.
- .7 Information on operation and maintenance of mechanical systems and equipment installed and commissioned - Section 2.0 of BMM.
- .8 Operating and maintenance manual - Section 3.2 of BMM.
- .9 Final commissioning plan as actually implemented.
- .10 Completed commissioning checklists.
- .11 Commissioning test procedures employed.
- .12 Completed Product Information (PI) and Performance Verification (PV) report forms, approved and accepted by Property Manager.
- .13 Commissioning reports.

**1.5****CONTENTS OF OPERATING AND MAINTENANCE MANUAL**

- .1 For detailed requirements refer to Section 01 78 00 - Closeout Submittals.
- .2 Consultant to review and approve format and organization within 2 weeks of award of contract.
- .3 Include original manufactures brochures and written information on products and equipment installed on this project.
- .4 Record and organize for easy access and retrieval of information contained in BMM.
- .5 Include completed PI report forms, data and information from other sources as required.
- .6 Inventory directory relating to information on installed systems, equipment and components.
- .7 Approved project shop-drawings, product and maintenance data.
- .8 Manufacturer's data and recommendations relating: manufacturing process, installation, commissioning, start-up, O&M, shutdown and training materials.
- .9 Inventory and location of spare parts, special tools and maintenance materials.
- .10 Warranty information.
- .11 Inspection certificates with expiration dates, which require on-going re-certification inspections.
- .12 Maintenance program supporting information including:



- .1 Recommended maintenance procedures and schedule.
- .2 Information to removal and replacement of equipment including, required equipment, points of lift and means of entry and egress.

## **1.6 SUPPORTING DOCUMENTATION FOR INSERTION INTO SUPPORTING APPENDICES**

- .1 Provide RCMP supporting documentation relating to installed equipment and system, including:
  - .1 General:
    - .1 Finalized commissioning plan.
    - .2 WHMIS information manual.
    - .3 Approved "as-built" drawings and specifications.
    - .4 Procedures used during commissioning.
    - .5 Cross-Reference to specification sections.
  - .2 Architectural and structural:
    - .1 Inspection certificates, construction permits.
  - .3 Fire prevention, suppression and protection:
    - .1 Test reports.
    - .2 Smoke test reports.
    - .3 PV reports.
  - .4 Mechanical:
    - .1 Installation permits, inspection certificates.
    - .2 Piping pressure test certificates.
    - .3 Ducting leakage test reports.
    - .4 TAB and PV reports.
    - .5 Copies of posted instructions.
  - .5 Electrical:
    - .1 Installation permits, inspection certificates.
    - .2 TAB and PV reports.
    - .3 Electrical work log book.
    - .4 Charts and schedules.
    - .5 Locations of cables and components.
    - .6 Copies of posted instructions.

## **1.7 LANGUAGE**

- .1 English and French Language to be in separate binders.

## **1.8 IDENTIFICATION OF FACILITY**

- .1 When submitting information to Departmental Representative for incorporation into BMM, use following system for identification of documentation:

.1 To be supplied to successful contractor.

**1.9 USE OF CURRENT TECHNOLOGY**

.1 Use current technology for production of documentation. Emphasis on ease of accessibility at all times, maintain in up-to-date state, compatibility with user's requirements.

**Part 2 Products**

**2.1 NOT USED**

.1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

.1 Not used.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1    Canadian Standards Association (CSA International)
  - .1        CSA S350-M1980(R1998), Code of Practice for Safety in Demolition of Structures.

**1.2                SUBMITTALS**

- .1    Submit shop drawings in accordance with Sections 01 33 00 - Submittal Procedures 01 00 10 - General Instructions.

**1.3                SITE CONDITIONS**

- .1    Should material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Consultant immediately.
  - .1        Do not proceed until written instructions have been received from Consultant.

**Part 2            Products**

**2.1                NOT USED**

- .1    Not used.

**Part 3            Execution**

**3.1                PREPARATION**

- .1    Inspect site with Consultant and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.
- .2    Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3    Notify and obtain approval of utility companies before starting demolition.

**3.2                PROTECTION**

- .1    Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features and parts of building to remain in place. Provide bracing and shoring required.
- .2    Keep noise, dust, and inconvenience to occupants to minimum.
- .3    Protect building systems, services and equipment.
- .4    Provide temporary dust screens, covers, railings, supports and other protection as required.

**3.3 SALVAGE**

- .1 Refer to demolition drawings and specifications for items to be salvaged for reuse.
- .2 Items to be stored in weather tight enclosure to ensure that no damaged is caused prior to re-installation

**3.4 SITE REMOVALS**

- .1 Remove items as indicated.

**3.5 DEMOLITION**

- .1 Remove parts of existing building to permit new construction.
- .2 Trim edges of partially demolished building elements to tolerances as defined by Consultant to suit future use.

**3.6 DISPOSAL**

- .1 Dispose of removed materials, except where specified otherwise, in accordance with authority having jurisdiction.

**END OF SECTION**

**Part 1      General**

**1.1      RELATED REQUIREMENTS**

- .1      Section 06 10 00, 061500, 061753.

**1.2      REFERENCES**

- .1      American National Standards Institute/National Particleboard Association (ANSI/NPA)
  - .1      ANSI/NPA A208.1-2009, Particleboard.
- .2      ASTM International
  - .1      ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2      ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealloyed) by the Hot-Dip Process.
  - .3      ASTM C578-11a, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
  - .4      ASTM C1289-11, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
  - .5      ASTM C1396/C1396M-11, Standard Specification for Gypsum Board.
  - .6      ASTM D1761-06, Standard Test Methods for Mechanical Fasteners in Wood.
  - .7      ASTM D5055-11, Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
  - .8      ASTM D5456-11, Standard Specification for Evaluation of Structural Composite Lumber Products.
- .3      Canadian General Standards Board (CGSB)
  - .1      CAN/CGSB-11.3-M87, Hardboard.
  - .2      CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
  - .3      CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction and amendment.
  - .4      CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- .4      CSA International
  - .1      CAN/CSA-A123.2-03(R2008), Asphalt Coated Roofing Sheets.
  - .2      CAN/CSA-A247-M86 (R1996), Insulating Fiberboard.
  - .3      CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
  - .4      CSA O112.9-10, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
  - .5      CSA O121-08, Douglas Fir Plywood.
  - .6      CAN/CSA O122-06(R2011), Structural Glued-Laminated Timber.

- .7 CSA O141-05(R2009), Softwood Lumber.
- .8 CSA O151-09, Canadian Softwood Plywood.
- .9 CSA O153-M1980 (R2008), Poplar Plywood.
- .10 CSA O325-07, Construction Sheathing.
- .11 CSA O437 Series-93(R2011), Standards on OSB and Waferboard.
- .12 CAN/CSA-Z809-08, Sustainable Forest Management.
- .5 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .6 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber 2010.
- .7 Sustainable Forestry Initiative (SFI)
  - .1 SFI-2010-2014 Standard.
- .8 The Truss Plate Institute of Canada
  - .1 Truss Design Procedures and Specifications for Light Metal Plate Connected Wood Trusses 2007.
- .9 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Manitoba, Canada.

### **1.4 QUALITY ASSURANCE**

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood, particleboard, OSB and wood based composite panels in accordance with CSA and ANSI standards.
- .3 Sustainable Standards Certification:
  - .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wood from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

**Part 2 Products**

**2.1 FRAMING STRUCTURAL AND PANEL MATERIALS**

- .1 Description:
  - .1 Sustainability Characteristics:
    - .1 Lumber, Finger Jointed Lumber, Glulam, I-Joists, Trusses, SCL, CAN/CSA-Z809 or FSC or SFI certified.
    - .2 Plywood. Particleboard OSB urea-formaldehyde free, CAN/CSA-Z809 or FSC or SFI certified.
  - .2 Lumber: softwood, S4S, moisture content 19% (S-dry) or less in accordance with following standards:
    - .1 CSA O141.
    - .2 NLGA Standard Grading Rules for Canadian Lumber.
  - .3 Glulam in accordance with Structural Glued-Laminated Timber CAN/CSA-O122.
  - .4 Wood I-joists in accordance with Prefabricated Wood I-Joists ASTM D5055.
  - .5 Light-frame trusses in accordance with "Truss Design and Procedures for Light Metal Connected Wood Trusses", The Truss Plate Institute of Canada.
  - .6 Structural Composite Lumber (SCL) in accordance with ASTM D5456.
  - .7 Framing and board lumber: in accordance with NBC.
  - .8 Furring, blocking, nailing strips, grounds, rough bucks, curbs, fascia backing and sleepers:
    - .1 Board sizes: "Standard" or better grade.
    - .2 Dimension sizes: "Standard" light framing or better grade.
    - .3 Post and timbers sizes: "Standard" or better grade.
  - .9 Plywood, OSB and wood based composite panels: to CSA O325.
  - .10 Douglas fir plywood (DFP): to CSA O121, standard construction.

- .11 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .12 Poplar plywood (PP): to CSA O153, standard construction.
- .13 Interior mat-formed wood particleboard: to ANSI/NPA 208.1.
- .14 Mat-formed structural panelboards (OSB wafer): to CAN O437.
- .15 Insulating fiberboard sheathing: to CAN/CSA-A247 CAN/ULC-S706.
- .16 Glass fibre board sheathing: non-structural, rigid, faced, fiberglass, insulating exterior sheathing board.
- .17 Gypsum sheathing: to ASTM C1396/C1396M.

**2.2****ACCESSORIES**

- .1 Exterior wall sheathing paper: to CAN/CGSB-51.32
- .2 Polyethylene film: to CAN/CGSB-51.34, Type 1, 0.15 mm thick.
- .3 Roll roofing: to CAN/CSA A123.2, Type S.
- .4 Air seal: closed cell polyurethane or polyethylene.
- .5 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .6 Subflooring adhesive: to CAN/CGSB-71.26, cartridge loaded.
- .7 General purpose adhesive: to CSA O112.9.
- .8 Nails, spikes and staples: to CSA B111.
- .9 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .10 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.
- .11 Joist hangers: minimum 1 mm thick sheet steel, galvanized ZF001 coating designation. Hangers to be sized by truss manufacturer.
- .12 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, extruded 6063-T6 aluminum alloy type approved by Consultant.
- .13 Fastener Finishes:
  - .1 Galvanizing: to ASTM A123/A123M, ASTM A653, use galvanized fasteners for exterior work and treated lumber.
- .14 Wood Preservative:
  - .1 Preservative Coating: in accordance with manufacturer's recommendations for surface conditions:
    - .1 Preservative: VOC limit 350 g/L maximum to SCAQMD Rule 1113.
    - .2 Coatings: VOC limit 350 g/L maximum to SCAQMD Rule 1113.



**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
  - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

**3.2 PREPARATION**

- .1 Treat surfaces of material with wood preservative, before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and one minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

**3.3 MATERIAL USAGE**

- .1 Roof sheathing:
  - .1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, square edge, 12.5 mm thick.
- .2 Exterior wall sheathing:
  - .1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, square edge, 12.5 mm thick.
- .3 Subflooring:
  - .1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, T and G edge, 19 mm thick.

**3.4 INSTALLATION**

- .1 Install members true to line, levels and elevations, square and plumb.
- .2 Construct continuous members from pieces of longest practical length.
- .3 Install spanning members with "crown-edge" up.
- .4 Select exposed framing for appearance. Install lumber panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .5 Install subflooring combined subfloor and underlay with panel end-joints located on solid bearing, staggered at least 800 mm.
  - .1 In addition to mechanical fasteners, floor panels secure floor subflooring to floor joists using glue and screws. Place continuous adhesive bead in accordance with

manufacturer's instructions, single-bead on each joist and double-bead on joists where panel ends butt.

- .6 Install all wall sheathing in accordance with manufacturer's printed instructions.
- .7 Install all roof sheathing in accordance with requirements of NBC.
- .8 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding electrical equipment mounting boards, and other work as required.
- .9 Install furring to support siding applied vertically where there is no blocking and where sheathing is not suitable for direct nailing.
  - .1 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .10 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .11 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized steel fasteners.
- .12 Install sleepers as indicated.
- .13 Use dust collectors and high quality respirator masks when cutting or sanding wood panels.
- .14 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .15 Countersink bolts where necessary to provide clearance for other work.
- .16 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

**3.5****CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**3.6****PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by rough carpentry installation.

**END OF SECTION**

**Part 1          General****1.1          REFERENCES**

- .1 American National Standards Institute (ANSI)
  - .1 ANSI A208.1-09, Particleboard.
  - .2 ANSI A208.2-09, Medium Density Fiberboard (MDF) for Interior Applications.
  - .3 ANSI/HPVA HP-1-10, Standard for Hardwood and Decorative Plywood.
- .2 ASTM International
  - .1 ASTM E1333-10, Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
  - .2 ASTM D2832-92(R2011), Standard Guide for Determining Volatile and Non-volatile Content of Paint and Related Coatings.
  - .3 ASTM D5116-10, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .3 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)
  - .1 Architectural Woodwork Quality Standards Illustrated, 8th edition, Version 1.0 (2009).
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
- .5 CSA International
  - .1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.
  - .2 CSA O112.10-08, Evaluation of Adhesives for Structural Wood Products (Limited Moisture Exposure).
  - .3 CSA O121-08, Douglas Fir Plywood.
  - .4 CSA O141-05(R2009), Softwood Lumber.
  - .5 CSA O151-09, Canadian Softwood Plywood.
  - .6 CSA O153-M1980(R2008), Poplar Plywood.
  - .7 CAN/CSA-Z809-08, Sustainable Forest Management.
- .6 Forest Stewardship Council (FSC)
  - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
- .7 Green Seal Environmental Standards (GS)
  - .1 GS-11-11, Paints and Coatings.
  - .2 GS-36-11, Commercial Adhesives.
- .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

- .1 Material Safety Data Sheets (MSDS).
- .9 International Organization for Standardization (ISO)
  - .1 ISO 14040-2006, Environmental Management-Life Cycle Assessment - Principles and Framework.
  - .2 ISO 14041-98, Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.
- .10 National Electrical Manufacturers Association (NEMA)
  - .1 ANSI/NEMA LD-3-05, High-Pressure Decorative Laminates (HPDL).
- .11 National Hardwood Lumber Association (NHLA)
  - .1 Rules for the Measurement and Inspection of Hardwood and Cypress 2011.
- .12 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber 2010.
- .13 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
  - .1 SCAQMD Rule 1113-A2011, Architectural Coatings.
  - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .14 Sustainable Forestry Initiative (SFI)
  - .1 SFI-2010-2014 Standard.

## **1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
  - .1 Indicate details of construction, profiles, jointing, fastening and other related details.
    - .1 Scales: profiles full size, details half full size.
  - .2 Indicate materials, thicknesses, finishes and hardware.
  - .3 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.
- .3 Samples:
  - .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures
  - .2 .
  - .3 Submit duplicate sample size 300 x 300 mm or 300mm long.
  - .4 Submit duplicate samples of laminated plastic for colour selection.
  - .5 Submit duplicate samples of laminated plastic joints, edging, cutouts and postformed profiles.
- .4 Certifications: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

**1.3 QUALITY ASSURANCE**

- .1 Lumber by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Sustainable Standards Certification:
  - .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.
- .3 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .1 Protect millwork against dampness and damage during and after delivery.
  - .2 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.
- .3 Storage and Handling Requirements:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect architectural woodwork from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**Part 2 Products****2.1 MATERIALS**

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 15 % or less in accordance with following standards:
  - .1 CSA O141.
  - .2 CAN/CSA-Z809 or FSC or SFI certified.
  - .3 NLGA Standard Grading Rules for Canadian Lumber.
  - .4 AWMAC custom and premium grade, moisture content as specified.
- .2 Machine stress-rated lumber is acceptable for all purposes.
- .3 Ensure manufacturing process adheres to Lifecycle Assessment (LCA) Standards to ISO 14040/14041 LCA Standards, CSA Z760-94 Life Cycle Assessment.
- .4 Hardwood lumber: moisture content 6 % or less in accordance with following standards:
  - .1 National Hardwood Lumber Association (NHLA).

- .2 CAN/CSA-Z809 or FSC or SFI certified.
- .3 AWMAC premium grade, moisture content as specified.
- .5 Douglas fir plywood (DFP): to CSA O121, standard construction, CAN/CSA-Z809 or FSC or SFI certified.
  - .1 Plywood resin to contain no added urea-formaldehyde.
- .6 Canadian softwood plywood (CSP): to CSA O151, standard construction, CAN/CSA-Z809 or FSC or SFI certified.
  - .1 Plywood resin to contain no added urea-formaldehyde.
- .7 Hardwood plywood: to ANSI/HPVA HP-1, CAN/CSA-Z809 or FSC or SFI certified.
  - .1 Plywood resin to contain no added urea-formaldehyde.
- .8 Poplar plywood (PP): to CSA O153, standard construction, CAN/CSA-Z809 or FSC or SFI certified.
  - .1 Plywood resin to contain no added urea-formaldehyde.
- .9 Interior mat-formed wood particleboard: to ANSI/NPA A208.1, CAN/CSA-Z809 or FSC or SFI certified.
  - .1 Particleboard resin to contain no added urea-formaldehyde.
- .10 Birch plywood: to AWMAC Natural, CAN/CSA-Z809 or FSC or SFI certified.
  - .1 Plywood resin to contain no added urea-formaldehyde.
- .11 Fibreboard must contain less than 10% roundwood by weight, using weighted average over three month period at manufacturing locations.
  - .1 Fibreboard resin to contain no added urea-formaldehyde.
  - .2 CAN/CSA-Z809 or FSC or SFI certified.
- .12 Hardboard:
  - .1 To CAN/CGSB-11.3, CAN/CSA-Z809 or FSC or SFI certified.
  - .2 Hardboard resin to contain no added urea-formaldehyde.
- .13 MDF (medium density fibreboard) core: to ANSI A208.2, density 769 kg/m<sup>2</sup>, CAN/CSA-Z809 or FSC or SFI certified.
  - .1 Medium density fibreboard performance requirements to: ANSI A208.2.
  - .2 MDF resin to contain no added urea-formaldehyde.
- .14 Thermofused Melamine: to NEMA LD3 Grade VGL.
  - .1 High wear resistant thermofused melamine: equal or exceed 400 cycles (Minimum standard for HPL abrasion test).
- .15 Nails and staples: to CSA B111.
- .16 Wood screws: stainless steel type and size to suit application.
- .17 Splines: wood.
- .18 Sealant: in accordance with Section 07 92 00 - Joint Sealants.

- .1 Sealants: VOC limit 250 g/L maximum to SCAQMD Rule 1168.
- .19 Laminated plastic adhesive:
  - .1 Adhesive: urea resin adhesive to CSA O112.10 contact adhesive to CAN/CGSB-71.20 resorcinol resin adhesive to CSA O112.10 polyvinyl adhesive to CSA O112.10 two component epoxy thermosetting adhesive.
  - .2 Adhesives: VOC limit 30 g/L maximum to GS-36.
  - .3 Clear Wood Finishes: VOC limit 350 550 g/L maximum to GS-11

## **2.2 Stainless Steel Cabinets/ Counter Tops**

- .1 General Stainless steel materials requirements (Counter and Cabinets for Room 118 and 126)
  - .1 Fabricate work square, true, straight to suit installation conditions and as indicated
  - .2 Fit and shop assemble equipment ready for erection where possible
  - .3 Debur, smooth and round off raw edges prior to forming
  - .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.
  - .5 Stainless sheet steel to ASTM 204/240M Type 304 with AISI No. 4 finish with 2mm thickness or as indicated
  - .6 Hardware and Fastenings: Stainless Steel
  - .7 Welding: sound, non-porous and free from imperfections
    - .1 Weld metal: color matched and corrosion-resistant as parent metal
    - .2 Spot welds. Minimum 3.0 mm in diameter with full penetration
    - .3 Grind exposed welds smooth and polish to match parent metal
    - .4 Grind other welds smooth
    - .5 Welding and finishing is not to impair corrosion resistance of finish article.
    - .6 Welds, except spot welds: continuous unless otherwise indicated
  - .8 Steel Section and tubing plates to CSA G40.20/G40.21
  - .9 Steel Pipe to ASTM A53/A53M
  - .10 Welding Materials to CSA W59
  - .11 Welding electrodes to CSA W48 Series
  - .12 Bolts and anchor bolts to ASTM A307

## **2.3 MANUFACTURED UNITS**

- .1 Casework:
  - .1 Fabricate caseworks to AWMAC premium quality grade.
  - .2 Furring, blocking, nailing strips, grounds and rough bucks and sleepers.

