DIVISION 1 – GENERAL REQUIREMENTS

DIVISION 2 – SITEWORK

DIVISION 3 – CONCRETE

DIVISION 4 – MASONARY

DIVISION 5 – METALS

DIVISION 6 – WOOD AND PLASTICS

DIVISION 7 – THERMAL & MOISTURE PROTECTION

07145 Cementitious Waterproofing
07160 Sheet Vapour Retarders
07180 Traffic Coatings
07190 Water Repellent Coatings
07211 Loose Fill Insulation
07212 Board Insulation
07213 Batt and Blanket Insulation
07216 Spray in Place Urethane Foam Insulation
07240 Exterior Insulation and Finish Systems
07272 Air Barriers
07561 Hot Applied Rubberized Asphalt Roofing and Waterproofing
07620 Metal Flashing and Trim
07712 Prefabricated Roof Expansion Joints
07724 Roof Hatches
07811 Fireproofing
07840 Fire Stopping
07900 Joint Sealers

DIVISION 8 – DOORS AND WINDOWS

08110 Steel Doors and Frames
08116 Insulated Balcony Doors
08120 Aluminum Doors and Frames
08210 Wood Doors
083213 Sliding Glass Doors
08342 Safety Glass Doors
08362 Sectional Metal Overhead Doors
08710 Door Hardware
08715 Cabinet and Miscellaneous Hardware

DIVISION 9 – FINISHES

09110 Non-load Bearing Wall Framing
09130 Acoustical Suspension
09250 Gypsum Board
09510 Acoustical Ceilings
09911 Interior Painting
09912 Exterior Painting

DIVISION 10 – SPECIALTIES

10200 Louvres and Vents
10605 Wire Mesh Partitions

DIVISION 11 – EQUIPMENT

11012 Window Cleaning Roof Anchors
11172 Waste Compactors

DIVISION 12 – FURNISHINGS

DIVISION 13 – SPECIAL CONSTRUCTION

DIVISION 14 – CONVEYING SYSTEMS

DIVISION 15 – MECHANICAL

DIVISION 16 – ELECTRICAL

PART 1 - GENERAL

1 Summary of Work

.1 Hampton Manor
25 Baker Hill Blvd.
1 – 7 storey residential condominium tower
1 level U/G parking garage
Stouffville, Ontario

2 Allowances

.1 Cash Allowances
.1 Refer to GC35.

.2 Contingency Allowance
.1 Refer to GC36.

3 Project Coordination

.1 Coordinate progress of the Work, progress schedules, submittals, use of site, temporary utilities, construction facilities and controls

4 Cutting and Patching

.1 Approvals
.1 Submit written request in advance of cutting or alteration which affects:
.1 Structural integrity of any element of Project.
.2 Integrity of weather-exposed or moisture-resistant elements.
.3 Efficiency, maintenance, or safety of any operational element.
.4 Visual qualities of sight-exposed elements.
.5 Work of Owner or separate contractor.

.2 Inspection
.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.

.3 Execution
.1 Perform cutting, fitting, and patching including excavation and fill, to complete the Work.
.2 Remove and replace defective and non- conforming work.
.3 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical work.
.4 Perform work to avoid damage to other work.
.5 Prepare proper surfaces to receive patching and finishing.
.6 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
.7 Cut rigid materials using power saw or core drill. Pneumatic or impact tools not allowed.
.8 Restore work with new products in accordance with Contract Documents.
.9 Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
.10 At penetration of fire-rated wall, ceiling, or floor construction, completely seal voids with listed firestop specified in Division15 or 16.

.11 Refinish surfaces to match adjacent finishes; for continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

5 Field Engineering

.1 Qualifications of Surveyor
.1 Qualified registered land surveyor, acceptable to Owner.
.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.2 Survey Requirements
.1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.
.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Records
.1 Maintain a complete, accurate log of control and survey work as it progresses.

.4 Subsurface Conditions
.1 Refer to GC 28.

6 Project Meetings

.1 Administrative
.1 Schedule and administer project progress meetings throughout progress of work.
.2 Distribute written notice of each meeting seven days in advance of meeting date to all required in attendance.
.3 Provide physical space and make arrangements for meetings.
.4 Record minutes. Include significant proceedings and decisions. Identify action by' parties.
.5 Reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participants and affected parties not in attendance.

7 Submittals

.1 Administrative
.1 Submit to Consultant submittals listed for review. Submit with reasonable promptness and in an orderly sequence so as to not cause delay in the Work.
.2 Work affected by submittal shall not proceed until review is complete.
.3 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 the Work and Contract Documents.
.4 Verify field measurements and affected adjacent Work are co-ordinated.

.2 Shop Drawings and Product Data
.1 Refer to GC 34.
.6 Submit one transparency of shop drawings for each requirement requested in specification Sections and as Consultant may reasonably request.
.7 Submit copies of product data sheets or brochures for requirements requested in specification Sections and as Consultant may reasonably request where shop drawings will not be prepared due to standardized manufacture of product.

.3 Samples
.1 Submit for review, samples in duplicate as requested in respective specification Sections.
.2 Deliver samples prepaid to Owner's business address.

.4 Operating Maintenance Manuals
.1 Two weeks prior to Substantial Performance of the Work, submit to Owner copies of operating and maintenance manuals.
.2 Manuals to contain operational information on equipment, cleaning and lubrication schedules, filters, overhaul and adjustment schedules and similar maintenance information.
.3 Bind contents in a three-ring, hard covered, plastic jacketed binder. Organize contents into applicable categories of work, parallel to specifications Sections.

.5 Record Drawings
.1 After award of Contract, Consultant will provide a set of drawings for purpose of maintaining record drawings. Accurately and neatly record deviations from Contract Documents caused by site conditions and changes ordered by Consultant.
.2 Record locations of concealed components of mechanical and electrical services.
.3 Identify drawings as "Project Record Copy". Maintain in new condition and make available for inspection on site by Consultant.
.4 On completion of Work and prior to final inspection, submit record documents to Consultant.

8 Schedule

.1 Schedules Required.
.1 Construction Progress Schedule.
.2 Submittal Schedule for Shop Drawings, Product Data and Samples.
.3 Cash Allowance Schedule for purchasing products.

.2 Format
.1 Prepare schedule in form of horizontal bar chart.
.2 Provide separate bar for each trade or operation.
.3 Provide horizontal time scale identifying first work day of each week.
.4 Format for listings: Chronological order of start of each item of work.

.3 Submission
.1 Submit initial schedules within 15 days after award of Contract.
.2 Submit one opaque reproduction, plus 2 copies to be retained by Owner.
.3 Owner will review schedule and return reviewed copy within 10 days after receipt.

.4 Resubmit finalized schedule within 7 days after return of reviewed copy.

9 Quality Control

.1 Inspection
.1 Refer to GC 32.

.2 Independent Inspection Agencies
.1 Independent Inspection/Testing Agencies will be engaged by Owner for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Owner.
.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Reports
.1 Submit 4 copies of inspection and test reports promptly to Consultant.
.2 Provide copies to Subcontractor of work being inspected/tested.

10 Construction Facilities and Temporary Controls

.1 Installation/Removal
.1 Provide construction facilities and temporary controls in order to execute work expeditiously.
.2 Remove from site all such work after use.

.2 Hoarding
.1 Erect hoarding around entire perimeter of site where indicated on drawings to protect public, workers, public and private property from injury or damage.
.2 Provide hoarding as detailed, protecting public and private property from injury or damage. Provide lockable gates within hoarding for access to site by workers and vehicles.

.3 Weather Enclosures
.1 Provide weathertight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
.2 Close off floor areas where walls are not finished; seal off other openings; enclose building interior work area for temporary heat.

.4 Dust Tight Screens
.1 Provide dust tight screens or 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.

.5 Dewatering
.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

.6 Site Storage/Loading
.1 Refer to GC 29.

.7 Sanitary Facilities
.1 Provide sufficient sanitary facilities for workers in accordance with local health authorities.
.2 Maintain in clean condition.
.3 Existing facilities as designated may be used during construction period.