- .1 S2S
- .2 Board sizes: "standard" or better grade.
- .3 Dimension sizes: "standard" light framing or better grade.
- .4 Urea-formaldehyde free.
- .3 Framing fir or spruce species, NLGA custom grade.
- .4 Case bodies (ends, divisions and bottoms).
  - .1 Softwood and poplar plywood DFP or CSP or PP custom grade, square edge, 19 mm thick.
  - .2 Particleboard, grade R, 19 mm thick.
  - .3 Solid wood: fir or spruce species, custom grade, 19 mm thick.
- .5 Backs:
  - .1 Softwood and poplar plywood DFP or CSP or PP custom grade, square edge, 19 mm thick.
  - .2 Particleboard, grade R, 6 mm thick.
  - .3 Fibreboard, Medium Density Fibreboard 19 mm thick.
  - .4 Solid wood: spruce species, custom grade, 19 mm thick.
- .6 Shelving:
  - .1 Softwood and poplar plywood DFP or CSP or PP G2G grade, square edge, 16 and 19 mm thick.
  - .2 Particleboard, HPL grade M2, 19 - 25 mm thick.
  - .3 Solid wood: hard maple species, premium grade, 19 mm thick.
  - .4 Edge banding: provide 10 mm thick solid matching wood strip on plywood edges 10 mm or thicker, exposed in final assembly. Strips same width as plywood.
- .2 Drawers:
  - .1 Fabricate drawers to AWMAC premium grade supplemented as follows:
  - .2 Sides and Backs.
    - .1 Softwood and poplar plywood DFP or CSP or PP G2G grade, square edge, 13 mm thick.
    - .2 Fibreboard: medium density fibreboard 13 mm thick.
    - .3 Thermofused melamine: 13 mm thick.
  - .3 Bottoms:
    - .1 Softwood and poplar plywood DFP or CSP or PP G2G grade, square edge, 13 mm thick.
    - .2 Hardboard: type 1, 6 mm thick.
  - .4 Fronts:
    - .1 Softwood and poplar plywood DFP or CSP or PP G2G grade, square edge, 19 mm thick.
    - .2 Particleboard, HPL grade 2000, 16 mm thick.
- .3 Casework Doors:



- .1 Fabricate doors to AWMAC premium grade supplemented as follows:
- .2 Softwood and poplar plywood DFP or CSP or PP G2G grade, square edge, 19 mm thick.
- .3 Particleboard, HPL grade 2000, 19 mm thick.
- .4 Medium Density Fibreboard, laminated with TFM.

## **2.4 FABRICATION**

- .1 Set nails and countersink screws apply wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .3 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .4 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .7 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .8 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 3000 mm. Keep joints 600 mm from sink cutouts.
- .9 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .10 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .11 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .12 Apply laminated plastic liner sheet where indicated.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for architectural woodwork installation in accordance with manufacturer's instructions.
  - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative DCC Representative Consultant.

**3.2 INSTALLATION**

- .1 Do architectural woodwork to Quality Standards of AWMAC.
- .2 Install prefinished millwork at locations shown on drawings.
  - .1 Position accurately, level, plumb straight.
- .3 Fasten and anchor millwork securely.
  - .1 Supply and install heavy duty fixture attachments for wall mounted cabinets.
- .4 Use draw bolts in countertop joints.
- .5 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- .6 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant in accordance with Section 07 92 00 - Joint Sealants.
- .7 Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.
- .8 Fit hardware accurately and securely in accordance with manufacturer's written instructions.
- .9 Install at location as indicated.
- .10 Site apply laminated plastic to units as indicated.
  - .1 Adhere laminated plastic over entire surface.
  - .2 Make corners with hairline joints.
  - .3 Use full sized laminate sheets.
  - .4 Make joints only where indicated approved Consultant.
  - .5 Slightly bevel arises.
- .11 For site application, offset joints in plastic laminate facing from joints in core.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - .1 Clean millwork and cabinet work outside surfaces inside cupboards drawers.
  - .2 Remove excess glue from surfaces.

**3.4 PROTECTION**

- .1 Protect millwork cabinet work from damage until final inspection.
- .2 Protect installed products and components from damage during construction.
- .3 Repair damage to adjacent materials caused by architectural woodwork installation.

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**Interior Renovation**

Norman Wells

Northwest Territories

Can-Tec Project No. 14-025-01-30

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Section 06 40 00  
Architectural Woodwork

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**END OF SECTION**

**Part 1           General**

**1.1           REFERENCES**

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .2 Underwriter's Laboratories of Canada (ULC)
  - .1 ULC-S115-2005, Fire Tests of Fire stop Systems.

**1.2           DEFINITIONS**

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.
- .4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of non-combustible construction or have "0" annular space in buildings of combustible construction.
  - .1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

**1.3           ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Shop Drawings:
  - .1 Submit shop drawings sealed by an Engineer licenced to Practice in the Province of Manitoba to show location, proposed material, reinforcement, anchorage, fastenings and method of installation. Through the fire walls as shown on drawing A2.0
  - .2 Construction details should accurately reflect actual job conditions.

- .4 Samples:
  - .1 Submit duplicate 300 x 300 mm samples showing actual fire stop material proposed for project.
- .5 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.
  - .1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.
    - .1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.
    - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
    - .3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, cleaning procedures and .
    - .4 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

#### **1.4 QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Installer: company specializing in fire stopping installations and approved by manufacturer.
- .2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative Departmental Representative DCC Representative Consultant in accordance with Section 01 32 16.06 - Construction Progress Schedule - Critical Path Method (CPM) Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart to:
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Co-ordination with other building subtrades.
  - .4 Review manufacturer's installation instructions and warranty requirements.
- .3 Provide shop drawings of proposed ULC listed fire stopping systems for approval by Consultant
- .4 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.
  - .1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
  - .2 Once during progress of Work at 50% complete.
  - .3 Upon completion of Work, after cleaning is carried out.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
  - .3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.
- .2 Storage and Protection:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .3 Waste Management and Disposal:
  - .1 Separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.
  - .1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended and conforming to specified special requirements described in PART 3.
- .2 Service penetration assemblies: systems tested to CAN-ULC-S115.
- .3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.
- .4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
- .5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
- .6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .9 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .10 Sealants for vertical joints: non-sagging.

**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 datasheets.

**3.2 COORDINATION**

- .1 General Contractor is to coordinate work between sub-contractors to ensure proper fire stopping coordination
  - .1 Fire stopping installer is to review site prior to and during installation of work by other trades
  - .2 Ensure that work by all trades is installed in such a manor to meet the requirements of ULC listed fire stopping systems approved for use.
  - .3 Do not enclose shafts, walls and other spaces until completion of all fire stopping work.
  - .4 Photograph completion of fire stopping in all concealed spaces prior to enclosing

**3.3 PREPARATION**

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
  - .1 Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

**3.4 INSTALLATION**

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.

### 3.5 SEQUENCES OF OPERATION

- .1 Proceed with installation only when submittals have been reviewed by Consultant.
- .2 Install floor fire stopping before interior partition erections.
- .3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.
- .4 Mechanical pipe insulation: certified fire stop system component.
  - .1 Ensure pipe insulation installation precedes fire stopping.

### 3.6 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.

### 3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

### 3.8 SCHEDULE

- .1 All Penetrations through fire wall as shown on sheet A2.0
- .2 Fire stop and smoke seal at:
  - .1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.
  - .2 Top of fire-resistance rated masonry and gypsum board partitions.
  - .3 Intersection of fire-resistance rated masonry and gypsum board partitions.
  - .4 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
  - .5 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
  - .6 Openings and sleeves installed for future use through fire separations.
  - .7 Around mechanical and electrical assemblies penetrating fire separations.
  - .8 Rigid ducts: greater than 129 cm<sup>2</sup> : fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.



**END OF SECTION**

**Part 1        General**

**1.1            REFERENCES**

- .1    ASTM International
  - .1    ASTM C919-08, Standard Practice for Use of Sealants in Acoustical Applications.
- .2    Canadian General Standards Board (CGSB)
  - .1    CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
  - .2    CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
  - .3    CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
  - .4    CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
  - .5    CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .3    General Services Administration (GSA) - Federal Specifications (FS)
  - .1    FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.
- .4    Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1    Material Safety Data Sheets (MSDS).

**1.2            ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Product Data:
  - .1    Submit manufacturer's instructions, printed product literature and data sheets for joint sealants and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2    Manufacturer's product to describe:
    - .1    Caulking compound.
    - .2    Primers.
    - .3    Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3    Samples:
  - .1    Submit samples of each type of material and colour.
  - .2    Cured samples of exposed sealants for each colour where required to match adjacent material.

- .4 Manufacturer's Instructions:
  - .1 Submit instructions to include installation instructions for each product used.

### 1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.

### 1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect joint sealants from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

### 1.5 SITE CONDITIONS

- .1 Ambient Conditions:
  - .1 Proceed with installation of joint sealants only when:
    - .1 Ambient and substrate temperature conditions are within limits permitted by joint sealant manufacturer or are above 4.4 degrees C.
    - .2 Joint substrates are dry.
    - .3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .2 Joint-Width Conditions:
  - .1 Proceed with installation of joint sealants only where joint widths are more than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
  - .1 Proceed with installation of joint sealants only after contaminants capable of interfering with adhesion are removed from joint substrates.

### 1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Health Canada.

- .2 Conform to manufacturers recommended installation conditions for applications of sealants
- .3 Ventilate area of work by use of portable supply and exhaust fans.

## **Part 2 Products**

### **2.1 SEALANT MATERIALS**

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .2 When low toxicity caulks are not possible, confine usage to areas which off gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off gas time.
- .3 Where sealants are qualified with primers use only these primers.
- .4 All sealants to be used in accordance with manufacturers recommended applications
- .5 It remains the contractors responsibility to verify compatibility of the sealant with the substrate, primers, backer rods and weather conditions prior to installation.
  - .1 Bring any discrepancies with the above to the attention of the project manager.

### **2.2 SEALANT MATERIAL DESIGNATIONS**

- .1 Exterior joints in horizontal wearing (concrete) surfaces: Polyurethane, semi-self-levelling, moisture curing, non-staining, non-bleeding, colour as selected.
  - .1 ASTM C920
  - .2 Single Component
  - .3 Pourable
  - .4 Class – Cyclic Movement - 100/50
  - .5 CAN/CGSB – 19.13-M87
  - .6 Acceptable Product: Vulkem 45 SSL – Tremco Sealants, or approved equivalent.
- .2 General exterior use: Silicone, neutral cure ultra-low modulus, moisture curing, nonstaining, nonbleeding, colour as selected.
  - .1 ASTM C920
  - .2 Single Component
  - .3 Non-Sag
  - .4 Class – Cyclic Movement - 100/50
  - .5 Class ‘A’
  - .6 ASTM C1248, C1382, E84
  - .7 CAN/CGSB – 19.13-M87

- .8 Acceptable Product: Spectrem 1 – Tremco Sealants, or approved equivalent.
- .3 Glazing: Silicone, neutral cure, medium modulus, colour as selected.
  - .1 ASTM C920
  - .2 Single Component
  - .3 Non-Sag
  - .4 Class – Cyclic Movement - 50
  - .5 Class ‘A’
  - .6 ASTM C1248
  - .7 CAN/CGSB – 19.13-M87
  - .8 Acceptable Product: Spectrem 2 – Tremco Sealants, or approved equivalent.
- .4 Air-Barrier to Window air-seal sealant: Silyl-terminated polyether polymer (STPe), moisture cure, medium modulus.
  - .1 Compatible with Air-Barrier system.
  - .2 ASTM C920
  - .3 Single Component
  - .4 Non-Sag
  - .5 Class – Cyclic Movement - 25
  - .6 Class ‘A’
  - .7 Acceptable Product: Bakor HE925 BES, or approved equivalent.
- .5 General interior use: painted gypsum, painted concrete, painted concrete block: Acrylic latex, colour as selected.
  - .1 Low VOC.
  - .2 Single Component
  - .3 Non-Sag
  - .2 Class – Cyclic Movement - 12.5
  - .3 Class ‘A’
  - .4 CAN/CGSB 19-GP-14M
  - .5 Acceptable Product: Tremflex 834 – Tremco Sealants, or approved equivalent.
- .6 Plumbing fixtures and general washroom / kitchen (wet-area) usage: sinks, tubs, urinals, water-closets, vanities: Silicone, acetoxy, moisture curing, with fungicide.
  - .1 ASTM C920
  - .2 Single Component
  - .3 Non-Sag
  - .4 Class – Cyclic Movement – 25
  - .5 Class ‘A’

- .6 CAN/CGSB – 19.13-M87
- .7 Acceptable Product: Tremsil 200 – Tremco Sealants, or approved equivalent.
- .7 Acoustical Sealant: to ASTM C919: Synthetic rubber, single-component, non-skinning, non-hardening.
  - .1 Single Component
  - .2 Non-Sag
  - .3 Class – Cyclic Movement – N/A
  - .4 CAN/CGSB 19.21 M87
  - .5 Acceptable Product: Acoustical Sealant – Tremco Sealants, or approved
- .8 Preformed compressible and non-compressible back-up materials:
  - .1 Polyethylene, urethane, neoprene or vinyl foam:
    - .1 Extruded open closed cell foam backer rod.
    - .2 Size: oversize 30 to 50 %.
  - .2 Neoprene or butyl rubber:
    - .1 Round solid rod, Shore A hardness 70.
  - .3 High density foam:
    - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m<sup>3</sup> density, or neoprene foam backer, size as recommended by manufacturer.
  - .4 Bond breaker tape:
    - .1 Polyethylene bond breaker tape which will not bond to sealant.

## 2.3 JOINT CLEANER

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant in accordance with sealant manufacturer's written recommendations.
- .2 Primer: in accordance with sealant manufacturer's written recommendations.

## Part 3 Execution

### 3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for joint sealants installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied

**3.2 SURFACE PREPARATION**

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

**3.3 PRIMING**

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

**3.4 BACKUP MATERIAL**

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

**3.5 MIXING**

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

**3.6 APPLICATION**

- .1 Sealant:
  - .1 Apply sealant in accordance with manufacturer's written instructions.
  - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
  - .3 Apply sealant in continuous beads.
  - .4 Apply sealant using gun with proper size nozzle.
  - .5 Use sufficient pressure to fill voids and joints solid.
  - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
  - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
  - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing:
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.

**3.7 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
  - .2 Clean adjacent surfaces immediately.
  - .3 Remove excess and droppings, using recommended cleaners as work progresses.
  - .4 Remove masking tape after initial set of sealant.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**3.8 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by joint sealants installation.

**END OF SECTION**



**Part 1            General**

**1.1                SUMMARY**

- .1    This section specified caulking and sealants in the following areas
  - .1    Prisoner cells
  - .2    Cell Shower

**1.2                SECTION INCLUDES**

- .1    Materials, preparation and application for caulking and sealants.
- .2    Text to complete other various Sections containing sealant or caulking specifications, including Section 07 52 00 - Modified Bituminous Membrane Roofing.

**1.3                RELATED SECTIONS**

- .1    Section 01 33 00 - Submittal Procedures.
- .2    Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .3    Section 01 45 00 - Quality Control.
- .4    Section 01 61 00 - Common Product Requirements.

**1.4                REFERENCES**

- .1    American Society for Testing and Materials International, (ASTM)
  - .1    ASTM C919-02, Standard Practice for Use of Sealants in Acoustical Applications.
- .2    Canadian General Standards Board (CGSB)
  - .1    CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
  - .2    CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
  - .3    CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
  - .4    CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
  - .5    CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .3    Department of Justice Canada (Jus)
  - .1    Canadian Environmental Protection Act, 1999 (CEPA).
- .4    General Services Administration (GSA) - Federal Specifications (FS)

- .1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .6 Transport Canada (TC)
  - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).

**1.5 SUBMITTALS**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's product to describe.
  - .1 Caulking compound.
  - .2 Primers.
  - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Submit duplicate samples of each type of material and colour.
- .5 Cured samples of exposed sealants for each color where required to match adjacent material.
- .6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Instructions to include installation instructions for each product used.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

**1.7 PROJECT CONDITIONS**

- .1 Environmental Limitations:
  - .1 Do not proceed with installation of joint sealants under following conditions:
    - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.
    - .2 When joint substrates are wet.
- .2 Joint-Width Conditions:
  - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

- .3 Joint-Substrate Conditions:
  - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

## **1.8 ENVIRONMENTAL REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

## **Part 2 Products**

### **2.1 SEALANT MATERIALS**

- .1 Pick Proof sealant: Two component 100% solids epoxy gel, no VOC odourless, fast drying, self priming, non-sag for use on horizontal and vertical surfaces.
- .2 Acceptable products: Tremco Peraquik 2252, Sika Anchor Fix 3, Pecora Dynapoxy EP-425, BASF Epolith G
- .3 Where sealants are qualified with primers use only these primers.

### **2.2 JOINT CLEANER**

- .1 Xylol, methyl ethyl ketone or non-corosive type recommended by sealant manufacturer and compatible with joint forming materials.
- .2 Primer: as recommended by manufacturer.

## **Part 3 Execution**

### **3.1 PROTECTION**

- .1 Protect installed Work of other trades from staining or contamination.

### **3.2 SURFACE PREPARATION**

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

**3.3 PRIMING**

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

**3.4 BACKUP MATERIAL**

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

**3.5 MIXING**

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

**3.6 APPLICATION**

- .1 Sealant.
  - .1 Apply sealant in accordance with manufacturer's written instructions.
  - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
  - .3 Apply sealant in continuous beads.
  - .4 Apply sealant using gun with proper size nozzle.
  - .5 Use sufficient pressure to fill voids and joints solid.
  - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
  - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
  - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing.
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup.
  - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
  - .2 Remove excess and droppings, using recommended cleaners as work progresses.

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**Interior Renovation**

Norman Wells

Northwest Territories

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- .3 Remove masking tape after initial set of sealant.

**END OF SECTION**

**Part 1        General**

**1.1        REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM A653/A653M-06a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2 ASTM B29-03, Standard Specification for Refined Lead.
  - .3 ASTM B749-03, Standard Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
  - .2 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA-G40.20-04/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CSA W59-03, Welded Steel Construction (Metal Arc Welding).
- .4 Canadian Steel Door Manufacturers' Association (CSDMA)
  - .1 CSDMA, Recommended Specifications for Commercial Steel Doors and Frames, 2000.
  - .2 CSDMA, Selection and Usage Guide for Commercial Steel Doors, 1990.
- .5 National Fire Protection Association (NFPA)
  - .1 NFPA 80-2007, Standard for Fire Doors and Fire Windows.
  - .2 NFPA 252-03, Standard Methods of Fire Tests of Door Assemblies.
- .6 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1113-04, Architectural Coatings.
  - .2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.
- .7 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
  - .2 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
  - .3 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
  - .4 CAN4-S104-M80, Standard Method for Fire Tests of Door Assemblies.
  - .5 CAN4-S105-M85, Standard Specification for Fire Door Frames Meeting the Performance Required by CAN4-S104.

## 1.2 SYSTEM DESCRIPTION

- .1 Design Requirements:
  - .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35 degrees C to 35 degrees C.
  - .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.
  - .3 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 NFPA 252 for ratings specified or indicated.
  - .4 Provide fire labelled frames for openings requiring fire protection ratings. Test products in conformance with CAN4-S104, ASTM E152 NFPA 252 and listed by nationally recognized agency having factory inspection services.

## 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide product data: in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed louvred, arrangement of hardware fire rating and finishes.
  - .2 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings reinforcing fire rating finishes.
  - .3 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
  - .4 Submit test and engineering data, and installation instructions.
- .4 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
- .5 Submit one 300 x 300 mm corner sample of each type of frame.
  - .1 Show butt cutout glazing stops snap-on trim with clips 300 mm long removable mullion connection.

## 1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**Part 2****Products****2.1****MATERIALS**

- .1 .
- .2 Hot dipped galvanized steel sheet: to ASTM A653M, ZF75, minimum base steel thickness in accordance with CSDMA Table 1 - Thickness for Component Parts.
- .3 Reinforcement channel: to CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653M, ZF75.
- .4 Composites: balance of core materials used in conjunction with lead: in accordance with manufacturers' proprietary design.

**2.2****DOOR CORE MATERIALS**

- .1 Honeycomb construction:
  - .1 Structural small cell, 24.5 mm maximum kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m<sup>3</sup> minimum sanded to required thickness.
- .2 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door to 250 degrees C at 60 minutes. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, ASTM E152 NFPA 252, covering Standard Method of Tests of Door Assemblies and listed by nationally recognized testing agency having factory inspection service.

**2.3****ADHESIVES**

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
- .2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.
- .3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

**2.4****PRIMER**

- .1 Touch-up prime CAN/CGSB-1.181.

**2.5****PAINT**

- .1 Field paint steel doors and frames in accordance with Sections 09 91 23 - Interior Painting, 09 91 13 - Exterior Painting. Protect weatherstrips from paint. Provide final finish free of scratches or other blemishes.

**2.6****ACCESSORIES**

- .1 Door silencers: single stud rubber/neoprene type.
- .2 Exterior Caps: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma steel.



- .3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .4 Frame Thermal Breaks: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA
- .5 Metallic paste filler: to manufacturer's standard.
- .6 Fire labels: metal riveted.
- .7 Glazing: see Section 08 80 50 Glazing.
- .8 Make provisions for glazing as indicated and provide necessary glazing stops.
  - .1 Provide removable stainless steel glazing beads for use with glazing tapes and compounds and secured with countersunk stainless steel screws.
  - .2 Design exterior glazing stops to be tamperproof.