.8 Water Supply
- .1 Owner will provide a continuous supply of potable water for construction use.
- .2 Arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.
- .3 Owner will pay for utility charge at prevailing rates.

.9 Temporary Heating
- .1 Provide temporary heating 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 not permitted.
- .3 Maintain temperatures of minimum 10 C in areas where construction is in progress, unless indicated otherwise in specifications.
- .4 Ventilate heated areas and keep building free of exhaust or combustion gases.
- .5 Permanent heating system of building, or portions thereof, may be used when available at Owner's request and engineers approval.

.10 Temporary Power
- .1 Owner will pay for temporary power required during construction for temporary lighting and operating of power tools, to maximum supply of 230 volts 30 amps.
- .2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance and removal.

.11 Temporary Telephone
- .1 Owner will provide and pay for temporary telephones necessary for use.

.12 Equipment/Tool/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.

.13 Project Cleanliness
- .1 Maintain the Work in tidy condition, free from accumulation of waste products and debris.
- .2 Remove waste material and debris from site and deposit in waste container at end of each working day.
- .3 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

11 Material and Equipment

.1 Product and Material Quality
- .1 Refer to GC 27.

.2 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 seals and labels intact.

.3 Store products subject to damage from weather in weatherproof enclosures.

.3 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 Consultant may establish course of action.
.3 Improper installation of erection of Products, due to failure in complying with these requirements, authorizes Consultant to require removal and reinstallation at no increase in Contract Price.

.4 Workmanship
.1 Workmanship shall be best quality, 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 any unfit person or anyone unskilled in their required duties.
.3 Decisions as to quality or fitness of workmanship in cases of dispute rest solely with Consultant, whose decision is final.

.5 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 a contradictory situation. Install as directed by Consultant.

12 Project Closeout

.1 Final Cleaning
.1 Refer to GC 30.

.2 Systems Demonstration
.1 Prior to final inspection, demonstrate operation of each system to Owner and Consultant.
.2 Instruct personnel in operation, adjustment, and maintenance of equipment and systems, using provided operation and maintenance data as basis for instruction.

.3 Documents
.1 Collect reviewed submittals and assemble documents executed by Subcontractors, suppliers, and manufacturers.
.2 Submit material prior to final Application for Payment.
.3 Submit operation and maintenance data, record (as-built) drawings.
.4 Provide warranties fully executed and notarized.
.5 Execute transition of Performance Bond to warranty period requirements.
.6 Submit a final statement of accounting giving total adjusted Contract Price, previous payments, and monies remaining due.
.7 Consultant will issue a final change order reflecting approved adjustments to Contract Price not previously made.

.4 Inspection/Takeover Procedures

.1 Prior to application for certificate of Substantial Performance, carefully inspect the Work and ensure it is complete, that major and minor construction deficiencies are complete, defects are corrected and building is clean and in condition for occupancy. Notify Consultant in writing, of satisfactory completion of the Work and request an inspection.

.2 During Consultant inspection, a list of deficiencies and defects will be tabulated. Correct same.

.3 When Consultant considers deficiencies and defects have been corrected and it appears requirements of Contract have been performed, make application for certificate of Substantial Performance. Refer to General Conditions Article GC 14 for specifics to application.

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

PART 1 - GENERAL

1.1 Section Includes

.1 Project meetings.

.2 Project coordination.

.3 Cutting and patching.

.4 Field engineering.

.5 Identification systems.

1.2 Related Sections

.1 Section 01601 - Material and Equipment: Coordination.

.2 Individual Product Sections: Cutting and patching incidental to work of the section. Advance notification to other sections required.

1.3 Meetings

.1 Schedule and administer project meetings throughout the progress of the work.

.2 Provide physical space and make arrangements for meetings.

.3 Record the minutes. Reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participants.

.4 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.5 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.6 During the course of Work and weeks prior to project completion, schedule progress meetings every 2 weeks.

.7 Contractor, major Subcontractors involved in Work Consultants and Owner are to be in attendance.

1.4 Coordination

.1 Allocate of mobilization areas of site; for field offices and sheds, for access, traffic, and parking facilities.