## **2.7 FRAMES FABRICATION GENERAL**

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Exterior frames: as per door schedule welded construction.
- .4 Interior frames: as per door schedule, welded construction.
- .5 Blank, reinforce, drill and tap frames for mortised, template hardware, electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Protect mortised cutouts with steel guard boxes.
- .7 Prepare frame for door silencers, 3 for single door, 2 at head for double door.
- .8 Manufacturer's nameplates on frames and screens are not permitted.
- .9 Conceal fastenings except where exposed fastenings are indicated.
- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Insulate exterior frame components with polyurethane insulation.

## **2.8 FRAME ANCHORAGE**

- .1 Provide appropriate anchorage to floor and wall construction.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.
- .3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.
- .4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm on centre maximum.

**2.9 FRAMES: WELDED TYPE**

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Securely attach floor anchors to inside of each jamb profile.
- .6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.
- .7 Securely attach lead to inside of frame profile from return to jamb soffit (inclusive) on door side of frame only.

**2.10 DOOR FABRICATION GENERAL**

- .1 Exterior doors shall be laminated core with core type as indicated on the door schedule.
- .2 Interior doors shall be laminated core with core type as indicated on the door schedule. Longitudinal edges shall be:
  - .1 Unless indicated otherwise on the door schedule: Mechanically interlocked.
  - .2 Where indicated on the door schedule: Mechanically interlocked, tack welded at top and bottom of door, above and below each edge cutout and at 150 mm (6") on center with visible edge seams.
- .3 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.
- .4 Blank, reinforce, drill doors and tap for mortised, templated hardware electronic hardware.
- .5 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
- .6 Reinforce doors where required, for surface mounted hardware. Provide flush PVC steel top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.
- .7 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
- .8 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in conformance with CAN4-S104 ASTM E152 NFPA 252 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
- .9 Manufacturer's nameplates on doors are not permitted.

**2.11 DOORS: CORE CONSTRUCTION**

- .1 Laminated Core Construction
  - .1 Exterior Doors: Both face sheets for exterior doors shall be formed from a sheet of steel with polyisocyanurate core, laminated under pressure to face sheets.
  - .2 Interior Doors: Both face sheets for interior doors shall be formed from a sheet steel with honeycomb, vertical steel stiffener core or temperature rise rated core, (as specified on the

**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 datasheets.

**3.2 INSTALLATION GENERAL**

- .1 Install labelled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.

**3.3 FRAME INSTALLATION**

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames between frame and adjacent material.
- .6 Maintain continuity of air barrier

**3.4 DOOR INSTALLATION**

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware.
- .2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.
  - .1 Hinge side: 1.0 mm.
  - .2 Latchside and head: 1.5 mm.
  - .3 Finished floor, top of carpet non-combustible sill and thresholds: 13 mm.
- .3 Adjust operable parts for correct function.

- .4 Install louvres.

**3.5 FINISH REPAIRS**

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

**3.6 GLAZING**

- .1 Install glazing for doors frames in accordance with Section 08 80 50 - Glazing.

**END OF SECTION**

**Part 1            General**

**1.1                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for access door components and include product characteristics, performance criteria, physical size, finish and limitations.
- .3        Shop Drawings:
  - .1        Submit catalogue details for each type of door illustrating profiles, dimensions and methods of assembly.

**1.2                CLOSEOUT SUBMITTALS**

- .1        Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2        Operation and Maintenance Data: submit operation and maintenance data for cleaning and maintenance of stainless steel finishes for incorporation into manual.

**1.3                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2        Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3        Storage and Handling Requirements:
  - .1        Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2        Store and protect access doors from nicks, scratches, and blemishes.
  - .3        Apply temporary protective coating to finished surfaces. Remove coating after installation.
    - .1        Use coatings in accordance with manufacturer's written instructions that are easily removable.
    - .2        Leave protective coating in place until final cleaning of building.
  - .4        Replace defective or damaged materials with new.

**Part 2            Products**

**2.1                ACCESS DOORS**

- .1        Sizes: as follows unless indicated:
  - .1        For body entry: 600 x 600 mm minimum.

- .2 For hand entry: 300 x 300 mm minimum.
- .2 Construction: rounded safety corners, concealed hinges, screwdriver latch, anchor straps, able to open 180 degrees.
- .3 Materials:
  - .1 Tiled or marble surfaces : stainless steel with brushed satin.
  - .2 Other areas: prime coated steel.

**2.2 EXCLUSIONS**

- .1 Lay-in tile ceilings: use unobtrusive identification locators.

**Part 3 Execution****3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for access door installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

**3.2 INSTALLATION**

- .1 Installation: locate access doors within view of equipment and ensure equipment is accessible for operating, inspecting, adjusting, servicing without using special tools.
  - .1 Install masonry surfaces: in accordance with Section 04 05 00 - Common Work Results for Masonry.
  - .2 Install gypsum board surfaces: in accordance with Section 09 21 16 - Gypsum Board Assemblies.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by access door installation.

**END OF SECTION**

**Part 1      General**

**1.1          REFERENCES**

- .1 Aluminum Association (AA)
  - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 ASTM International
  - .1 ASTM A1008/A1008M-10, Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
  - .2 ASTM D523-08, Standard Test Method for Specular Gloss.
  - .3 ASTM D822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.105-M91, Quick-Drying Primer.
  - .2 CAN/CGSB-1.213-04, Etch Primer (Pretreatment Coating or Tie Coat) for Steel and Aluminum.
  - .3 CAN/CGSB-1.181-99, Ready-Mixed, Organic Zinc-Rich Coatings.
- .4 CSA International
  - .1 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
- .5 Environmental Choice Program (ECP)
  - .1 CCD-016-97(R2005), Thermal Insulation.
  - .2 CCD-047-98(R2005), Architectural Surface Coatings.
  - .3 CCD-048-98(R2006), Surface Coatings - Recycled Water-borne.

**1.2          ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-Installation Meetings:
  - .1 Convene pre-installation meeting 1 week prior to beginning work of this Section, with Consultant in accordance with Section 01 31 19 - Project Meetings to:
    - .1 Verify project requirements.
    - .2 Review installation and substrate conditions.
    - .3 Co-ordination with other construction subtrades.
    - .4 Review manufacturer's written installation instructions and warranty requirements.
- .2 Arrange for site visit with Consultant prior to start of Work to examine existing site conditions adjacent to demolition Work.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for doors, hardware, and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Indicate sizes, service rating, types, materials, operating mechanisms, glazing locations and details, hardware and accessories, required clearances and electrical connections.
- .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .5 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .6 Manufacturers Reports:
  - .1 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in Part 3 - FIELD QUALITY CONTROL.

**1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for sectional metal doors for incorporation into manual.

**1.5 MAINTENANCE MATERIAL SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Spare parts:
  - .1 Supply spare parts for sectional metal doors as follows:
    - .1 Door panels: 1.
    - .2 Door rollers: 2 sets.
    - .3 Weather-stripping: 2 sets.
    - .4 Springs and cables: 1 set.
  - .2 Store where directed. Identify each part and reference to appropriate door.

**1.6 QUALITY ASSURANCE**

- .1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.



**1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect sectional metal doors, hardware and accessories from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

**Part 2 Products****2.1 DESIGN CRITERIA**

- .1 Design exterior door assembly to withstand wind load of 1 kPa with a maximum horizontal deflection of 1/120 of opening width.
- .2 Design door panel assemblies with thermal insulation factor 1.2 RSI.
- .3 Design door assembly to withstand minimum 100,000 cycles per annum, and 20 years total life cycle.
- .4 Water Penetration to ASTM E547: absolutely no leak

**2.2 MATERIALS**

- .1 Galvanized steel sheet: commercial quality Z275 zinc coating.
- .2 Steel sheet: commercial quality to ASTM A1008/A1008M unexposed (U), exposed (E), with plain finish.
- .3 Aluminum extrusions: Aluminum Association alloy AA6063-T5.
- .4 Primer: to CAN/CGSB-1.181, for galvanized steel surfaces.
- .5 Insulation: to meet design requirements.
- .6 Cable: 6mm dia. multi-strand galvanized steel aircraft cable.

**2.3 DOORS**

- .1 Fabricate 75 mm thick insulated flush panel doors of interlocking roll formed steel sections as indicated.
- .2 Fabricate panel frames from 1.6mm (16 GA) CRS in a continuous box frame with vertical stiffeners 1.6mm (16GA) vertical steel stiffeners at 300 mm centres.
- .3 Fabricate sections from single sheet galvanized steel sheet faces, exterior 1.6MM (16GA) and interior 1.6MM (16 GA).

- .4 Galvanized steel skins roof formed into tongue and groove joint with thermal break and double bubble shaped weather seal.
- .5 Fabricate doors from prepainted steel stock final color by Consultant

**2.4 HEAVY DUTY INDUSTRIAL HARDWARE**

- .1 Track: standard hardware with 75 mm size 2.66 mm core thickness galvanized steel track: tapered and wedged and mounted for wedge type closing, reinforce as required.
- .2 Track Supports: 2.3 mm core thickness continuous galvanized steel angle track supports.
- .3 Spring counter balance: heavy duty oil tempered torsion spring with manufacturers standard brackets.
  - .1 Drum: 200 mm diameter die cast aluminum.
  - .2 Shaft: 32 mm diameter galvanized steel.
- .4 Top roller carrier: galvanized Steel 3.04 mm thick adjustable.
- .5 Rollers: full floating grease packed hardened steel, ball bearing 75 mm diameter solid steel tire.
- .6 Roller brackets: adjustable, minimum 2.5 mm galvanized steel.
- .7 Hinges: heavy duty, minimum of four 3.04 mm thick galvanized bolted at maximum spacing of 750mm O.C. per section .
- .8 Cable: 6 mm diameter galvanized steel aircraft cable.

**2.5 ACCESSORIES**

- .1 Overhead horizontal track and operator supports: galvanized steel, type and size to suit installation.
- .2 Track guards: 5 mm thick formed sheet 1500 mm high track guards.
- .3 Pusher springs 100,000 cycle rated
- .4 One Two horizontal sliding lock bolts on interior.
- .5 Weather-stripping:
  - .1 Perimeter Weather Seal: 3 Lip flexible PVC weather seal in extruded aluminum retainer
  - .2 Bottom Weather Seal: U-Shaped, flexible PVC double weather seal, retained in heavy-duty aluminum retainer.
- .6 Finish ferrous hardware items with minimum zinc coating of 300 g/m<sup>2</sup> to CAN/CSA-G164.

**2.6 ELECTRICAL OPERATOR**

- .1 Electrical jack shaft type operator.
  - .1 Standard of Acceptance: Dorlec EJH-383

- .2 Electrical motors, controller units, remote pushbutton stations, relays and other electrical components: to CSA approval with adjustable timer "TO CLOSE" feature
- .3 Power supply: 208 V, 3 phase, 60 Hz.
  - .1 Motor: ¾ HP high starting torque, class A insulated.
- .4 Controller units with integral motor reversing starter, solenoid operated brake 3 heater elements for overload protection, including pushbuttons and control relays as applicable.
- .5 Operation: Interior.
  - .1 Remote pushbutton stations: adjacent to each door. 24V. Flush Mounted, key operated model Square D 9001KY295 complete with emergency stop button, complete with Abloy CY415 cylinder. Abloy Cylinder supplied by hardware supplier .
- .6 Exterior Operation
  - .1 Remote pushbutton station: adjacent to door. 24V Flush mounted key operate model square D 9001KY195, without emergency stop button, complete with Abloy CY415 cylinder. Abloy cylinder to be supplied by the hardware supplier.
- .7 Safety switch: combination roll rubber with limit switches for full length of bottom rail of bottom section of door, to reverse door to open position when coming in contact with object on closing cycle.
  - .1 Safety switch mechanism c/w one set of photo eyes and one reflector.
- .8 For jack shaft operators:
  - .1 Provide floor level disconnect device to allow for manual operation in event of power failure.
  - .2 Equip Operator with:
    - .1 Electrical interlock switch to disconnect power to operator when in manual operation.
    - .2 Built-in chain hoist for manual operation in event of power failure.
  - .3 Cable fail safe device:
    - .1 Solenoid brake able to stop door immediately if cable breaks on door free fall Braking Capacity 500 kg
- .9 Door speed: 300 mm per second.
- .10 Control transformer: for 24 VAC control voltage.
- .11 Mounting brackets: galvanized steel, size and gauge to suit conditions.

## **2.7 STANDARD OF ACCEPTANCE**

- .1 Stand Alone Shed: Richard Wilcox Thermatite T175-20

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for sectional metal doors installation in accordance with manufacturer's written instructions.

**3.2 INSTALLATION**

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Install doors and hardware in accordance with manufacturer's instructions.
- .3 Rigidly support rail and operator and secure to supporting structure.
- .4 Touch-up steel doors with primer where galvanized finish damaged during fabrication.
- .5 Install operator including electrical motors, controller units, pushbutton stations, relays and other electrical equipment required for door operation.
- .6 Lubricate and adjust door operating components to ensure smooth opening and closing of doors.
- .7 Adjust weatherstripping to form a weather tight seal.
- .8 Adjust doors for smooth operation.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove traces of primer; clean doors and frames.
  - .2 Clean glass and glazing materials with approved non-abrasive cleaner.

**3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by sectional metal door installation.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2        Section 01 61 00 - Common Product Requirements.
- .3        Section 01 78 00 - Closeout Submittals.
- .4        Section 08 14 16 - Flush Wood Doors.
- .5        Section 08 70 05 - Special Function Hardware.
- .6        Section 16: Electrical wiring for magnetic strikes, electric releases and electric locks.

**1.2                REFERENCES**

- .1        Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).
  - .1        CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): standard hardware location dimensions.
- .2        Canadian General Standards Board (CGSB).
  - .1        CAN/CGSB-69.17-M86(R1993), Bored and Preassembled Locks and Latches.
  - .2        CAN/CGSB-69.18-M90/ANSI/BHMA A156.1-1981, Butts and Hinges.
  - .3        CAN/CGSB-69.19-93/ANSI/BHMA A156.3-1984, Exit Devices.
  - .4        CAN/CGSB-69.20-M90/ANSI/BHMA A156.4-1986, Door Controls (Closers).
  - .5        CAN/CGSB-69.21-M90/ANSI/BHMA A156.5-1984, Auxiliary Locks and Associated Products.
  - .6        CAN/CGSB-69.22-M90/ANSI/BHMA A156.6-1986, Architectural Door Trim.
  - .7        CAN/CGSB-69.24-M90/ANSI/BHMA A156.8-1982, Door Controls - Overhead Holders.
  - .8        CAN/CGSB-69.26-96/ANSI/BHMA A156.10-1991, Power-operated Pedestrian Doors.
  - .9        CAN/CGSB-69.28-M90/ANSI/BHMA A156.12-1986, Interconnected Locks and Latches.
  - .10        CAN/CGSB-69.29-93/ANSI/BHMA A156.13-1987, Mortise Locks and Latches.
  - .11        CAN/CGSB-69.30-93/ANSI/BHMA A156.14-1991, Sliding and Folding Door Hardware.
  - .12        CAN/CGSB-69.31-M89/ANSI/BHMA A156.15-1981, Closer/Holder Release Device.
  - .13        CAN/CGSB-69.32-M90/ANSI/BHMA A156.16-1981, Auxiliary Hardware.
  - .14        CAN/CGSB-69.33-M90/ANSI/BHMA A156.17-1987, Self-closing Hinges and Pivots.

- .15 CAN/CGSB-69.34-93/ANSI/BHMA A156.18-1987, Materials and Finishes.
- .16 CAN/CGSB-69.35-M89/ANSI/BHMA A156.19-1984, Power Assist and Low Energy Power Operated Doors.
- .17 CAN/CGSB-69.36-M90/ANSI/BHMA A156.20-1984, Strap and Tee Hinges and Hasps.

**1.3 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures .
- .2 Samples:
  - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures .
  - .2 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish and hardware package number.
  - .3 After approval samples will be returned for incorporation in the Work.
- .3 Hardware List:
  - .1 Submit contract hardware list in accordance with Section 01 33 00 - Submittal Procedures .
  - .2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .4 Manufacturer's Instructions:
  - .1 Submit manufacturer's installation instructions.
- .5 Closeout Submittals
  - .1 Provide operation and maintenance data for door closers, locksets, door holders electrified hardware and fire exit hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals .

**1.4 QUALITY ASSURANCE**

- .1 Regulatory Requirements:
  - .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, Shipping, Handling and Unloading:
  - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements .

.2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

.2 Storage and Protection:

.1 Store finishing hardware in locked, clean and dry area.

## **1.6 WASTE DISPOSAL AND MANAGEMENT**

.1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal .

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Dispose of corrugated cardboard polystyrene plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

## **1.7 MAINTENANCE**

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals .

.2 Supply two sets of wrenches for door closers locksets and fire exit hardware.

## **1.8 GUARANTEE**

.1 Provide a manufacturer's written guarantee stating that the door closers specified in the Section are guaranteed against malfunction for a period of 60 months form the date of interim Certificate of Completion.

## **Part 2 Products**

### **2.1 HARDWARE ITEMS**

.1 Use one manufacturer's products only for similar items.

### **2.2 DOOR HARDWARE**

.1 Co-ordinate door hardware with Door, Frame and Hardware Schedule.

.2 Locksets to be Schlage No Substitution.

.3 Locks and latches:

.1 Bored and preassembled locks and latches: to CAN/CGSB-69.17, series 2000 preassembled lock, grade 1, designed for function and keyed as stated in Hardware Schedule.

.2 Interconnected locks and latches: to CAN/CGSB-69.28, series 5000 interconnected lock, grade 1, designed for function and keyed as stated in Hardware Schedule.

- .3 Mortise locks and latches: to CAN/CGSB-69.29, series 1000 mortise lock, grade 1, designed for function and keyed as stated in Hardware Schedule.
- .4 Lever handles : plain design with return. **PROVIDE LOCKS WITH KNOBS FOR DOORS IN CELL BLOCK AREA AND AS SCHEDULED.**
- .5 Normal strikes: box type, lip projection not beyond jamb.
- .6 Cylinders: key into keying system as directed.
- .4 Keying: All cylinders with new keying system. Locks to be equipped with 6-pin cylinders keyed by bonded locksmith. Install cylinders just prior to interim inspection or takeover of area. Turn keys over to RCMP.
- .5 Butts and hinges:
  - .1 Butts and hinges: to CAN/CGSB-69.18, designated by letter A and numeral identifiers, followed by size and finish, listed in Hardware Schedule.
- .6 Door Closers and Accessories:
  - .1 Door controls (closers): to CAN/CGSB-69.20, size in accordance with CAN/CGSB-69.20, table A1.
- .7 Auxiliary hardware: to CAN/CGSB-69.32, listed in Hardware Schedule.
- .8 Door bottom seal: heavy duty , door seal of extruded aluminum frame and solid hollow closed cell neoprene weather seal, recessed in door bottom, closed ends, adjustable, clear anodized finish.

### **2.3 MISCELLANEOUS HARDWARE**

- .1 Latch Guard: Heavy Gauge formed steel plate cover to protect lock strike area, 300mm high, through bolt mounting formed to suit mortised locksets with standard strikes.
- .2 Door Viewers: Wide angle (min 180 degree) viewer prism, 12mm diameter male/female threaded, brass tube, adjustable for door thickness, to CAN/CGSB-69.32.
- .3 Padlocks: Keyed heavy duty brass padlocks with hardened steel shackle, with six-pin key core cylinders to match locksets and keying system specified.

### **2.4 FASTENINGS**

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.
- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.



- .5 Use fasteners compatible with material through which they pass.

## **2.5 KEYING**

- .1 All lockset and special lock cylinders of 6 pin design, pinned to 444444, minimum 32 mm long with restricted keying from on of the following products:
  - .1 Schlage D
- .2 Provide temporary locks in perimeter doors during construction until new locks are installed
- .3 Factory key all cylinder cores to 444444 and key all cylinders using a bonded locksmith, to keying schedule provided by Departmental Representative, and install cylinders in locks just prior to interim completion under supervision of RCMP representative.
- .4 Cabinet locks: 5 pin tumbler locks, 3 keys for drawer lock.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.
- .3 Furnish manufacturers' instructions for proper installation of each hardware component.

### **3.2 INSTALLATION**

- .1 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.
- .2 Where door stop contacts door pulls, mount stop to strike bottom of pull.
- .3 Install key control cabinet.
- .4 Use only manufacturer's supplied fasteners. Failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.
- .5 Remove construction cores when directed by Departmental Representative ; install permanent cores and check operation of locks.

**3.3 ADJUSTING**

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to provide tight fit at contact points with frames.

**3.4 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**3.5 DEMONSTRATION**

- .1 Keying System Setup and Cabinet:
  - .1 Set up key control system with file key tags, duplicate key tags, numerical index, alphabetical index and key change index, label shields, control book and key receipt cards.
  - .2 Place file keys and duplicate keys in key cabinet on their respective hooks.
  - .3 Lock key cabinet and turn over key to Departmental Representative.
- .2 Maintenance Staff Briefing:
  - .1 Brief maintenance staff regarding:
    - .1 Proper care, cleaning, and general maintenance of projects complete hardware.
    - .2 Description, use, handling, and storage of keys.
    - .3 Use, application and storage of wrenches for door closers locksets and fire exit hardware.
- .3 Demonstrate operation, operating components, adjustment features, and lubrication requirements.

**3.6 SCHEDULE**

- .1 Quantities shown in schedule are for one opening only. Include all hardware for each door listed, except as noted. See drawings for door layout and arrangement.
- .2 Hardware Schedule Based on the following:

- .1 Hinge IVES (IVES)
- .2 Mortise Lockset Schlage Lock Company (SCH)
- .3 Mortise Passage Schlage Lock Company (SCH)
- .4 Roller Latch Standard Metal Mfg. (SM)
- .5 Door Pull Standard Metal Mfg. (SM)
- .6 Door Closer LCN Closers (LCN)
- .7 Kick Plate IVES (IVES)
- .8 Wall Bumper IVES (IVES)
- .9 Overhead Holder/Stop Glynn - Johnson (GJ)
- .10 Door Bottom K. N. Crowder Mfg., Inc. (KNC)
- .11 Sound Seal K. N. Crowder Mfg., Inc. (KNC)
- .3 Finishes
  - .1 626 - Satin Chromium Plated
  - .2 628 - Satin Aluminum Anodized
  - .3 630 - Satin Stainless Steel
  - .4 652 - Satin Chromium Plated
  - .5 689 - Aluminum Painted

**Hardware Set#: 1**

Single: D3

Qty	UOM	Item Type	Item Series/Description	Finish
3.0	EA	Hinge	3CB1HW 4.5 X 4.5 NRP	652
1.0	EA	Mortise Lockset	L9464	626
1.0	EA	Roller Latch	F76	C26D
1.0	EA	Door Pull	H404	630

**Hardware Set#: 2**

Single: D2

Qty	UOM	Item Type	Item Series/Description	Finish
3.0	EA	Hinge	3CB1HW 4.5 X 4.5 NRP	652
1.0	EA	Mortise Lockset	L9080 42D	626
1.0	EA	Door Closer	4011	689
1.0	EA	Kick Plate	8400 10 X 1 1/2" Less Door Width	630
1.0	EA	Overhead Holder/Stop	100S	630

**Hardware Set#: 3**

Single: D1

Qty	UOM	Item Type	Item Series/Description	Finish
1.0	EA	Door Viewer	698B26D	26D

**END OF SECTION**

**PART 1 – GENERAL**

1.1 *SECTION INCLUDES*

- A. Supply and installation of the indoor resilient multipurpose surfacing
- B. Application of the game lines
- C. References for the correct construction and preparation of concrete slabs to receive resilient flooring.

1.2 *SUBMITTALS*

- A. Product Data:
  - Manufacturer's promotional brochures, specifications and installation instructions
- B. Samples:
  - 1. Submit for selection and approval two (2) sets of the indoor resilient multipurpose surfacing, manufacturer's brochures, samples or sample boards of all of the available colors, textures and styles.
  - 2. Submit color samples of all the available game line paint colors for selection and approval.
- C. Closeout Submittals:
  - 1. Submit three (3) copies of the indoor resilient multipurpose surfacing and manufacturer's maintenance instructions.
  - 2. Submit three (3) copies of the material and installation warranties as specified.

1.3 *QUALITY ASSURANCE*

- A. Qualifications:
  - 1. The indoor resilient multipurpose surfacing shall have been actively marketed for a minimum of five (5) years.
  - 2. The indoor resilient multipurpose surfacing shall be manufactured in an ISO 9001 certified plant.
  - 3. The indoor resilient multipurpose surfacing supplier shall be an established firm experienced in the field and appointed as a distributor by the manufacturer of the indoor resilient multipurpose surfacing.
  - 4. The installer of the indoor resilient multipurpose surfacing shall have a minimum of five (5) years experience in the field installing indoor resilient multipurpose surfacing and have worked on at least five (5) projects of similar size, type and complexity.
- B. Certifications:
  - 1. Installer to submit the indoor resilient athletic surfacing manufacturer's or distributor's certification attesting that they are an approved installer of the indoor resilient multipurpose surfacing.
- C. Testing:

Tests shall be relative for multi-purpose use with certificates from independent testing resources to be made available upon request. Test results shall be no more than 5 years old and performed according to ASTM and/or EN standard testing procedures.

#### 1.4 DELIVERY, STORAGE AND HANDLING

##### A. Delivery:

Material shall not be delivered until all related work is in place and finished and/or proper storage facilities and conditions can be provided and guaranteed stable according to FieldTurf USA, Inc. recommendations.

##### B. Storage:

Store the material in a secure, clean and dry location. Maintain temperature between 55° and 85° Fahrenheit. Store the indoor resilient athletic surfacing on a clean flat surface. Do not stack rolls.

#### 1.5 PROJECT/SITE CONDITIONS

A. It is the responsibility of the general contractor/construction manager to maintain project/site conditions acceptable for the installation of the indoor resilient multipurpose flooring.

B. The area in which the indoor resilient multipurpose surfacing will be installed shall be dry and weather tight. Permanent heat, light and ventilation shall be installed and operable.

C. All other trades shall have completed their work prior to the installation of

the resilient athletic flooring. The general contractor or Construction Manager shall maintain a secure and clean working environment before, during and after the installation. Suspension of other trades' work may be authorized providing their work will not damage the new flooring.

D. Maintain a stable room temperature of at least 65°F for a minimum of one (1) week prior to, during and thereafter installation.

E. An effective low-permeance vapor barrier is placed directly beneath the concrete subfloor. For "on" or "below grade" installations, it is recommended to provide a permanent vapor barrier resistant to long term hydrostatic pressure/moisture exposure. Protrusions should be sealed to prevent moisture migration into the slab. Moisture should not be allowed to

enter the slab after the completed construction.

F. Concrete subfloor surface pH level within the 7 to 9 range dependent upon installation type.

G. Concrete subfloor should be no greater than 1/8" within a 10 ft diameter. This tolerance can be measured in accordance with ASTM E1155. A specified ( $F_F$ ) of 50 and an ( $F_L$ ) of 30 should reach this degree of floor flatness and floor level. There is no numerical correlation between F numbers and the deviation from the straight edge, however the above specified numbers should achieve a flat floor with minimal deviation in the slab. Reference ACI 117 and ACI 302.1R. The general contractor should provide a certificate of compliance with the above recommendations.

H. Concrete subfloor must be clean and free of all foreign materials or objects including, but not limited to, curing compounds and sealers.

- I. Fill cracks, grooves, voids, depressions, and other minor imperfections with Ardex (or equal) cement-based patching/leveling compounds. Follow the manufacturer's directions. Moveable joints must be treated utilizing specific transitioning joint devices depending upon the architect's recommendations.

Follow current ASTM F710 guidelines for the preparation of concrete slabs to receive resilient flooring.

- J. Refer to ACI 302.2R "Guidelines for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials" for concrete design and construction.

- K. Concrete slab shall be fortified with continual steel reinforcement. Fiber reinforcement alone shall not be considered adequate fortification.

#### 1.6 *WARRANTY*

##### A. Materials:

The indoor resilient athletic surfacing shall be covered by the manufacturer against product defects for 3 years.

##### B. Installation:

The installation of the indoor resilient multipurpose surfacing shall be covered against poor workmanship and faulty installation by a two (2) year written, limited warranty provided by the contractor performing/overseeing the installation.

#### 1.7 *ADDITIONAL MATERIALS*

Furnish to the owner additional materials containing a total of at least 3% of each different color or design of the indoor resilient athletic surfacing used on the project.

### **PART 2 - PRODUCTS**

#### 2.1 *MANUFACTURERS*

The basis of the design for the indoor resilient multipurpose surfacing is **Dropzone, Dropzone Speckle, and/or Dropzone Interlocking** as provided by FieldTurf USA, Inc. All other installation accessories and related components must be either made or approved by the indoor resilient athletic surfacing manufacturer. Other products may be approved as equal if deemed qualified and submitted in accordance with the General Conditions. Test reports confirming compliance from an Independent Sports Laboratory must be provided along with samples, technical data, installation, maintenance, and warranty prior to acceptance as an alternative product.

#### 2.2 *MATERIALS*.

Dropzone, Dropzone Speckle, and/or Dropzone Interlocking 8mm recycled non-laminated rubber flooring.

1. Physical properties of the indoor resilient athletic surfacing shall conform to the following minimums:

	Width	.....	Roll Width 4ft – Tile 2ft x 2ft
	Length	.....	Specify length (min. 15 ft)
	Total Thickness	.....	8 mm
	Weight	.....	1.92 lbs/sq.ft.
Tensile Strength	ASTM D412		200 minimum
	Static Load	ASTM F970	1000 p.s.i (modified test)
	Coefficient of Friction	ASTM 2047	>.9
	Chemical Resistance	ASTM F925	Excellent
	Ambient Noise Reduction	ASTM C423	.10
	Impact Sound Insulation	ASTM E492	.45 minimum
	Thermal Conductivity	ASTM C518	Approximate .406
	Sound Transmission	ASTM 413	.45 minimum

**PART 3 - EXECUTION**

3.1 EXAMINATION

- A. It is the responsibility of the general contractor/construction manager to ensure that project/site conditions are acceptable for the installation of the indoor resilient athletic flooring.
- B. Verify that the area in which the indoor resilient athletic surfacing will be installed is dry and weather tight. Verify that permanent heat, light and ventilation is installed and operable.
- C. Verify that all other work that could cause damage, dirt and dust or interrupt the normal pace of the indoor resilient athletic flooring installation is completed or suspended.
- D. Verify that there is a stable room temperature of at least 65°F.
- E. Verify that there are no foreign materials or objects on the subfloor and that the subfloor is clean and ready for installation.
- F. Direct Full Spread Adhering to Concrete Subfloor: moisture content less than 92 % RH when tested per ASTM F2170. Use only manufacturer recommended Multi-Poxy adhesive.
- G. If both tests are performed, use the highest value. Do not average the results of the tests. Report all field test results in writing to the General Contractor, Architect, and End User prior to installation.
- H. Verify that the concrete subfloor surface pH level is within the 7 - 9 range.
- I. Document the results indicating the slab is within manufacturer's tolerances for slab deviation.

3.2 PREPARATION OF SURFACES

- A. Sand the entire surface of the concrete slab.
- B. Sweep the concrete slab so as to remove all dirt and dust. If a sweeping compound is to be used it must be a sweeping compound that does not contain oil or other items that may inhibit the adhesive bond.
- C. Slab must be dust free. In the event that dust impairs adhesive bond, priming the slab prior to application of adhesive may be necessary. Follow installation guidelines.

3.3 OPTIONS FOR MOISTURE MITIGATION

- A. For projects with moisture conditions higher than the specified tolerances,



**TARKOLAY** may be used for conditions that do not 98% per ASTM F2170.

Use only approved adhesive as directed by the manufacturer. Tarkolay is available for roll goods only.

#### 3.4 *INSTALLATION*

- A. The installation area shall be closed to all traffic and activity for a period to be set by the indoor resilient athletic surfacing installer. The indoor resilient athletic surfacing installation shall not begin until the installer is familiar with the existing conditions.
- B. All necessary precautions should be taken to minimize noise, smell, dust, the use of hazardous materials and any other items that may inconvenience others.
- C. Install the indoor resilient athletic surfacing in strict accordance with the indoor resilient athletic surfacing manufacturer's written instructions.
- D. Install the indoor resilient athletic surfacing minimizing cross seams. Provide a seam diagram during the submittal process for approval prior to installation.
- E. Install appropriate threshold plates or transition strips where necessary.

#### 3.5 *CLEANING*

- A. Remove all unused materials, tools, and equipment and dispose of any debris properly. Clean the indoor resilient athletic surfacing in accordance with the manufacturer's instructions.

#### 3.6 *PROTECTION*

If required, protect the indoor resilient athletic surfacing from damage using coverings approved by the manufacturer until acceptance of work by the customer or their authorized representative.

#### 3.6 RELATED STANDARDS AND GUIDELINES

- A. ASTM F2170 "Standard Test Method for Determining Relative Humidity In Concrete Floor Slabs Using In-Situ Probes"
- B. ASTM F710 "Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring"
- C. ACI 302.2R-06 "Guideline for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials"

**End of Section**

**Part 1          General**

**1.1            REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM F1303-04, Standard Specification for Sheet Vinyl Floor Covering with Backing.
- .2 Canada Green Building Council (CaGBC)
  - .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).
  - .2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .4 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1113-04, Architectural Coatings.
  - .2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.

**1.2            ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base, nosing, feature strips, treads, edge strips.
- .4 Sustainable Design Submittals:
  - .1 LEED Canada-NC Version 1.0 CI Version 1.0 Submittals: in accordance with Section 01 35 21 - LEED Requirements.
- .5 Closeout Submittals:
  - .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.3            SUSTAINABLE REQUIREMENTS**

- .1 Materials and products in accordance with Section 01 47 15 - Sustainable Requirements: Construction.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**1.5 AMBIENT CONDITIONS**

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees for 48 hours before, during and 48 hours after installation.

**1.6 MAINTENANCE**

- .1 Extra Materials:
  - .1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Provide m<sup>2</sup> of each colour, pattern and type flooring material required for project for maintenance use.
  - .3 Extra materials one piece and from same production run as installed materials.
  - .4 Identify each roll of sheet flooring and each container of adhesive.
  - .5 Deliver to Departmental Representative DCC Representative Consultant, upon completion of the work of this section.
  - .6 Store where directed by Departmental Representative DCC Representative Consultant.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Resilient Sheet Flooring (RSV) :Standard of Acceptance iQ Optima
  - .1 Color from manufacturers standard range.
  - .2 Complies with requirements for ASTM F 1913 Standard Specification for Vinyl Sheet Floor Covering Without Backing.
  - .3 iQ construction: no wax, no finish for life of product.
  - .4 Roll/Sheet Width: 6' 6" (2 m)
  - .5 Wear layer/Overall thickness: .080" (2.0 mm).
  - .6 ASTM D 2047, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring of 0.6 or greater.
  - .7 ASTM F 970, Standard Test Method for Static Load Limit – 250 PSI.
  - .8 ASTM E 648, Standard Test method for Critical Radiant Flux of 0.45 watts/cm<sup>2</sup> or greater, Class I
  - .9 Contains 25% pre-consumer recycled content

- .10 100% Recyclable
- .11 NSF-332 Platinum Certified
- .12 Phthalate-free (except for recycled material)
- .2 Primers and adhesives: of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.
  - .1 Rubber floor adhesives:
  - .2 Cove base adhesives:
- .3 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious pastes recommended by flooring manufacturer for use with their product.
- .4 Metal edge strips:
  - .1 Aluminum extruded, smooth, polished stainless steel with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .5 External corner protectors: stainless steel, type recommended by flooring manufacturer.
- .6 Edging to floor penetrations: stainless steel, type recommended by flooring manufacturer.
- .7 Sealer and wax: type recommended by resilient flooring material manufacturer for material type and location.

**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 datasheets.

**3.2 SITE VERIFICATION OF CONDITIONS**

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

**3.3 PREPARATION**

- .1 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .2 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .3 Prime and Seal concrete slab to resilient flooring manufacturer's printed instructions.

**3.4 APPLICATION: FLOORING**

- .1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated

air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.

- .2 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .3 Lay flooring with seams parallel to building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.
- .4 Run sheets in direction of traffic. Double cut sheet joints and continuously seal heat weld according to manufacturer's printed instructions.
- .5 Heat weld seams of linoleum sheet flooring in accordance with manufacturer's printed instructions.
- .6 As installation progresses, and after installation roll flooring with 45 kg minimum roller to ensure full adhesion.
- .7 Cut flooring around fixed objects.
- .8 Install feature strips and floor markings where indicated. Fit joints tightly.
- .9 Install flooring in pan type floor access covers. Maintain floor pattern.
- .10 Continue flooring over areas which will be under built-in furniture.
- .11 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .12 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.
- .13 Install metal edge strips at unprotected or exposed edges where flooring terminates.

### **3.5 APPLICATION: BASE**

- .1 Lay out base to keep number of joints at minimum.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.
- .8 Use toeless type base where floor finish will be carpet, coved type elsewhere.
- .9 Install toeless type base before installation of carpet on floors.
- .10 Heat weld base in accordance with manufacturer's printed instructions.

### **3.6 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:

- .1 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.

**3.7 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Remove excess adhesive from floor, base and wall surfaces without damage.
- .3 Clean, seal and wax floor and base surface to flooring manufacturer's printed instructions.

**3.8 PROTECTION**

- .1 Protect new floors from time of final set of adhesive until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.

**END OF SECTION**

**Part 1            General**

**1.1                SCOPE**

- .1        Provide all seamless epoxy ceramic granular flooring to patch and resurface cell areas to blend in with other areas.

**1.2                EXAMINATION**

- .1        Examine work upon which work of this section depends. Do not apply the work of the section until any unsatisfactory conditions have been rectified. Commencement will be deemed acceptable of substrate.

**1.3                SAMPLES**

- .1        Submit samples in accordance with Section 01 33 00 – Submittals.

**1.4                Handling and Storage**

- .1        Store materials in original undamaged condition with manufacturer's labels and seals intact. Prevent damage to materials during handling and storage.

**1.5                Description of Systems**

- .1        Epoxy / ceramic granular flooring, shown on room schedule as "Epoxy Flooring" flooring, shall consist of multi-coloured quartz aggregates imbedded in a clear epoxy with clear coat of epoxy:
  - .1        Bond coat-epoxy
  - .2        Matrix-epoxy and ceramic coated granular aggregate.

**1.6                Environmental Conditions**

- .1        Maintain minimum 55 deg. F air temperature at the installation area for 24 hours prior to, during and after construction.

**Part 2            Products**

**2.1                Materials**

- .1        Epoxy / ceramic granular flooring shall have the following physical characteristics:
  - .1        Primer: epoxy coated binder pigmented, non-yellowing.
  - .2        Aggregate: ceramic coated quartz.
  - .3        Matrix: epoxy binder.
  - .4        Grout Coats: 100% solids, clear epoxy, non-yellowing, non- flammable.
  - .5        Finish Coats: epoxy 100% solids, non-ambering, non-flammable.
  - .6        Finish: matte finish complete with integral base.

- .7 Normal thickness: 3mm
- .2 Performance characteristics:
  - .1 Tensile strength: ASTM-638. 1600 psi.
  - .2 Compression Strength: ASTM D695. 9000 psi.
  - .3 Impact Resistance Gardener Impact Tester. 160 in/lb – no cracking, chipping or delamination.
  - .4 Impact Resistance: MIL D 313F Section 4.7.3 Withstands 16 ft/lb no cracking, delamination or chipping.
  - .5 Indentation Resistance: MIL D-3134F Section 4.7.4 Withstands; 2000 lb/sq. in. for 30 minutes without indentation.
  - .6 Resistance to elevated temperature: MIL D313F Section 4.7.5. No slip of flow at required temperatures of 158 deg. F.
  - .7 Taber abrasion resistance: CS17 wheels with 2000 gram load for 1000 cycles.
  - .8 Water absorption: ASTM D-570 (24 hrs. immersion) 0.08%.
  - .9 Bond Strength to concrete: After 7 days water emersion ACI Committee 403, Bulletin 59-43. 333 psi failure in concrete.
  - .10 Moisture Vapour permeability: ASTM E—96. 0.06 perms.
  - .11 Toxicity: U.S. Dept. of Agriculture Research Service Meat Inspection Division. Non toxic.
  - .12 Flammability: ASTM D-635. Self extinguishing by this test. Extent of burning .0 inch.
- .3 Divider Strips:
  - .1 Between epoxy and flooring of other material, extruded heat treated aluminum having a total height of 3 mm. Divider strips shall be secured in place and be absolutely vandal proof and non removable. Provide metal strip at top of base.

**2.2 Manufacturer**

- .1 Use the same manufactured brands and sources for each for each type of material for the entire project, in order to ensure uniformity of finished and colour.
- .2 Standard of Acceptance:
  - .1 Stonhard Stone Shield SLT – Color from manufacturers standard colors
  - .2 Approved Equal.

**Part 3 Execution****3.1 Application**

- .1 Apply flooring in accordance with manufacturer's printed instructions, employing technically trained, approved mechanics, using equipment specifically designed for this purpose.
- .2 Prepare surface of existing substrate in accordance with flooring material manufacturer's suggestions and instructions.



- .3 Patch cracks and other openings in substrate using an epoxy filler.
- .4 Grind down uneven joints, rough areas, projections and foreign matter from surfaces to receive flooring and base.
- .5 Mask adjacent surfaces and apply seamless flooring and 100 mm high integral seamless cove base in accordance with manufacturer's directions.
- .6 Install metal divider strips at junctions of seamless flooring and other floorings, at exposed edges of seamless flooring and at other locations required due to application techniques of the system.
- .7 Install 100 mm seamless cove base with metal screed on concrete block.

**END OF DOCUMENT**

**Part 1        General**

**1.1        REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C423-07, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .2 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .5 South Coast Air Quality Management District (SCAQMD), California State
  - .1 SCAQMD Rule 1113-04, Architectural Coatings.
  - .2 SCAQMD Rule 1168-05, Adhesives and Sealants Applications.
- .6 Underwriter Laboratories of Canada (ULC)
  - .1 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.