.2 During construction coordinate use of site and facilities through procedures for submittals, reports and records, schedules, coordination of drawings, recommendations, and resolution of ambiguities and conflicts.

.3 Provide information required for preparation of coordination drawings. Review and approve revised drawings for submission to Consultant.

.4 Mechanical and Electrical Coordinator: Employ and pay for services of a person or firm technically qualified and experienced in field coordination for the type of mechanical and electrical work required for this Project, for duration of construction work.

1.5 Cutting and Patching

.1 Execute cutting, fitting, and patching including excavation and fill, to complete the Work.

.2 Remove and replace defective and non-conforming work.

.3 Restore work with new products in accordance with requirements of Contract Documents.

.4 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical work.

.5 Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.

.6 Employ original installer to perform cutting and patching for exposed to view materials.

.7 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed with masonry materials without prior approval.

.8 Refinish surfaces to match adjacent finishes: For continuous surfaces refinish to nearest intersection; for an assembly, refinish entire unit.

1.6 Field Engineering

.1 Qualified registered land surveyor, acceptable to Owner.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Report to Consultant when a reference point is lost or destroyed, or requires relocation because of necessary changes in grades or location.

.4 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.

.5 Establish lines and levels, locate and lay out, by instrumentation.

.6 On completion of foundation, prepare a certified survey showing dimensions, locations, angles and elevations of Work.

1.7 Identification Systems

.1 Submit 2 typed copies of schedules for nameplates and valve tags 15 days prior to inspection for Substantial Performance or 5 days prior to date scheduled for instruction of Owner's personnel.

.2 Nameplate schedules shall list: Pump, control, and electrical equipment nameplates.

.3 Include nameplate designation, manufacturer's nameplate data, equipment and component parts; numbers, location of equipment, and switch location and normal operating position of switch.

.4 Valve tag schedules shall list each tag by system. Include reference number, valve location and usage, system identification, colour code, and function, size and valve manufacturer with model number, and normal operating position of valve.

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

PART 1 - GENERAL

1.1 Section Includes

.1 Field engineering survey services to measure and stake the site.

.2 Survey services to establish and confirm invert measurements for the Work.

.3 Subsurface conditions.

1.2 Related Sections

.1 Section 01340 - Submittals: Record Documents.

.2 Owners identification of existing survey control points and property limits.

1.3 Qualifications of Surveyor

.1 Qualified registered land surveyor, acceptable to Owner.

1.4 Survey Reference Points

.1 Existing base horizontal and vertical control points are designated on drawings.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to Consultant.

.4 Report to Consultant when a reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

.5 Require surveyor to replace control points in accordance with original survey control.

1.5 Survey Requirements

.1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake for grading, fill placement and landscaping features.

.4 Stake slopes and berms.

.5 Establish pipe invert elevations.

.6 Stake batter boards for foundations.

.7 Establish foundation column locations and floor elevations.

.8 Establish lines and levels for mechanical and electrical work.

1.6 Records

.1 Maintain a complete, accurate log of control and survey work as it progresses.

1.7 Submittals

.1 Submit name and address of Surveyor to Consultant.

.2 On request of Consultant, submit documentation to verify accuracy of field engineering work.

.3 Submit certificate signed by Surveyor certifying that elevations and locations of completed Work are in conformance, or non- conformance with Contract Documents.

1.8 Subsurface Conditions

.1 Refer to GC 28.

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

PART 1 - GENERAL

1.1 Section Includes

.1 Scheduled progress meetings.

1.2 Related Sections

.1 Section 01601 - Material and Equipment: Coordination

1.3 Administrative

.1 Schedule and administer project meetings throughout the progress of the work.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting seven days in advance of meeting date to all required in attendance.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the minutes. Include significant proceedings and decisions. Identify action by the parties.

.7 Reproduce and distribute copies of minutes within three days after each meeting and transmit to meeting participants, affected parties not in attendance.

.8 Representative of Contractor, Subcontractor and suppliers attending meetings shall be qualified and authorized to act on behalf of the party each represents.