**1.2        ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit duplicate sample of each type acoustical unit.

**1.3        QUALITY ASSURANCE**

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Construct one representative mock-up of each type acoustical wall treatment system.
- .3 Construct mock-up 10 m<sup>2</sup> minimum to indicate method of assembly, installation and fixing.
- .4 Construct mock-up where directed.
- .5 Allow 48 hours for inspection of mock-up by Consultant before proceeding with work.
- .6 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

**1.4 ENVIRONMENTAL REQUIREMENTS**

- .1 Commence installation after building enclosed and dust generating activities are completed.
- .2 Permit wet work to dry prior to commencement of installation.
- .3 Maintain uniform minimum temperature of 15 degrees C and relative humidity of 20-40% prior to, during and after installation.

**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

**1.6 MAINTENANCE**

- .1 Extra Materials:
  - .1 Provide extra materials of acoustic units and adhesive in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Provide acoustical units for maintenance use amounting to 2% of gross wall area for each pattern and type required for project.
  - .3 Provide sufficient adhesive to install extra material provided.
  - .4 Extra materials from same production run as installed materials.
  - .5 Identify each package of acoustical units including colour and type, and each container of adhesive.
  - .6 Deliver to Departmental Representative, upon completion of the work of this section.
  - .7 Store where directed by Departmental Representative.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Acoustical construction products must:
  - .1 Not require being labelled as poisonous, corrosive, flammable or explosive under Consumer Chemical and Container Regulations of the Hazardous Products Act.
  - .2 Be accompanied by detailed instructions for proper handling and installation so as to minimize health concerns.
  - .3 The manufacturing process must adhere to lifecycle assessment standards as per CANISO 14040
- .2 Demountable acoustic units
  - .1 Acoustic core material: to CAN/CGSB-92.1.
    - .1 Fabric faced demountable acoustic units. (Room 107)
      - .1 Acoustic core material; to CAN/CGSB-92.1, impact resistant 6 pcf fibreglass.

- .2 Fabric Finish: Fire resistant 2-ply polyester, colour to be selected by Departmental Representative from manufacturer's standard range.
  - .3 Weight: 10oz/lin.yd. min.
  - .4 Metal Support Clips: roll formed galvanized steel clip-on strip to acoustical unit supplier's standard allowing non-destructive de-mounting.
  - .5 Flame Spread: 25 or less, passing CAN/ULC-S102.
  - .6 Noise reduction coefficient (NRC) 1.10
  - .7 Sound Absorption Characteristics: Hz 150, 250, 500, 1000,2000, 4000 Sabins 0.31, 0.81, 1.09, 0.99, 1.02, 0.98
  - .8 Size as indicated on drawings.
  - .9 Metal support clips: roll formed galvanized steel to acoustic unit supplier's standard.
- .3 Adhesive: type recommended by acoustic unit manufacturer.
  - .4 Staples, nails and screws: to CSA B111, non-corrosive finish, type recommended by acoustic unit manufacturer.
  - .5 Polyethylene: to CAN/CGSB-51.34, 0.015 mm thick.
  - .6 Select paints that provide reduced environmental impacts as described in section 09 91 23 - Interior Painting. Ensure that selected paint materials will not compromise the acoustical properties of wall treatments.

## **2.2 FABRICATION**

- .1 Demountable acoustic units:
  - .1 Use one piece trim, continuous, with mitred corners and concealed fastenings.
  - .2 Conceal and make magnetic fastenings integral part of trim. Adhesive bonding of magnets is not acceptable.

## **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 datasheets.

### **3.2 INSTALLATION**

- .1 Ensure substrate surface is straight to tolerance of plus or minus 3 mm over 3000 mm.
- .2 Install Fabric Type 1 acoustic units to clean, dry and firm substrate using mounting clips glued and screwed to the wall at a maximum 600 mm o.c. in accordance with manufacturer's instruction for a Type A mounting. If requested by Departmental Representative, glue full perimeter of panels to wall.

- .3 Scribe acoustic units to fit adjacent work. Butt joints tight.

**3.3 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Keep acoustic installation and all components clean. Remove blemishes immediately.

**3.4 PROTECTION**

- .1 Use polyethylene to protect finished acoustical wall treatment from damage.
- .2 Remove prior to substantial completion.

**END OF SECTION**

**Part 1      General**

**1.1          SUMMARY**

- .1 Section Includes:
  - .1 Material and installation of site applied paint finishes to new interior surfaces, including site painting of shop primed surfaces.

**1.2          REFERENCES**

- .1 Department of Justice Canada (Jus)
  - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33
- .2 Environmental Protection Agency (EPA)
  - .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .4 Master Painters Institute (MPI)
  - .1 MPI Architectural Painting Specifications Manual, 2004.
- .5 National Fire Code of Canada - 1995
- .6 Society for Protective Coatings (SSPC)
  - .1 SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.
- .7 Transport Canada (TC)
  - .1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34 .

**1.3          QUALITY ASSURANCE**

- .1 Qualifications:
  - .1 Contractor: minimum of five years proven satisfactory experience. Provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
  - .2 Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
  - .3 Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.
- .2 Pre-Installation Meeting:
  - .1 Convene pre-installation meeting one week prior to beginning work of this Section on-site installations in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart.

- .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Coordination with other building subtrades.
  - .4 Review manufacturer's installation instructions and warranty requirements.
- .3 Health and Safety:
- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

#### **1.4 SCHEDULING**

- .1 Submit work schedule for various stages of painting to Consultant for review. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Obtain written authorization from Consultant for changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants.
- .4 The mechanical Rooms and other rooms where a significant amount mechanical and electrical equipment are to be painted prior to the installation of the electrical and mechanical work.

#### **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit product data and instructions for each paint and coating product to be used.
  - .2 Submit product data for the use and application of paint thinner.
  - .3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application and curing.
- .3 Samples:
  - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
  - .2 Submit duplicate 200 x 300 mm sample panels of each paint stain clear coating special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
    - .1 3 mm plate steel for finishes over metal surfaces.
    - .2 13 mm birch plywood for finishes over wood surfaces.
    - .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
    - .4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.
    - .5 10 mm cedar hardboard siding plywood for finishes over wood surfaces.

- .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .4 Test reports: submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
  - .1 Lead, cadmium and chromium: presence of and amounts.
  - .2 Mercury: presence of and amounts.
  - .3 Organochlorines and PCBs: presence of and amounts.
- .5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .6 Manufacturer's Instructions:
  - .1 Submit manufacturer's installation application instructions.
- .7 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:
  - .1 Product name, type and use.
  - .2 Manufacturer's product number.
  - .3 Colour numbers.
  - .4 MPI Environmentally Friendly classification system rating.

## 1.6 MAINTENANCE

- .1 Extra Materials:
  - .1 Deliver to extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
  - .2 Quantity: provide one - four litre can of each type and colour of primer stain finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
  - .3 Delivery, storage and protection: comply Consultant requirements for delivery and storage of extra materials.

## 1.7 DELIVERY, STORAGE AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
  - .1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Acceptance at Site:
  - .1 Identify products and materials with labels indicating:
    - .1 Manufacturer's name and address.
    - .2 Type of paint or coating.
    - .3 Compliance with applicable standard.
    - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.



- .4 Storage and Protection:
  - .1 Provide and maintain dry, temperature controlled, secure storage.
  - .2 Store materials and supplies away from heat generating devices.
  - .3 Store materials and equipment in well-ventilated area with temperature range 7 degrees C to 30 degrees C.
- .5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.
- .7 Remove paint materials from storage only in quantities required for same day use.
- .8 Fire Safety Requirements:
  - .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.
  - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
  - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .9 Waste Management and Disposal:
  - .1 Separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
  - .3 Handle and dispose of hazardous materials in accordance with Regional and Municipal, regulations.
  - .4 Ensure emptied containers are sealed and stored safely.
  - .5 Unused paint coating materials must be disposed of at official hazardous material collections site as approved by Consultant.
  - .6 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
  - .7 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
  - .8 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
  - .9 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:
    - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.

- .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
- .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
- .4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.
- .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .10 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .11 Set aside and protect surplus and uncontaminated finish materials: . Deliver to or arrange collection by employees, individuals, or organizations for verifiable re-use or re-manufacturing.

## 1.8

### SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
  - .1 Ventilate enclosed spaces .
  - .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
  - .3 Provide continuous ventilation for seven days after completion of application of paint.
  - .4 Coordinate use of existing ventilation system with Departmental Representative DCC Representative Consultant and ensure its operation during and after application of paint as required.
  - .5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
  - .6 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
  - .1 Unless pre-approved written approval by Paint Inspection Agency Authority and product manufacturer, perform no painting when:
    - .1 Ambient air and substrate temperatures are below 10 degrees C.
    - .2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.
    - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
    - .4 The relative humidity is under 85% or when the dew point is more than 3 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.

- .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
- .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
- .2 Perform painting work when maximum moisture content of the substrate is below:
  - .1 Allow new concrete and masonry to cure minimum of 28 days.
  - .2 15% for wood.
  - .3 12% for plaster and gypsum board.
- .3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
- .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
  - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
  - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
  - .3 Apply paint when previous coat of paint is dry or adequately cured.
- .4 Additional interior application requirements:
  - .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

**Part 2 Products****2.1 MATERIALS**

- .1 Materials and resources in accordance with Section 01 47 15 - Sustainable Requirements: Construction.
- .2 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .3 Provide paint materials for paint systems from single manufacturer.
- .4 Only qualified products with E3 "Environmentally Friendly" rating are acceptable for use on this project.
- .5 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .6 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.

- .7 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.
- .8 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes to meet minimum "Environmentally Friendly" E2 rating.

**2.2 COLOURS**

- .1 Departmental Representative will provide color schedule after contract award
- .2 Colour schedule will be based upon selection of seven base colours and five accent colours. No more than twelve colours will be selected for entire project and no more than five colours will be selected in each area.
- .3 Selection of colours from manufacturers full range of colours.
- .4 Where specific products are available in restricted range of colours, selection based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

**2.3 MIXING AND TINTING**

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

**2.4 GLOSS/SHEEN RATINGS**

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

- .2 Gloss level ratings of painted surfaces as indicated as noted on Finish Schedule.

## **2.5 INTERIOR PAINTING SYSTEMS**

- .1 Concrete horizontal surfaces: floors and stairs:
  - .1 INT 3.2F - Concrete floor sealer.
- .2 Concrete masonry units: smooth and split face block and brick:
  - .1 INT 4.2D - High performance architectural G5 latex finish.
- .3 Structural steel and metal fabrications: columns, beams, joists:
  - .1 INT 5.1B - Waterborne light industrial G5 coating.
- .4 Galvanized metal: doors, frames, railings, misc. steel, pipes, overhead decking, and ducts.
  - .1 INT 5.3B - Waterborne light industrial G5 coating.
- .5 Dressed lumber: including doors, door and window frames, casings, mouldings:
  - .1 INT 6.3E - Polyurethane varnish G5 finish (over stain).
- .6 Wood paneling and casework: partitions, panels, shelving, millwork:
  - .1 INT 6.4E - Polyurethane varnish G5 finish (over stain).
- .7 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock type material", and textured finishes:
  - .1 INT 9.2A - Latex G3 finish (over latex sealer).
- .8 Canvas and cotton coverings.
  - .1 INT 10.1A - Latex G3 finish.

## **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 data sheet.

### **3.2 GENERAL**

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

**3.3 EXAMINATION**

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
  - .1 Stucco, plaster and gypsum board: 12%.
  - .2 Concrete: 12%.
  - .3 Clay and Concrete Block/Brick: 12%.
  - .4 Wood: 15%.

**3.4 PREPARATION**

- .1 Protection:
  - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Consultant.
  - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
  - .3 Protect factory finished products and equipment.
  - .4 Protect passing pedestrians, building occupants and general public in and about the building.
- .2 Surface Preparation:
  - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
  - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
  - .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative DCC Representative Consultant.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
  - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
  - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.

- .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
- .4 Allow surfaces to drain completely and allow to dry thoroughly.
- .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
- .6 Use trigger operated spray nozzles for water hoses.
- .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
  - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
  - .2 Apply wood filler to nail holes and cracks.
  - .3 Tint filler to match stains for stained woodwork.
- .6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air vacuum cleaning.
- .8 Touch up of shop primers with primer as specified.
- .9 Do not apply paint until prepared surfaces have been accepted Consultant

### 3.5 APPLICATION

- .1 Method of application to be as approved by Consultant. Apply paint by brush roller air sprayer airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
  - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
  - .2 Work paint into cracks, crevices and corners.
  - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
  - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
  - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray application:

- .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
- .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
- .3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.
- .4 Brush out immediately all runs and sags.
- .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .5 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .9 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .10 Finish closets and alcoves as specified for adjoining rooms.
- .11 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

### **3.6 MECHANICAL/ELECTRICAL EQUIPMENT**

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.
- .2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .5 Do not paint over nameplates.
- .6 Keep sprinkler heads free of paint.
- .7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .8 Paint fire protection piping red.



- .9 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .10 Paint natural gas piping yellow.
- .11 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .12 Do not paint interior transformers and substation equipment.

### **3.7 SITE TOLERANCES**

- .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
- .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

### **3.8 FIELD QUALITY CONTROL**

- .1 Interior painting and decorating work shall be inspected by a Paint Inspection Agency (inspector) acceptable to the specifying authority and local Painting Contractor's Association. Painting contractor shall notify Paint Inspection Agency a minimum of one week prior to commencement of work and provide a copy of project painting specification, plans and elevation drawings (including pertinent details) as well as a Finish Schedule.
- .2 Interior surfaces requiring painting shall be inspected by Paint Inspection Agency who shall notify Consultant and General Contractor in writing of defects or problems, prior to commencing painting work, or after prime coat shows defects in substrate.
- .3 Where "special" painting, coating or decorating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer shall provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Departmental Representative.
- .4 Standard of Acceptance:
  - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
  - .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
  - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .5 Field inspection of painting operations to be carried out by independent inspection firm as designated by Departmental Representative and paid for by Section 01 21 00 Allowances.
- .6 Advise Consultant when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .7 Cooperate with inspection firm and provide access to areas of work.

- .8 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative Consultant.

**3.9 RESTORATION**

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

**END OF SECTION**

**Part 1          General**

**1.1            REFERENCES**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-1.186-1996, High Performance Glazed Coating System, Interior.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

**1.2            ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's Instructions: provide to indicate special handling criteria, installation sequence, cleaning procedures.
- .3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit duplicate 400 x 200mm samples of each colour and finish and decorative effects, coating applied to porous concrete block.
- .4 Closeout Submittals:
  - .1 Provide maintenance data for coatings for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.3            QUALITY ASSURANCE**

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Apply coating of each finish and decorative effect to 10 m<sup>2</sup> area of surface to be treated.
- .3 Allow 48 hours for inspection of mock-up by Consultant before proceeding with coating work.
- .4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

**1.4            DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
  - .1 Deliver and store materials in manner to prevent damage.
  - .2 Ensure materials remain in original wrapping and containers until used.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## 1.5 SITE CONDITIONS

- .1 Safety:
  - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of materials.
  - .2 Ensure no open flame heating devices are used.
  - .3 Discourage occupancy of treated space until volatile materials are no longer being emitted and there is no odour.
  - .4 Provide adequate respiratory protection to exposed individuals.
- .2 Ventilation:
  - .1 Provide ventilation continuously during and after coating application. Run system 24 hours per day during application; provide continuous ventilation for 7days after completion of application.
- .3 Temperature:
  - .1 Do not apply emulsion systems unless uniform minimum 10 degrees C air temperature at installation area for 24 hours prior to and after application.
  - .2 Maintain minimum temperature 10 degrees C within area of installation until final acceptance of building.

## Part 2 Products

### 2.1 MATERIALS - (F.S. Epox)

- .1 Apply one coat of **Flame Control 20-20** from Flame Control Coatings to walls and ceilings of all cells.
- .2 Apply Two coats of **Flame Control No. 30-30 Semi-Gloss Class "A" Enamel Overcoat** over top of Flame Control 20-20.
- .3 Coatings are to be installed as per manufacturers installation instructions.
- .4 Colors to be chosen from manufacturers standard color set.

### 2.2 MIXES

- .1 Mix coatings according to manufacturer's instructions.

## 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 datasheets.

### 3.2 PREPARATION

- .1 Prepare surfaces in accordance with CAN/CGSB-1.186 and coating material manufacturer's instructions.

- .2 Mask surrounding surfaces to provide neat, clean juncture lines.
- .3 Protect adjacent surfaces and equipment from damage by overspray.

**3.3 APPLICATION**

- .1
- .2 Apply coating to produce smooth surface, uniform in sheen, colour and finish, free from marks, dirt, particles, runs, crawls, curling, holes, air pockets and other defects and to achieve smoothness index in accordance with CAN/CGSB-1.186. Total dry film thickness to manufacturers recommended thickness
- .3 Apply filler coats to porous surfaces.
- .4 Apply base per manufacturers recommended instructions.
- .5 Apply top glaze coat.

**3.4 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .1 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.

**3.5 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
  - .1 Clean surfaces to coating manufacturer's printed instructions.

**END OF SECTION**

**Part 1            General**

**1.1                ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Clearly Indicate component construction and installation details.

**1.2                QUALITY ASSURANCE**

- .1        Provide each flagpole as complete unit produced by single manufacturer, including fittings, accessories, bases and anchorage devices.

**1.3                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2        Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3        Storage and Handling Requirements:
  - .1        Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2        Store and protect flagpoles from nicks, scratches, and blemishes.
  - .3        Replace defective or damaged materials with new.

**Part 2            Products**

**2.1                Manufactured Products**

- .1        Institutional Wall Mount Seat – Rooms 121 and 126
  - .1        Bobrick Model B-5191

**2.2                CLEANING**

- .1        Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1        Leave Work area clean at end of each day.
- .2        Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**2.3                PROTECTION**

- .1        Protect installed products and components from damage during construction.
- .2        Repair damage to adjacent materials caused by flagpole installation.

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**Interior Renovation**

Norman Wells

Northwest Territories

Can-Tec Project No. 14-025-01-30

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Section 10 95 00  
Miscellaneous Specialities

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**END OF SECTION**

**Part 1            General**

**1.1                SUBMITTALS**

- .1        Submittals: in accordance with Section 01 33 00 - Submittal Procedures .
- .2        Shop drawings; submit drawings stamped and signed by professional engineer registered or licensed in the Northwest Territories, Canada.
- .3        Shop drawings to show:
  - .1        Mounting arrangements.
  - .2        Operating and maintenance clearances.
- .4        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.
- .5        In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures : use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
- .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 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 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 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.

**1.2 QUALITY ASSURANCE**

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

- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements .

**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.
- .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.

**Part 2 Products****2.1 MATERIALS****Part 3 Execution****3.1 PAINTING REPAIRS AND RESTORATION**

- .1 Do painting in accordance with Section 09 19 99 – Painting for Minor works .
- .2 Prime and touch up marred finished paintwork to match original.
- .3 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 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 Fan control 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.

**3.4****PROTECTION**

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

**END OF SECTION**

**Part 1            General**

**1.1            SECTION INCLUDES**

- .1    Disinfection of potable water distribution and transmission system.
- .2    Testing and reporting results.

**1.2            RELATED SECTIONS**

- .1    Section 01 33 00 - Submittal Procedures
- .2    Section 01 45 00 - Quality Control.
- .3    Section 01 61 00 - Common Product Requirements.
- .4

**1.3            REFERENCES**

- .1    AWWA B300 - Standard for Hypochlorites.
- .2    AWWA B301 - Standard for Liquid Chlorine.
- .3    AWWA B302 - Standard for Ammonium Sulfate.
- .4    AWWA B303 - Standard for Sodium Chlorite.
- .5    AWWA C651 - Standards for Disinfecting Water Mains.

**1.4            SUBMITTALS FOR INFORMATION**

- .1    Test Reports: Indicate results comparative to specified requirements.
- .2    Certificate: Certify that cleanliness of water distribution system meets or exceeds Territorial and Municipal Standards

**1.5            PROJECT RECORD DOCUMENTS**

- .1    Section 01 78 10: Submission procedures.
- .2    Disinfection report:
  - .1    Type and form of disinfectant used.
  - .2    Date and time of disinfectant injection start and time of completion.
  - .3    Test locations.
  - .4    Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
  - .5    Date and time of flushing start and completion.

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- .6 Disinfectant residual after flushing in ppm for each outlet tested.
- .3 Bacteriological report:
  - .1 Date issued, project name, and testing laboratory name, address, and telephone number.
  - .2 Time and date of water sample collection.
  - .3 Name of person collecting samples.
  - .4 Test locations.
  - .5 Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
  - .6 Coliform bacteria test results for each outlet tested.
  - .7 Certification that water conforms, or fails to conform, to bacterial standards of Northwest Territories.

## 1.6 QUALITY ASSURANCE

- .1 Perform Work in accordance with AWWA C651 – Disinfecting Water Mains.
- .2 Testing Firm: Company specializing in testing potable water systems, certified by the Northwest Territories.
- .3 Submit bacteriologist's signature and authority associated with testing.

## 1.7 REGULATORY REQUIREMENTS

- .1 Conform to applicable code or regulation for performing the work of this Section.
- .2 Provide certificate of compliance from authority having jurisdiction indicating approval of water system.

## Part 2 Products

### 2.1 DISINFECTION CHEMICALS

- .1 Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

## Part 3 Execution

### 3.1 EXAMINATION

- .1 Verify that piping system has been cleaned, inspected, and pressure tested.
- .2 Perform scheduling and disinfecting activity with start-up, testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

**3.2 EXECUTION**

- .1 Provide and attach required equipment to perform the work of this Section.
- .2 Introduce treatment into piping system.
- .3 Maintain disinfectant in system for 24 hours.
- .4 Flush, circulate, and clean until required cleanliness is achieved; use municipal water.
- .5 Replace permanent system devices removed for disinfection.

**3.3 FIELD QUALITY CONTROL**

- .1 Section 01 45 00: Field inspection and testing.
- .2 Test samples in accordance with AWWA C651 – Disinfecting Water Mains .

**END OF SECTION**

**Part 1            General**

**1.1            SECTION INCLUDES**

- .1    Pipe, pipe fittings, valves, and connections for piping systems.
  - .1    Sanitary sewer.
  - .2    Domestic water.

**1.2            RELATED SECTIONS**

- .1    Section 01 33 00 - Administrative Requirements.
- .2    Section 01 44 00 - Quality Assurance: Requirements for references and standards.
- .3    Section 01 44 00 - Quality Assurance.
- .4    Section 01 61 00 - Common Product Requirements.
- .5    Section 01 78 10 - Execution Requirements.
- .6    Section 08 31 13 - Access Doors And Frames.
- .7    Section 09 91 10 - Painting.
- .8    Section 23 05 48 - Vibration Isolation.
- .9    Section 23 05 53 - Mechanical Identification.
- .10   Section 23 07 19 - Piping Insulation.
- .11   Section 26 05 80 - Equipment Wiring: Electrical characteristics and wiring connections.

**1.3            REFERENCES**

- .1    AGA Z21.22 - Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems.
- .2    ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
- .3    ASME B16.3 - Malleable Iron Threaded Fittings.
- .4    ASME B16.4 - Grey Iron Threaded Fittings.
- .5    ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
- .6    ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- .7    ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV.

- .8 ASME B16.26 - Copper Alloy Bronze Fittings for Flared Copper Tubes.
- .9 ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
- .10 ASME B16.32 - Cast Copper Alloy Solder Joint Fittings for Solvent Drainage Systems.
- .11 ASME B31.1 - Power Piping.
- .12 ASME B31.2 - Fuel Gas Piping.
- .13 ASME B31.9 - Building Services Piping.
- .14 ASME SEC IV - Construction of Heating Boilers.
- .15 ASME SEC IX - Welding and Brazing Qualifications.
- .16 ASTM A47/A47M - Ferritic Malleable Iron Castings.
- .17 ASTM A53/A53M - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- .18 ASTM A74 - Cast Iron Soil Pipe and Fittings.
- .19 ASTM A234/A234M - Piping Fittings of Wrought-Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
- .20 ASTM B32 - Solder Metal.
- .21 ASTM B42 - Seamless Copper Pipe, Standard Sizes.
- .22 ASTM B43 - Seamless Red Brass Pipe, Standard Sizes.
- .23 ASTM B68 - Seamless Copper Tube, Bright Annealed.
- .24 ASTM B75 - Seamless Copper Tube.
- .25 ASTM B88 - Seamless Copper Water Tube.
- .26 ASTM B251 - General Requirements for Wrought Seamless Copper and Copper-Alloy Tube.
- .27 ASTM B280 - Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
- .28 ASTM B302 - Threadless Copper Pipe, Standard Sizes.
- .29 ASTM B306 - Copper Drainage Tube (DWV).
- .30 ASTM C4 - Clay Drain Tile and Perforated Clay Drain Tile.



- .31 ASTM C14/C14M - Concrete Sewer, Storm Drain, and Culvert Pipe.
- .32 ASTM C425 - Compression Joints for Vitrified Clay Pipe and Fittings.
- .33 ASTM C443 - Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
- .34 ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- .35 ASTM C700 - Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated.
- .36 ASTM C1053 - Borosilicate Glass Pipe and Fittings for Drain, Waste, and Vent (DWV) Applications.
- .37 ASTM D1785 - Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- .38 ASTM D2235 - Solvent Cement for Acrylonitrile - Butadiene - Styrene (ABS) Plastic Pipe and Fittings.
- .39 ASTM D2239 - Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
- .40 ASTM D2241 - Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
- .41 ASTM D2447 - Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter.
- .42 ASTM D2466 - Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
- .43 ASTM D2513 - Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.
- .44 ASTM D2564 - Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
- .45 ASTM D2609 - Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe.
- .46 ASTM D2661 - Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings.
- .47 ASTM D2662 - Polybutylene (PB) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
- .48 ASTM D2665 - Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
- .49 ASTM D2666 - Polybutylene (PB) Plastic Tubing.
- .50 ASTM D2683 - Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
- .51 ASTM D2729 - Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- .52 ASTM D2751 - Acrylonitrile-Butadiene-Styrene (ABS) Sewer, Pipe, and Fittings.

- .53 ASTM D2846 - Chlorinated Polyvinyl Chloride (CPVC) Pipe, Fittings, Solvent Cements and Adhesives for Potable Hot Water Systems.
- .54 ASTM D2855 - Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
- .55 ASTM D2996 - Filament-Wound 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Pipe.
- .56 ASTM D2997 - Centrifugally-Cast 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Pipe.
- .57 ASTM D3000 - Polybutylene (PB) Plastic Pipe (SDR-PR) Based on Outside Diameter.
- .58 ASTM D3034 - Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- .59 ASTM D3262 - 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Sewer Pipe.
- .60 ASTM D3309 - Polybutylene (PB) Plastic Hot- and Cold-Water Distribution System.
- .61 ASTM D3517 - 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Pressure Pipe.
- .62 ASTM D3754 - 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Sewer and Industrial Pressure Pipe.
- .63 ASTM D3840 - 'Fibreglass' (Glass-Fibre-Reinforced Thermosetting-Resin) Pipe Fittings for Non-Pressure Applications.
- .64 ASTM E814 - Fire Tests of Through-Penetration Fire Stops.
- .65 ASTM F437 - Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- .66 ASTM F438 - Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40.
- .67 ASTM F439 - Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
- .68 ASTM F441 - Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80.
- .69 ASTM F442 - Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe(SDR-PR).
- .70 ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- .71 ASTM F493 - Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.
- .72 ASTM F628 - Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe with a Cellular Core.

- .73 ASTM F679 - Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.
- .74 ASTM F708 - Design and Installation of Rigid Pipe Hangers.
- .75 ASTM F1281 - Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe.
- .76 ASTM F1282 - Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure Pipe.
- .77 AWS A5.8 - Filler Metals for Brazing and Braze Welding.
- .78 AWWA C105 - Polyethylene Encasement for Ductile-Iron Piping Systems.
- .79 AWWA C110 - Ductile - Iron and Gray - Iron Fittings, 3 In. - 48 In. (76 mm - 1219 mm), for Water.
- .80 AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .81 AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast, for Water.
- .82 AWWA C651 - Disinfecting Water Mains.
- .83 AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe (and Fabricated Fittings), 4 inch - 12 inch (100 mm - 300 mm), for Water Distribution.
- .84 AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 inch - 3 inch (13 mm - 76 mm) for Water Service.
- .85 AWWA C902 - Polybutylene (PB) Pressure Pipe and Tubing, 1/2 inch - 3 inch (13 mm - 76 mm) for Water.
- .86 AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 inch - 48 inch (350 mm - 1200mm).
- .87 AWWA C950 - Fibreglass Pressure Pipe.
- .88 CAN-3 B281 - Aluminum Drain, Waste, and Vent Pipe and Components.
- .89 CISPI 301 - Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications.
- .90 CISPI 310 - Joints with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
- .91 MSS SP58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
- .92 MSS SP-67 - Butterfly Valves.
- .93 MSS SP69 - Pipe Hangers and Supports - Selection and Application.

- .94 MSS SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
- .95 MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
- .96 MSS SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends.
- .97 MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves.
- .98 MSS SP-85 - Cast Iron Globe & Angle Valves, Flanged and Threaded Ends.
- .99 MSS SP89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
- .100 MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
- .101 NCPWB - Procedure Specifications for Pipe Welding.
- .102 UL 1479 - Fire Tests of Through-Penetration Firestops.

#### **1.4 SUBMITTALS FOR REVIEW**

- .1 Section 01 33 00: Procedures for submittals.
- .2 Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalogue information. Indicate valve data and ratings.

#### **1.5 SUBMITTALS AT PROJECT CLOSEOUT**

- .1 Section 01 78 10: Procedures for submittals.
- .2 Project Record Documents: Record actual locations of valves.

#### **1.6 QUALITY ASSURANCE**

- .1 Perform Work to Province of Manitoba standards. Maintain one copy on site.
- .2 Valves: Manufacturer's name and pressure rating marked on valve body.
- .3 Welding Materials and Procedures: Conform to ASME SEC IX and applicable provincial labour regulations.
- .4 Welders Certification: To ASME SEC IX and NCPWB Standard Procedure Specifications.
- .5 Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

#### **1.7 REGULATORY REQUIREMENTS**

- .1 Perform Work to Province of Manitoba plumbing code.

- .2 Conform to applicable code for installation of backflow prevention devices.

### **1.8 DELIVERY, STORAGE, AND PROTECTION**

- .1 Section 01 61 00: Transport, handle, store, and protect products.
- .2 Accept valves on site in shipping containers with labelling in place. Inspect for damage.
- .3 Provide temporary protective coating on cast iron and steel valves.
- .4 Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- .5 Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

### **1.9 ENVIRONMENTAL REQUIREMENTS**

- .1 Section 01 61 00: Environmental conditions affecting products on site.
- .2 Do not install underground piping when bedding is wet or frozen.

### **1.10 EXTRA MATERIALS**

- .1 Section 01 78 10: Operation and maintenance data.
- .2 Provide two repacking kits for each size valve.

## **Part 2 Products**

### **2.1 COPPER TUBE AND FITTINGS**

- .1 Above ground sanitary and vent Type DWV to: ASTM B306.
  - .1 Fittings.
    - .1 Cast brass: to CAN/CSA-B125.3.
    - .2 Wrought copper: to CAN/CSA-B125.3.
  - .2 Solder: Type TA 95, to ASTM B32.

### **2.2 SANITARY SEWER PIPING, ABOVE GRADE**

- .1 Cast Iron Pipe: ASTM A74, service weight.
  - .1 Fittings: Cast iron.
  - .2 Joints: ASTM C564, neoprene gasket system or lead and oakum.
- .2 Cast Iron Pipe: CISPI 301, hubless, service weight.
  - .1 Fittings: Cast iron.

- .2 Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

### **2.3 WATER PIPING, ABOVE GRADE**

- .1 Copper Tubing: ASTM B88M, Type L, hard drawn.
  - .1 Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
  - .2 Joints: ASTM B32, solder, Grade 95TA.

### **2.4 FLANGES, UNIONS, AND COUPLINGS**

- .1 Pipe Size 80 mm and Under:
  - .1 Ferrous pipe: Class 150 malleable iron threaded unions.
  - .2 Copper tube and pipe: Class 150 bronze unions with soldered joints.
- .2 Pipe Size Over 25 mm:
  - .1 Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
  - .2 Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
- .3 Grooved and Shouldered Pipe End Couplings:
  - .1 Housing: Malleable iron clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; steel bolts, nuts, and washers; galvanized for galvanized pipe.
  - .2 Sealing gasket: "C" shape composition sealing gasket.
- .4 Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

### **2.5 PIPE HANGERS AND SUPPORTS**

- .1 Plumbing Piping - Drain, Waste, and Vent:
  - .1 Conform to ASME B31.9 ASTM F708 MSS SP58 MSS SP69 MSS SP89.
  - .2 Hangers for Pipe Sizes 15 to 40 mm: Carbon steel, adjustable swivel, split ring.
  - .3 Hangers for Pipe Sizes 50 mm and Over: Carbon steel, adjustable, clevis.
  - .4 Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
  - .5 Wall Support for Pipe Sizes to 80 mm: Cast iron hook.
  - .6 Wall Support for Pipe Sizes 100 mm and Over: Welded steel bracket and wrought steel clamp.
  - .7 Vertical Support: Steel riser clamp.
  - .8 Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
  - .9 Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

- .2 Plumbing Piping - Water:
  - .1 Conform to ASME B31.9 ASTM F708 MSS SP58 MSS SP69 MSS SP89.
  - .2 Hangers for Pipe Sizes 15 to 40 mm: Malleable iron Carbon steel, adjustable swivel, split ring.
  - .3 Hangers for Cold Pipe Sizes 50 mm and Over: Carbon steel, adjustable, clevis.
  - .4 Hangers for Hot Pipe Sizes 50 to 100 mm: Carbon steel, adjustable, clevis.
  - .5 Hangers for Hot Pipe Sizes 150 mm and Over: Adjustable steel yoke, cast iron pipe roll, double hanger.
  - .6 Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.
  - .7 Multiple or Trapeze Hangers for Hot Pipe Sizes 150 mm and Over: Steel channels with welded supports or spacers and hanger rods, cast iron roll.
  - .8 Wall Support for Pipe Sizes to 80 mm: Cast iron hook.
  - .9 Wall Support for Pipe Sizes 100 mm and Over: Welded steel bracket and wrought steel clamp.
  - .10 Wall Support for Hot Pipe Sizes 150 mm and Over: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron pipe roll.
  - .11 Vertical Support: Steel riser clamp.
  - .12 Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
  - .13 Floor Support for Hot Pipe Sizes to 100 mm: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
  - .14 Floor Support for Hot Pipe Sizes 150 mm and Over: Adjustable cast iron pipe roll and stand, steel screws, and concrete pier or steel support.
  - .15 Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

## 2.6 GATE VALVES

- .1 Up To and Including 80 mm:
  - .1 MSS SP-80, Class 125 , bronze body, bronze trim, rising stem, handwheel, inside screw, solid wedge disc, solder or threaded ends.
- .2 50 mm and Larger:
  - .1 MSS SP-70, Class 125 , iron body, bronze trim, outside screw and yoke, handwheel, solid wedge disc, flanged ends. Provide chain-wheel operators for valves 150 mm and larger mounted over 2400 mm above floor.

## 2.7 GLOBE VALVES

- .1 Up To and Including 80 mm:
  - .1 MSS SP-80, Class 125 , bronze body, bronze trim, handwheel, teflon disc, solder or threaded ends.
- .2 50 mm and Larger:

- .1 MSS SP-85, Class 125 , iron body, bronze trim, handwheel, outside screw and yoke, renewable bronze plug-type disc, renewable seat, flanged ends. Provide chain-wheel operators for valves 150 mm and larger mounted over 2400 mm above floor.

**2.8 BALL VALVES**

- .1 Construction, 100 mm and Smaller: MSS SP-110, Class 150, 2760 kPa CWP , bronze, two piece body, chrome plated brass ball, regular port, teflon seats and stuffing box ring, blow-out proof stem, lever handle with balancing stops, solder or threaded ends with union.

**2.9 PLUG VALVES**

- .1 Construction 65 mm and Larger: MSS SP-78, 1200 kPa CWP , cast iron body and plug, pressure lubricated, teflon or Buna N packing, flanged or grooved ends. Provide lever operator with set screw.

**2.10 FLOW CONTROLS**

- .1 Construction: Class 150 , Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet , blowdown/backflush drain.
- .2 Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 24 kPa.

**2.11 SWING CHECK VALVES**

- .1 Up To and Including 80 mm:
  - .1 MSS SP-80, Class 125 , bronze body and cap, bronze swing disc with rubber seat, solder or threaded ends.
- .2 50 mm and Larger:
  - .1 MSS SP-71, Class 125 , iron body, bronze swing disc, renewable disc seal and seat, flanged or grooved ends.

**2.12 SPRING LOADED CHECK VALVES**

- .1 Class 125 , iron body, bronze trim, stainless steel springs, bronze disc, Buna N seals, wafer style ends.

**2.13 WATER PRESSURE REDUCING VALVES**

- .1 MSS SP-80, bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, threaded double union ends.
- .2 Over 50 mm:
  - .1 MSS SP-85, cast iron body, bronze fitted, elastomeric diaphragm and seat disc, flanged.



**2.14 RELIEF VALVES**

- .1 Pressure Relief:
  - .1 AGA Z21.22 certified, bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated.
- .2 Temperature and Pressure Relief:
  - .1 AGA Z21.22 certified, bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 98.9 degrees C, capacity ASME SEC IV certified and labelled.

**2.15 STRAINERS**

- .1 Size 50 mm and Under:
  - .1 Class 150, threaded bronze body 2070 kPa CWP, Y pattern with 0.8 mm 1/32 inch stainless steel perforated screen.
- .2 Size 40 mm to 100 mm:
  - .1 Class 125, flanged iron body, Y pattern with 1.6 mm stainless steel perforated screen.
- .3 Size 125 mm and Larger:
  - .1 Class 125, flanged iron body, basket pattern with 3.2 mm stainless steel perforated screen.

**2.16 FIRE STOP SYSTEMS**

- .1 General Purpose Fire Stopping Sealant:
  - .1 Water based, nonslumping, premixed sealant with intumescent properties, rated for 3 hours per ASTM E814 and UL 1479.
- .2 General Purpose Vibration Resistant Fire Stopping Sealant:
  - .1 Silicone based, nonslumping, premixed sealant with intumescent properties, vibration and moisture resistant, rated for 3 hours per ASTM E814 and UL 1479.
- .3 DWV Plastic Pipe Systems Fire Stopping Sealant:
  - .1 Silicone based, premixed sealant with intumescent properties, vibration and moisture resistant, rated for 3 hours per ASTM E814 and UL 1479 with metal collars.

**Part 3 Execution****3.1 EXAMINATION**

- .1 Section 01100- Coordination and Meetings: Verification of existing conditions before starting work.
- .2 Verify that excavations are to required grade, dry, and not over-excavated.

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### 3.2 PREPARATION

- .1 Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- .2 Remove scale and dirt, on inside and outside, before assembly.
- .3 Prepare piping connections to equipment with flanges or unions.

### 3.3 INSTALLATION

- .1 Install to manufacturer's instructions.
- .2 Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- .3 Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- .4 Install piping to maintain headroom, conserve space, and not interfere with use of space.
- .5 Group piping whenever practical at common elevations.
- .6 Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 23 05 16.
- .7 Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 23 07 19.
- .8 Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08 31 13.
- .9 Establish elevations of buried piping outside the building to ensure not less than 1.0 m of cover.
- .10 Install vent piping penetrating roofed areas to maintain integrity of roof assembly
- .11 Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- .12 Provide support for utility meters to requirements of utility companies.
- .13 Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 09 91 10.
- .14 Excavate to Sections 31 23 18 and 31 23 23 for work of this Section.
- .15 Backfill to Sections 31 23 16 and 31 23 23 for work of this Section.
- .16 Install bell and spigot pipe with bell end upstream.
- .17 Install valves with stems upright or horizontal, not inverted.

- .18 Pipe vents from gas pressure reducing valves to outdoors and terminate in weather proof hood.
- .19 Install water piping to ASME B31.9.
- .20 Sleeve pipes passing through partitions, walls and floors.
- .21 Inserts:
  - .1 Provide inserts for placement in concrete formwork.
  - .2 Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
  - .3 Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 100 mm.
  - .4 Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
  - .5 Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above flush with top of recessed into and grouted flush with slab.
- .22 Pipe Hangers and Supports:
  - .1 Install to ASTM B31.9 ASTM F708 and MSS SP89.
  - .2 Support horizontal piping as scheduled.
  - .3 Install hangers to provide minimum 15 mm space between finished covering and adjacent work.
  - .4 Place hangers within 300 mm of each horizontal elbow.
  - .5 Use hangers with 40 mm minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - .6 Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
  - .7 Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  - .8 Provide copper plated hangers and supports for copper piping sheet lead packing between hanger or support and piping.
  - .9 Prime coat exposed steel hangers and supports. Refer to Section 09 91 10. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
  - .10 Provide hangers adjacent to motor driven equipment with vibration isolation; refer to Section 23 05 48.
  - .11 Support cast iron drainage piping at every joint.

**3.4****APPLICATION**

- .1 Use grooved mechanical couplings and fasteners only in accessible locations.
- .2 Install unions downstream of valves and at equipment or apparatus connections.

- .3 Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
- .4 Install gate ball or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- .5 Install globe ball or butterfly valves for throttling, bypass, or manual flow control services.
- .6 Provide lug end butterfly valves adjacent to equipment when provided to isolate equipment.
- .7 Provide spring loaded check valves on discharge of water pumps.
- .8 Provide flow controls in water recirculating systems where indicated.

### **3.5 ERECTION TOLERANCES**

- .1 Section 01 44 00: Tolerances.
- .2 Establish invert elevations, slopes for drainage to 2 one percent minimum. Maintain gradients.
- .3 Slope water piping minimum 0.25 percent and arrange to drain at low points.

### **3.6 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM**

- .1 Disinfect water distribution system to Section 22 05 81.

### **3.7 SERVICE CONNECTIONS**

- .1 Provide new sanitary sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.
- .2 Provide new water service complete with approved double check backflow preventer and water meter with by-pass valves pressure reducing valve,.
  - .1 Provide sleeve in wall for service main and support at wall with reinforced concrete bridge. Caulk enlarged sleeve and make watertight with pliable material. Anchor service main inside to concrete wall.

### **3.8 SCHEDULES**

- .1 Pipe Hanger Schedule:
  - .1 Metal Piping:
    - .1 Pipe size: 15 to 32 mm:
      - .1 Maximum hanger spacing: 2 m.
      - .2 Hanger rod diameter: 9 mm.
    - .2 Pipe size: 40 to 50 mm:

- .1 Maximum hanger spacing: 3 m.
- .2 Hanger rod diameter: 9 mm.
- .3 Pipe size: 65 to 75 mm:
  - .1 Maximum hanger spacing: 3 m.
  - .2 Hanger rod diameter: 13 mm.
- .4 Pipe size: 100 to 150 mm:
  - .1 Maximum hanger spacing: 3 m.
  - .2 Hanger rod diameter: 15 mm.
- .5 Pipe size: 200 to 300 mm:
  - .1 Maximum hanger spacing: 4.25 m.
  - .2 Hanger rod diameter: 22 mm.
- .6 Pipe size: 350 mm and Over:
  - .1 Maximum hanger spacing: 6 m.
  - .2 Hanger rod diameter: 25 mm.
- .2 Plastic Piping:
  - .1 All Sizes:
    - .1 Maximum hanger spacing: 1.8 m.
    - .2 Hanger rod diameter: 9 mm.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1      Water closets.
- .2      Penal combi-units.
- .3      Lavatories.
- .4      Sinks.

**1.2                RELATED SECTIONS**

- .1      Section 01 33 00 - Administrative Requirements.
- .2      Section 01 44 00 - Quality Assurance.
- .3      Section 01 61 00 - Common Product Requirements.
- .4      Section 01 78 10 - Execution Requirements.
- .5      Section 07 92 00 - Joint Sealants: Seal fixtures to walls and floors.
- .6      Section 23 05 29 - Supports And Anchors.
- .7      Section 22 10 00 - Plumbing Piping.
- .8      Section 22 42 01 - Plumbing Specialties.
- .9      Section 22 47 00 - Plumbing Equipment.
- .10     Section 26 05 80 - Equipment Wiring: Electrical characteristics and wiring connections.

**1.3                REFERENCES**

- .1      ASME A112.6.1 - (Floor Affixed) Supports for Off-the-Floor Plumbing Fixtures for Public Use.
- .2      ASME A112.18.1 - Plumbing Fixture Fittings.
- .3      ASME A112.19.1 - Enamelled Cast Iron Plumbing Fixtures.
- .4      ASME A112.19.2 - Vitreous China Plumbing Fixtures.
- .5      ASME A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use).
- .6      ASME A112.19.4 - Porcelain Enamelled Formed Steel Plumbing Fixtures.
- .7      ASME A112.19.5 - Trim for Water-Closet Bowls, Tanks, and Urinals.

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.8 NFPA 70 - National Electrical Code.

#### 1.4 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Procedures for submittals.
- .2 Product Data: Provide catalogue illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- .3 Samples: Submit two lavatory supply fittings fixtures for colour matching sets of colour chips for each standard colour .

#### 1.5 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Procedures for submittals.
- .2 Manufacturer's Instructions: Indicate installation methods and procedures.

#### 1.6 SUBMITTALS AT PROJECT CLOSEOUT

- .1 Section 01 78 10: Procedures for submittals.
- .2 Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- .3 Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### 1.7 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

#### 1.8 REGULATORY REQUIREMENTS

- .1 Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

#### 1.9 DELIVERY, STORAGE, AND PROTECTION

- .1 Section 01 61 00: Transport, handle, store, and protect products.
- .2 Accept fixtures on site in factory packaging. Inspect for damage.
- .3 Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

#### 1.10 WARRANTY

- .1 Section 01 78 10.

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**1.11 EXTRA MATERIALS**

- .1 Section 01 78 10.
- .2 Supply two sets of faucet washers, Flush valve service kits, lavatory supply fittings, shower heads, toilet seats..

**Part 2 Products****2.1 TANK TYPE WATER CLOSETS WC-2**

- .1 American Standard Cadet 3 right height elongated 419 mm high #2386.500.020 low consumption toilet, white vitreous china with Everclean antimicrobial surface, floor-mounted, siphon jet flush action, 6l per flush, raised sanitary bar and four point tank stabilization. Lined tank, unbolted tank cover, oversized flush valve with flapper, pilot valve water control (without float) for quiet refill, 12" rough-in, and 54mm fully glazed internal trapway, floor outlet, bolt caps. Centoco #820STSS.001 heavy duty toilet seat, for elongated bowl open front, white solid plastic, with cover, reinforced stainless steel check hinges, metal flat washers stainless steel posts and nuts. McGuire #H172BV toilet supply, chrome plated polished brass, ¼ turn ball valve angle stop, 13mm i.d. inlet x 127mm long rigid short horizontal integral copper sweat tube nipple, combination v.p. loose key handle, escutcheon and flexible copper riser. Floor flange (provide same material as connecting pipe drain) with all brass bolts and rubber gasket.

**2.2 WATER/LAVATORY COMBO WC-1**

- .1 Combination water closet and lavatory for prison cell, floor type waste outlet one piece unit with welded components of 1.8mm 304 stainless steel with recessed paper holder. 1.8mm vertical cabinet enclosure reinforced with 3mm steel plate, angles and wall sleeve completely sound deadened. Exposed surfaces #4 finishes
- .2 Water closet bowl: elongated, blowout type with back inlet and outlet, with integral flushing rim, complete with min. 76mm trap seal, capable of passing a 64mm ball and free of burrs, crevices and projections. Jet located at lowest point of upward leg trap.
- .3 Lavatory top bowl: on piece of construction with perforated fast drain outlet and raised edges around rim and back, integral trap. Lavatory back with keyed depression for push button escutcheon and fastened with lock nut to prevent removal from room side. Hot and cold vandal proof push button valves complete with lavatory spout. The water shall discharge from the spout in a downward direction and NOT upward.
- .4 Self draining soap dish, no paper holders, nuts and mounting angles shall be included with the unit. No exposed fasteners in room allowed, all piping concealed.
- .5 Concealed penal flushometer with remote controlled cast brass adjustable flush diaphragm valve, pressure loss check, vacuum breaker, renewable seat flush connection for 40 mm back spun and universal 25mm i.p./copper sweat inlet wheel handle angle stop
  - .1 Acceptable Materials
    - .1 Fixture: Acorn 1440



.2 Willoughby 1806 ECW-R/L-MOD-RCMP

## 2.3 SINKS

### .1 SINGLE COMPARTMENT BOWL: S-1

.1 Kindred Commercial LBS1306 S.S. sink, three hole with 4" centers, 8" wide spread , 15-7/16" x 15-1/6" x 6" (392mm x 384mm x 152mm) deep, counter mounted, back ledge, grade 18-8 type 302 stainless steel, single compartment, satin finished rim and bowl, self-rimming, with 1 1/2" (38mm) tail piece, sound deadening and mounting kit, 3-1 1/2" (89mm) crumb cup strainer with 1-1 1/2" (38mm) tail piece.

.2 Substitutions: Refer to Section 01 62 00.

#### .2 Trim:

.1 Moen model #8248 two handle faucet with 4" blades, brass construction with chrome plating, gooseneck swing spout, 2.2 GPM vandal proof aerator, and ceramic cartridge. Substitutions: Refer to Section 01 62 00.

.3 Accessories: 1.3 mm brass P-trap with clean-out plug and arm with escutcheon, wheel handle stop, flexible supplies.

## Part 3 Execution

### 3.1 EXAMINATION AND PREPARATION

- .1 Section 01 70 00: Verification of existing conditions before starting work.
- .2 Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- .3 Verify that electric power is available and of the correct characteristics.
- .4 Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

### 3.2 PREPARATION

- .1 Rough-in fixture piping connections to minimum sizes indicated in fixture rough-in schedule for particular fixtures.

### 3.3 INSTALLATION

- .1 Install each fixture with trap, easily removable for servicing and cleaning.
- .2 Provide chrome plated rigid or flexible supplies to fixtures with loose key screwdriver stops, reducers, and escutcheons.
- .3 Install components level and plumb.
- .4 Install and secure fixtures in place with wall supports wall carriers and bolts.

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- .5 Seal fixtures to wall and floor surfaces with sealant as specified in Section 07 92 00, colour to match fixture.
- .6 Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

### **3.4 INTERFACE WITH OTHER PRODUCTS**

- .1 Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

### **3.5 ADJUSTING**

- .1 Section 01 78 10 - Execution Requirements: Adjusting installed work.
- .2 Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

### **3.6 CLEANING**

- .1 Section 01 78 10 - Execution Requirements: Cleaning installed work.
- .2 Clean plumbing fixtures and equipment.

### **3.7 PROTECTION OF FINISHED WORK**

- .1 Section 01 78 10 - Execution Requirements: Protecting installed work.
- .2 Do not permit use of fixtures.

### **3.8 SCHEDULES**

- .1 Fixture Heights: Install fixtures to heights above finished floor as indicated.
  - .1 Water Closet:
    - .1 Standard: 380 mm mm to top of bowl rim.
    - .2 Accessible: 455 mm mm to top of seat.
  - .2 Water Closet Flush Valves:
    - .1 Standard: 280 mm mm min. above bowl rim.
    - .2 Recessed: 255 mm mm min. above bowl rim.
  - .3 Urinal:
    - .1 Standard: 560 mm mm to top of bowl rim.
    - .2 Accessible: 430 mm mm to top of bowl rim.
  - .4 Lavatory:
    - .1 Standard: 785 mm mm to top of basin rim.
    - .2 Accessible: 865 mm mm to top of basin rim.
  - .5 Drinking Fountain:
    - .1 Child: 760 mm mm to top of basin rim.

- .2 Standard Adult: 1015 mm mm to top of basin rim.
- .3 Accessible: 915 mm mm to top of spout.
- .6 Shower Heads:
  - .1 Adult Male: 1765 mm mm to bottom of head.
  - .2 Adult Female: 1640 mm mm to bottom of head.
  - .3 Child: 1490 mm mm to bottom of head.
- .7 Emergency Eye And Face Wash:
  - .1 Standard: 965 mm mm to receptor rim.
- .8 Emergency Shower:
  - .1 Standard: 2130 mm mm to bottom of head.

.2 Fixture Rough-In

Water Closet: (Flush Valve)	25 mm	100 mm	50 mm	
Water Closet: (Tank Type)	15 mm	100 mm	50 mm	
Bidet:	15 mm	15 mm	40 mm	32 mm
Urinal: (Flush Valve)	20 mm	50 mm	40 mm	
Urinal: (Tank Type)	15 mm	50 mm	40 mm	
Lavatory:	15 mm	15 mm	40 mm	32 mm
Sink:	15 mm	15 mm	40 mm	32 mm
Service Sink:	15 mm	15 mm	50 mm	40 mm
Service Sink:	15 mm	15 mm	80 mm	40 mm
Drinking Fountain:	15 mm	32 mm	32 mm	
Bathtub:	15 mm	15 mm	40 mm	32 mm
Shower:	15 mm	15 mm	40 mm	32 mm

**END OF SECTION**

**Part 1            General****1.1                SECTION INCLUDES**

- .1    Nameplates.
- .2    Tags.
- .3    Stencils.
- .4    Pipe Markers.

**1.2                RELATED SECTIONS**

- .1    Section 01 33 00 - Administrative Requirements.
- .2    Section 01 61 00 - Common Product Requirements.

**1.3                REFERENCES**

- .1    ASME A13.1 - Scheme for the Identification of Piping Systems.

**1.4                SUBMITTALS**

- .1    Section 01 33 00: Procedures for submittals.
- .2    Submit list of wording, symbols, letter size, and colour coding for mechanical identification.
- .3    Submit valve chart and schedule, including valve tag number, location, function, and valve manufacturer's name and model number.
- .4    Product Data: Provide manufacturers catalogue literature for each product required.
- .5    Samples: Submit two label samples.
- .6    Manufacturer's Installation Instructions: Indicate special procedures, and installation.

**1.5                PROJECT RECORD DOCUMENTS**

- .1    Section 01 78 10: Submittals for project closeout.
- .2    Record actual locations of tagged valves.

**Part 2            Products****2.1                NAMEPLATES**

- .1    Manufacturers:

□

- .1 Lamacoid.
- .2 Substitutions: Refer to Section 01 62 00.
- .2 Description: Laminated three-layer plastic with engraved black letters on light contrasting background colour.

**2.2 TAGS**

- .1 Manufacturers:
  - .1 Lamacoid
  - .2 Substitutions: Refer to Section 01 62 00.
- .2 Chart: Typewritten letter size list in anodized aluminum frame.

**2.3 STENCILS**

- .1 Stencils: With clean cut symbols and letters of following size:
  - .1 20-30 mm Outside Diameter of Insulation or Pipe: 200 mm long colour field, 15 mm high letters.
  - .2 40-50 mm Outside Diameter of Insulation or Pipe: 200 mm long colour field, 20 mm high letters.
  - .3 65-150 mm Outside Diameter of Insulation or Pipe: 300 mm long colour field, 30 mm high letters.
  - .4 200-250 mm Outside Diameter of Insulation or Pipe: 600 mm long colour field, 65 mm high letters.
  - .5 Over 250 mm Outside Diameter of Insulation or Pipe: 800 mm long colour field, 90 mm high letters.
  - .6 Ductwork and Equipment: 65 mm high letters.
- .2 Stencil Paint: As specified in Section 09 91 99.

**2.4 PIPE MARKERS**

- .1 Manufacturers:
  - .1 Brady Canada
  - .2 Substitutions: Refer to Section 01 62 00.
- .2 Colour: Conform to ASME A13.1.
- .3 Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.
- .4 Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
- .5 Underground Plastic Pipe Markers: Bright coloured continuously printed plastic ribbon tape, minimum 150 mm wide by 0.10 mm thick, manufactured for direct burial service.

**Part 3 Execution**

**3.1 PREPARATION**

- .1 Degrease and clean surfaces to receive adhesive for identification materials.
- .2 Prepare surfaces to Section 09 91 99 for stencil painting.

**3.2 INSTALLATION**

- .1 Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- .2 Install tags with corrosion resistant chain.
- .3 Apply stencil painting to Section 09 91 99.
- .4 Install plastic pipe markers to manufacturer's instructions.
- .5 Install plastic tape pipe markers complete around pipe to manufacturer's instructions.
- .6 Install underground plastic pipe markers 150 to 200 mm below finished grade, directly above buried pipe.
- .7 Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates. Small devices, such as in-line pumps, may be identified with tags.
- .8 Identify control panels and major control components outside panels with plastic nameplates.
- .9 Identify thermostats relating to terminal boxes or valves with nameplates.
- .10 Identify valves in main and branch piping with tags.
- .11 Identify air terminal units and radiator valves with numbered tags.
- .12 Tag automatic controls, instruments, and relays. Key to control schematic.
- .13 Identify piping, concealed or exposed, with plastic tape pipe markers. stencilled painting. Use tags on piping 20 mm diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 6 m on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.
- .14 Identify ductwork with stencilled painting. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.
- .15 Provide ceiling tacks to locate valves or dampers above T-bar type panel ceilings. Locate in corner of panel closest to equipment.

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**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1      Testing, adjustment, and balancing of air systems.
- .2      Measurement of final operating condition of HVAC systems.

**1.2                RELATED SECTIONS**

- .1      Section 01 20 13 - Price and Payment Procedures.
- .2      Section 01 33 00 - Administrative Requirements.
- .3      Section 01 44 00 - Quality Assurance:
  - .1      Testing laboratory services.
  - .2      Employment of testing agency and payment for services.
  - .3      Inspection and testing allowances.
- .4      Section 01 61 00 - Common Product Requirements.
- .5      Section 01 78 10 - Execution Requirements:
  - .1      Starting of Systems.
  - .2      Testing, Adjusting, and Balancing of Systems.

**1.3                REFERENCES**

- .1      AABC - National Standards for Total System Balance.
- .2      ADC - Test Code for Grilles, Registers, and Diffusers.
- .3      ASHRAE 111 - Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air-conditioning, and Refrigeration Systems.
- .4      NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.
- .5      SMACNA - HVAC Systems Testing, Adjusting, and Balancing.

**1.4                SUBMITTALS**

- .1      Section 01 33 00: Procedures for submittals.
- .2      Submit name of adjusting and balancing agency for approval within 30 days after award of Contract.
- .3      Section 01 44 00: Procedures for submitting Field Reports.

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- .4 Field Reports: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
- .5 Prior to commencing work, submit report forms or outlines indicating adjusting, balancing, and equipment data required.
- .6 Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Consultant and for inclusion in operating and maintenance manuals.
- .7 Provide reports in soft cover, letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
- .8 Include detailed procedures, agenda, sample report forms and copy of AABC National Project Performance Guaranty prior to commencing system balance.
- .9 Test Reports: Indicate data on AABC National Standards for Total System Balance forms. Submit data in S.I. Metric units.

**1.5 PROJECT RECORD DOCUMENTS**

- .1 Section 01 78 00: Submittals for project closeout.
- .2 Record actual locations of flow measuring stations balancing valves and rough setting.

**1.6 QUALITY ASSURANCE**

- .1 Perform total system balance to AABC National Standards for Field Measurement and Instrumentation, Total System Balance.
- .2 Maintain one copy of each document on site.

**1.7 QUALIFICATIONS**

- .1 Agency: Company specializing in the testing, adjusting, and balancing of systems specified in this Section with minimum three years documented experience certified by AABC.
- .2 Perform Work under supervision of AABC Certified Test and Balance Engineer.

**Part 2 Products**

- .1 Not used

**Part 3 Execution**

**3.1 AGENCIES**

- .1 Air Movement
- .2 AirDronics Inc.

**3.2 EXAMINATION**

- .1 Verify that systems are complete and operable before commencing work. Ensure the following conditions:
  - .1 Systems are started and operating in a safe and normal condition.
  - .2 Temperature control systems are installed complete and operable.
  - .3 Proper thermal overload protection is in place for electrical equipment.
  - .4 Final filters are clean and in place. If required, install temporary media in addition to final filters.
  - .5 Duct systems are clean of debris.
  - .6 Fans are rotating correctly.
  - .7 Fire and volume dampers are in place and open.
  - .8 Air coil fins are cleaned and combed.
  - .9 Access doors are closed and duct end caps are in place.
  - .10 Air outlets are installed and connected.
  - .11 Duct system leakage is minimized.
  - .12 Pumps are rotating correctly.
  - .13 Proper strainer baskets are clean and in place.
  - .14 Service and balance valves are open.
- .2 Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.
- .3 Beginning of work means acceptance of existing conditions.

**3.3 PREPARATION**

- .1 Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Consultant to facilitate spot checks during testing.
- .2 Provide additional balancing devices as required.

**3.4 INSTALLATION TOLERANCES**

- .1 Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

- .2 Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

### **3.5 ADJUSTING**

- .1 Ensure recorded data represents actual measured or observed conditions.
- .2 Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- .3 After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- .4 Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- .5 At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

### **3.6 AIR SYSTEM PROCEDURE**

- .1 Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- .2 Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- .3 Measure air quantities at air inlets and outlets.
- .4 Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- .5 Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- .6 Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- .7 Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- .8 Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- .9 Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

- .10 Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- .11 Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- .12 Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 12.5 Pa positive static pressure near the building entries.
- .13 Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

**3.7****SCHEDULES**

- .1 Equipment requiring testing, adjusting and balancing:
  - .1 Forced Air Furnaces
  - .2 Air Cooled Refrigerant Condensers
  - .3 Modular A/C units
  - .4 Fire Dampers
  - .5 Outside air damper.
  - .6 Air Filters
  - .7 Air Inlets and Outlets
- .2 Report Forms
  - .1 Title Page:
    - .1 Name of Testing, Adjusting, and Balancing Agency
    - .2 Address of Testing, Adjusting, and Balancing Agency
    - .3 Telephone number of Testing, Adjusting, and Balancing Agency
    - .4 Project name
    - .5 Project location
    - .6 Project Architect
    - .7 Project Engineer
    - .8 Project Contractor
    - .9 Project altitude
    - .10 Report date
  - .2 Summary Comments:
    - .1 Design versus final performance
    - .2 Notable characteristics of system
    - .3 Description of systems operation sequence
    - .4 Summary of outdoor and exhaust flows to indicate amount of building pressurization
    - .5 Nomenclature used throughout report

- .6 Test conditions
- .3 Instrument List:
  - .1 Instrument
  - .2 Manufacturer
  - .3 Model number
  - .4 Serial number
  - .5 Range
  - .6 Calibration date
- .4 Electric Motors:
  - .1 Manufacturer
  - .2 Model/Frame
  - .3 HP/BHP
  - .4 Phase, voltage, amperage; nameplate, actual, no load
  - .5 RPM
  - .6 Service factor
  - .7 Starter size, rating, heater elements
  - .8 Sheave Make/Size/Bore
- .5 V-Belt Drive:
  - .1 Identification/location
  - .2 Required driven RPM
  - .3 Driven sheave, diameter and RPM
  - .4 Belt, size and quantity
  - .5 Motor sheave diameter and RPM
  - .6 Centre to centre distance, maximum, minimum, and actual
- .6 Air Cooled Condenser:
  - .1 Identification/number
  - .2 Location
  - .3 Manufacturer
  - .4 Model number
  - .5 Serial number
  - .6 Entering DB air temperature, design and actual
  - .7 Leaving DB air temperature, design and actual
  - .8 Number of compressors
- .7 Air Moving Equipment
  - .1 Location
  - .2 Manufacturer
  - .3 Model number
  - .4 Serial number
  - .5 Arrangement/Class/Discharge
  - .6 Air flow, specified and actual

- .7 Return air flow, specified and actual
- .8 Outside air flow, specified and actual
- .9 Total static pressure (total external), specified and actual
- .10 Inlet pressure
- .11 Discharge pressure
- .12 Sheave Make/Size/Bore
- .13 Number of Belts/Make/Size
- .14 Fan RPM
- .8 Return Air/Outside Air Data:
  - .1 Identification/location
  - .2 Design air flow
  - .3 Actual air flow
  - .4 Design return air flow
  - .5 Actual return air flow
  - .6 Design outside air flow
  - .7 Actual outside air flow
  - .8 Return air temperature
  - .9 Outside air temperature
  - .10 Required mixed air temperature
  - .11 Actual mixed air temperature
  - .12 Design outside/return air ratio
  - .13 Actual outside/return air ratio
- .9 Exhaust Fan Data:
  - .1 Location
  - .2 Manufacturer
  - .3 Model number
  - .4 Serial number
  - .5 Air flow, specified and actual
  - .6 Total static pressure (total external), specified and actual
  - .7 Inlet pressure
  - .8 Discharge pressure
  - .9 Sheave Make/Size/Bore
  - .10 Number of Belts/Make/Size
  - .11 Fan RPM
- .10 Duct Traverse:
  - .1 System zone/branch
  - .2 Duct size
  - .3 Area
  - .4 Design velocity
  - .5 Design air flow

- .6 Test velocity
- .7 Test air flow
- .8 Duct static pressure
- .9 Air temperature
- .10 Air correction factor
- .11 Air Monitoring Station Data:
  - .1 Identification/location
  - .2 System
  - .3 Size
  - .4 Area
  - .5 Design velocity
  - .6 Design air flow
  - .7 Test velocity
  - .8 Test air flow

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1     Duct work insulation.
- .2     Duct Liner.
- .3     Insulation jackets.

**1.2                RELATED SECTIONS**

- .1     Section 01 45 00 - Quality Assurance.
- .2     Section 01 61 00 - Common Product Requirements.
- .3     Section 09 91 99 - Painting: Painting insulation jackets.
- .4     Section 23 05 53 - Mechanical Identification.
- .5     Section 23 31 00 - Duct Work: Glass fibre duct work.
- .6     Section 23 31 00 - Duct Work: Duct liner.

**1.3                REFERENCES**

- .1     ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- .2     ASTM C518 - Steady-State Thermal Transmission Properties by Means of the Heat Flow Metre Apparatus.
- .3     ASTM C553 - Standard Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
- .4     ASTM C612 - Standard Specification for Mineral Fibre Block and Board Thermal Insulation.
- .5     ASTM C921 - Properties of Jacketing Materials for Thermal Insulation.
- .6     ASTM C1071 - Fibrous Glass Duct Lining Insulation(Thermal Sound Absorbing Material).
- .7     ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- .8     ASTM E96 - Water Vapour Transmission of Materials.
- .9     ASTM E162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.



- .10 ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- .11 NAIMA National Insulation Standards.
- .12 NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.
- .13 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- .14 UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.
- .15 TIAC – Thermal Insulation Association of Canada

**1.4 SUBMITTALS FOR REVIEW**

- .1 Section 01 33 00: Procedures for submittals.
- .2 Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

**1.5 SUBMITTALS FOR INFORMATION**

- .1 Section 01 33 00: Procedures for submittals.
- .2 Manufacturer's Instructions: Indicate installation procedures which ensure acceptable workmanship and installation standards will be achieved.

**1.6 QUALITY ASSURANCE**

- .1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- .2 Applicator Qualifications: Company specializing in performing the work of this section with minimum 3 years documented experience approved by manufacturer.

**1.7 DEFINITIONS**

- .1 For purposes of this section
  - .1 CONCEALED - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces
  - .2 EXPOSED – will mean “not concealed” as devined herin
  - .3 Insulation systems – Insulation material, fasteners, jackets and other accessories
- .2 TIAC Codes
  - .1 CRD: Code Round Ductwork
  - .2 CRF: Code Rectangular finish

**1.8 REGULATORY REQUIREMENTS**

- .1 Materials: Flame spread/smoke developed rating of 25/50 to ASTM E84 NFPA 255 UL 723.

**1.9 DELIVERY, STORAGE, AND PROTECTION**

- .1 Section 01 61 00: Transport, handle, store, and protect products.
- .2 Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- .3 Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

**1.10 ENVIRONMENTAL REQUIREMENTS**

- .1 Section 01 61 00: Environmental conditions affecting products on site.
- .2 Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- .3 Maintain temperature during and after installation for minimum period of 24 hours.

**Part 2 Products**

**2.1 INSULATION**

- .1 Mineral fibre: as specified includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24 deg C mean temperature when tested in accordance with ASTM C 335
- .3 TIAC Code C-1; Rigid mineral fibre board to ASTM C 612, with or without factory applied vapour retarder jacket to CBSB 51-GP-52Ma
- .4 TIAC Code C-2: Mineral fibre blanket to ASTM C 553 faced with or without factory applied vapour retarder jacket to CGSB 51-GP-52Ma
  - .1 Mineral Fibre to ASTM c 553
  - .2 Jacket: to CGSB 51-gp-52MA
  - .3 Maximum "k" Factor to ASTM C 553

**2.2 JACKETS**

- .1 Canvas:
  - .1 220 gm/m2 cotton. Plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921

**2.3 ACCESSORIES**

- .1 Vapour retarder lap adhesive
  - .1 Water based, fire retardant type, compatible with insulation
- .2 Indoor Vapour Retarder Finish
  - .1 Vinyl emulsion type acrylic, compatible with insulation
- .3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C 449
- .4 ULC Listed Canvas Jacket
- .5 Tape self-adhesive, aluminum reinforced 75mm wide
- .6 Contact adhesive: quick setting
- .7 Canvas adhesive: washable
- .8 Tie wire: 1.5mm stainless steel
- .9 Banding: 12mm wide, 0.5mm thick stainless steel
- .10 Facing: 25mm galvanized steel hexagonal wire mesh stitched on one face of insulation
- .11 Fasteners: 4mm dia pins with 35mm dia clips, length to suit insulation thickness.

**Part 3 Execution****3.1 EXAMINATION**

- .1 Section 01 70 00 - Examination and Preparation: Verification of existing conditions before starting work.
- .2 Verify that duct work has been tested before applying insulation materials.
- .3 Verify that surfaces are clean, foreign material removed, and dry.

**3.2 INSTALLATION**

- .1 Quality Assurance: Manufacturer's instructions.
- .2 Install to NAIMA National Insulation Standards.
- .3 Insulated duct work conveying air below ambient temperature:
  - .1 Provide insulation with vapour barrier jackets.
  - .2 Finish with tape and vapour barrier jacket.
  - .3 Continue insulation through walls, sleeves, hangers, and other duct penetrations.

- .4 Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- .4 Insulated duct work conveying air above ambient temperature:
  - .1 Provide with or without standard vapour barrier jacket.
  - .2 Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- .5 Duct Work Exposed in Mechanical Equipment Rooms or Finished Spaces below 3 metres above finished floor: Finish with canvas jacket sized for finish painting.
- .6 Exterior Applications: Provide insulation with vapour barrier jacket. with caulked aluminum jacket with seams located on bottom side of horizontal duct section.
- .7 Duct and Plenum Liner Application:
  - .1 Adhere insulation with adhesive for 100 percent coverage.
  - .2 Secure insulation with mechanical liner fasteners. Refer to SMACNA Standards for spacing.
  - .3 Seal and smooth joints. Seal and coat transverse joints.
  - .4 Seal liner surface penetrations with adhesive.
  - .5 Duct dimensions indicated are net inside dimensions required for air flow. Increase duct size to allow for insulation thickness.

### 3.3 SCHEDULES

Ducts	Insulation
Exhaust Ducts Within 3 m of Exterior Openings	2" foil-faced insulation
Outside Air Intake Ducts and Plenum	2" foil-faced insulation

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1      Metal duct work.
- .2      Casing and plenums.
- .3      Duct cleaning.

**1.2                REFERENCES**

- .1      ASTM A36/A36M - Carbon Structural Steel.
- .2      ASTM A90/A90M - Weight (Mass) of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
- .3      ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .4      ASTM A480/A480M - General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip.
- .5      ASTM A568/A568M - General Requirements for Steel Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled.
- .6      ASTM A653/A653M - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .7      ASTM A1008/A1008M - Steel, Sheet, Cold-Rolled Carbon, Structural, High-Strength Low-Alloy and High Strength Low-Alloy with Improved Formability.
- .8      ASTM A1011/A1011M - Standard Specification for Steel, Sheet, and Strip Hot-Rolled, Carbon, Structural, High-Strength, Low-Alloy with Improved Formability.
- .9      ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
- .10     ASTM C14/C14M - Concrete Sewer, Storm Drain, and Culvert Pipe.
- .11     ASTM C443 - Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
- .12     AWS D9.1 - Sheet Metal Welding Code.
- .13     NBS PS 15 - Voluntary Product Standard for Custom Contact-Moulded Reinforced-Polyester Chemical Resistant Process Equipment.
- .14     NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- .15     NFPA 90B - Installation of Warm Air Heating and Air-Conditioning Systems.

- .16 NFPA 91 - Exhaust Systems for Air Conveying of Vapours, Gases, Mists, and Noncombustible Particulate Solids.
- .17 NFPA 96 - Ventilation Control and Fire Protection of Commercial Cooking Operations.
- .18 SMACNA - HVAC Air Duct Leakage Test Manual.
- .19 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- .20 SMACNA - Fibrous Glass Duct Construction Standards.
- .21 UL 181 - Factory-Made Air Ducts and Connectors.

### **1.3 PERFORMANCE REQUIREMENTS**

- .1 No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts to ASHRAE table of equivalent rectangular and round ducts.

### **1.4 SUBMITTALS**

- .1 Section 01 33 00: Procedures for submittals.
- .2 Shop Drawings: Indicate duct fittings, particulars such as gauges, sizes, welds, and configuration prior to start of work for 1000 kPa pressure class and higher glass fibre duct systems.
- .3 Product Data: Provide data for duct materials duct liner duct connectors .

### **1.5 PROJECT RECORD DOCUMENTS**

- .1 Section 01 78 10: Submittals for project closeout.
- .2 Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

### **1.6 QUALITY ASSURANCE**

- .1 Perform Work to SMACNA - HVAC Duct Construction Standards - Metal and Flexible.
- .2 Maintain one copy of document on site.

### **1.7 QUALIFICATIONS**

- .1 Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- .2 Installer: Company specializing in performing the work of this section with minimum 3 years documented experience.

**1.8 REGULATORY REQUIREMENTS**

- .1 Construct duct work to NFPA 90B standards.

**1.9 ENVIRONMENTAL REQUIREMENTS**

- .1 Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- .2 Maintain temperatures during and after installation of duct sealants.

**Part 2 Products****2.1 MATERIALS**

- .1 Galvanized Steel Ducts: ASTM A653 galvanized steel sheet, lock-forming quality, having G90 zinc coating of to ASTM A90.
- .2 Fasteners: Rivets, bolts, or sheet metal screws.
- .3 Sealant:
  - .1 Manufacturers:
    - .1 Duro Dyne S-2.
    - .2 Foster
    - .3 Substitutions: Refer to Section 01 62 00. Not permitted.
  - .2 Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
- .4 Hanger Rod: ASTM A36; steel , galvanized; threaded both ends, threaded one end, or continuously threaded.

**2.2 DUCT WORK FABRICATION**

- .1 Fabricate and support to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
- .2 Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centreline. Where not possible and where rectangular elbows are used, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fibre insulation.
- .3 Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- .4 Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.

**2.3 MANUFACTURED DUCT WORK AND FITTINGS**

- .1 Manufacture to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.

**2.4 CASINGS**

- .1 Fabricate casings to SMACNA HVAC Duct Construction Standards - Metal and Flexible and construct for operating pressures indicated.
- .2 Mount floor mounted casings on 100 mm high concrete curbs. At floor, rivet panels on 200 mm centres to angles. Where floors are acoustically insulated, provide liner of 1.20 mm galvanized expanded metal mesh supported at 300 mm centres, turned up 300 mm at sides with sheet metal shields.
- .3 Reinforce door frames with steel angles tied to horizontal and vertical plenum supporting angles. Install hinged access doors where indicated or required for access to equipment for cleaning and inspection. Provide clear wire glass observation ports, minimum 150 X 150 mm size.
- .4 Fabricate acoustic casings with reinforcing turned inward. Provide 1.50 mm back facing and 0.80 mm perforated front facing with 2.4 mm diameter holes on 4 mm centres. Construct panels 75 mm thick packed with 72 kg/cu m minimum glass fibre media, on inverted channels of 1.50 mm.

**Part 3 Execution****3.1 INSTALLATION**

- .1 Install to manufacturer's instructions.
- .2 Install and seal ducts to SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- .3 Duct Sizes are inside clear dimensions. For lined ducts, maintain sizes inside lining.
- .4 Provide openings in duct work where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated duct work, install insulation material inside a metal ring.
- .5 Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- .6 Use crimp joints with or without bead for joining round duct sizes 200 mm and smaller with crimp in direction of air flow.
- .7 Use double nuts and lock washers on threaded rod supports.



- .8 Connect diffusers or light troffer boots to low pressure ducts directly or with 1.5 m maximum length of flexible duct held in place with strap or clamp.
- .9 Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.
- .10 Set plenum doors 150 to 300 mm above floor. Arrange door swings so that fan static pressure holds door in closed position.
- .11 During construction provide temporary closures of metal or taped polyethylene on open duct work to prevent construction dust from entering duct work system.

**3.2 CLEANING**

- .1 Clean work to 01 78 10.
- .2 Clean debris from floor supply duct in room 210/215.
- .3 Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.
- .4 Clean duct systems with high power vacuum machines. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into duct work for cleaning purposes.

**3.3 SCHEDULES**

**3.4 DUCT WORK MATERIAL SCHEDULE**

	<b>AIR SYSTEM</b>	<b>MATERIAL</b>
	Low Pressure Supply (Heating Systems)	Steel
	Low Pressure Supply (System with Cooling Coils)	Steel
	Return and Relief	Steel
	General Exhaust	Steel
	Outside Air Intake	Steel
	Evaporative Condenser Intake and Exhaust	Steel

**3.5 DUCT WORK PRESSURE CLASS SCHEDULE**

	<b>AIR SYSTEM</b>	<b>PRESSURE CLASS</b>
	Supply (Heating Systems)	125 Pa 250 Pa
	Supply (System with Cooling Coils)	125 Pa 250 Pa 500 Pa
	Return and Relief	125 Pa 250 Pa
	General Exhaust	125 Pa 250 Pa
	Outside Air Intake	125 Pa

	<b>AIR SYSTEM</b>	<b>PRESSURE CLASS</b>
		250 Pa 500 Pa
	Evaporative Condenser	125 Pa
	Intake and Exhaust	250 Pa 500 Pa

**END OF SECTION**

**Part 1            General**

**1.1            SECTION INCLUDES**

- .1    Diffusers/grilles.

**1.2            RELATED SECTIONS**

- .1    Section 01 33 00 - Administrative Requirements.
- .2    Section 01 44 00 - Quality Assurance.
- .3    Section 01 61 00 - Common Product Requirements.
- .4    Section 01 78 10 - Execution Requirements.

**1.3            REFERENCES**

- .1    ADC 1062 - Air Distribution and Control Device Test Code.
- .2    AMCA 500 - Method of Testing Louvres for Ratings.
- .3    ARI 650 - Air Outlets and Inlets.
- .4    ASHRAE 70 - Method of Testing for Rating the Performance of Outlets and Inlets.
- .5    SMACNA - HVAC Duct Construction Standard - Metal and Flexible.
- .6    NFPA 90A - Installation of Air Conditioning and Ventilating Systems.

**1.4            SUBMITTALS**

- .1    Section 01 33 00: Procedures for submittals.
- .2    Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

**1.5            PROJECT RECORD DOCUMENTS**

- .1    Section 01 78 10: Submittals for project closeout.
- .2    Record actual locations of air outlets and inlets.

**1.6            QUALITY ASSURANCE**

- .1    Test and rate air outlet and inlet performance to ADC Equipment Test Code 1062 and ASHRAE 70.

□

**1.7 QUALIFICATIONS**

- .1 Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

**Part 2 Products****2.1 MANUFACTURERS**

- .1 Virtucom SCO Security
- .2 Eneround Security type ventilating grill
- .3 Simpson Model V-2
- .4 Chubb OP-20V
- .5 NO SUBSTITUTIONS

**2.2 GRILLES AND DIFFUSERS**

- .1 Type: As shown on Diffuser Schedule.
- .2 Frame: As per location in plan
- .3 Fabrication: As per Schedule.
- .4 Accessories: As per Schedule.

**Part 3 Execution****3.1 INSTALLATION**

- .1 Install to manufacturer's instructions.
- .2 Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- .3 Install diffusers to duct work with air tight connection.
- .4 Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
- .5 Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 91 10.

**3.2 SCHEDULES**

- .1 See Mechanical Drawings for Diffuser Schedule

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1      Radiant heaters.
- .2      Electric heaters.

**1.2                RELATED SECTIONS**

- .1      Section 01 33 00 - Administrative Requirements.
- .2      Section 01 44 00 - Quality Assurance.
- .3      Section 01 61 00 - Common Product Requirements.
- .4      Section 01 78 10 - Execution Requirements.
- .5      Section 25 90 00 - Sequence Of Operation.
- .6      Section 26 05 80 - Equipment Wiring:
  - .1      Electrical characteristics and wiring connections.
  - .2      Installation of room thermostats.
  - .3      Electrical supply to units.

**1.3                SUBMITTALS FOR REVIEW**

- .1      Section 01 33 00: Procedures for submittals.
- .2      Product Data: Provide typical catalogue of information including arrangements.
- .3      Shop Drawings:
  - .1      Indicate cross sections of cabinets, grilles, bracing and reinforcing, and typical elevations.
  - .2      Submit schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output provided.
  - .3      Indicate mechanical and electrical service locations and requirements.

**1.4                SUBMITTALS FOR INFORMATION**

- .1      Section 01 33 00: Submittals for information.
- .2      Manufacturer's Instructions: Indicate installation instructions and recommendations.

**1.5                SUBMITTALS AT PROJECT CLOSEOUT**

- .1      Section 01 78 10: Submittals for project closeout.

- .2 Project Record Documents: Record actual locations of components and locations of access doors in radiation cabinets required for access or valving.
- .3 Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.
- .4 Warranty: Submit manufacturer warranty and ensure forms have been completed in Owners name and registered with manufacturer.

**1.6 QUALITY ASSURANCE**

- .1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

**1.7 REGULATORY REQUIREMENTS**

- .1 Products Requiring Electrical Connection: Listed by Underwriters Laboratories Canada Inc., certified by CSA as suitable for the purpose specified and indicated.

**1.8 WARRANTY**

- .1 Section 01 78 10: Submittals for project closeout.

**Part 2 Products**

**2.1 ELECTRIC RADIANT HEATERS**

- .1 Manufacturer: QMarkModel CP751.
- .2 Other acceptable manufacturers offering equivalent products.
  - .1 [ ] Model [ ].
  - .2 [ ] Model [ ].
  - .3 [ ] Model [ ].
  - .4 Substitutions: [Refer to Section 01 62 00.]
- .3 Assembly: CSA listed and labelled, with thermal box and cover, and built-in controls.
- .4 Heating Elements: Enclosed copper tube element of coiled nickel-chrome resistance wire centred in tubes and embedded in refractory material, bonded to ceiling panel.
- .5 Ceiling Panels: 610 x 1219 mm.
- .6 Electrical Characteristics:
  - .1 750 W.
  - .2 120 volts, single phase, 60 Hz.
  - .3 Refer to Section 26 05 80.

**Part 3****Execution****3.1****INSTALLATION**

- .1 Install to manufacturer's instructions.
- .2 Install equipment exposed to finished areas after walls and ceiling are finished and painted. Avoid damage.
- .3 Protection: Provide finished cabinet units with protective covers during balance of construction.
- .4 Install electric heating equipment including devices provided by manufacturer but not factory-mounted. Provide copy of manufacturer's wiring diagram submittal. Install electrical wiring to manufacturer's submittals and Section 26 05 80.

**END OF SECTION**