1.4 Preconstruction Meeting

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Owner Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include the following:
- .1 Appointment of official representative of participants in the Work,
- .2 Schedule of Work, progress scheduling
- .3 Schedule of submission of shop drawings, samples, colour chips, (Section 01340)
- .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences (Section 01400)
- .5 Delivery schedule of specified equipment
- .6 Site security (Section 01535)
- .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements (GC)
- .8 Owner provided Products
- .9 Record drawings
- .10 Maintenance manuals (Section 01730)
- .11 Take-over procedures, acceptance, warranties (Section 01730)
- .12 Monthly progress claims, administrative procedures, photographs, holdbacks (GC)
- .13 Appointment of inspection and testing agencies or firms (Section 01400)
- .14 Insurances, transcript of policies (GC)

1.5 Progress Meetings

.1 During course of Work and 8 weeks prior to project completion, schedule progress meetings every 2 weeks.

.2 Contractor, major Subcontractors involved in Work Consultant and Owner are to be in attendance.

.3 Notify parties minimum 4 days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within three 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 Not Used.

PART 3 - EXECUTION Not Used.

1 General

.1 This section specifies general requirements and procedures for contractors submissions of shop drawings, product data, samples and mock- ups to Engineer for review. Additional specific requirements for submissions are specified in individual sections of Divisions 2 to 16.

.2 Do not proceed with work until relevant submissions are reviewed by Engineer.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's review of submissions.

.6 Notify Engineer, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Engineer's review of submission, unless Engineer gives written acceptance of specific deviations.

.8 Make any changes in submissions which Engineer may require consistent with Contract Documents and resubmit as directed by Engineer.

.9 Notify Engineer, in writing, when resubmitting, of any revisions other than those requested by Engineer.

2 Submission Requirements

.1 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.

.2 Allow 5 days for Engineers review of each submission.

.3 Accompany submissions with transmittal letter, in duplicate, 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.

.4 Submissions shall 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 Contractors 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.

.5 After Engineer's review, distribute copies.

3 Shop Drawings

.1 Shop drawings: original drawings, or modified standard drawings provided by Contractor, to illustrate details of portions of Work, which are specific to project requirements.

.2 Maximum sheet size: 850 x 1050 mm.

.3 Submit shop drawings as follows:
.1 one opaque diazo print.

.4 Cross-reference shop drawing information to applicable portions of Contract Documents.

4 Product Data

.1 Product data: manufacturers catalogue sheets, brochures, literature, performance charts and diagrams, used to illustrate standard manufactured products.

.2 Submit 6 copies of product data.

.3 Sheet size: 215 x 280 mm, maximum of 3 modules.

.4 Delete information not applicable to project.

.5 Supplement standard information to provide details applicable to project.

.6 Cross-reference product data information to applicable portions of Contract Documents.

5 Samples

.1 Samples: examples of materials, equipment, quality, finishes, workmanship.

.2 Where colour, pattern or texture is criterion, submit full range of samples.

.3 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.

6 Mock-ups

.1 Mock-ups: field-erected example of work complete with specified materials and workmanship.

.2 Erect mock-ups at locations acceptable to Engineer.

.3 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be verified.

7 Shop Drawings Review

.1 The review of shop drawings by GRAZIANI + CORAZZA Architects Inc. is for the sole purpose of ascertaining conformance with the general concept. This review shall not mean that GRAZIANI + CORAZZA Architects Inc. approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Contractor submitting same, and such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of responsibility for meeting all requirements of the construction and contract documents. Without restricting the generality of the foregoing, the Contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of the work of all sub-trades.

PART 1 - GENERAL

1.1 Section Includes

.1 Inspection and testing, administrative and enforcement requirements.

.2 Tests and mix designs.

.3 Mock-ups.

.4 Mill tests.

.5 Equipment and system adjust and balance.

1.2 Related Sections

.1 Section 01340 - Submittals: Submission of samples to confirm product quality.

.2 Section 01601 - Material and Equipment: Material and workmanship quality, reference standards.

1.3 Inspection

.1 Refer to GC 32.

1.4 Independent Inspection Agencies

.1 Independent Inspection/Testing Agencies will be engaged by the Owner for the purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Owner.

.2 Provide equipment required for executing inspection and testing by the appointed agencies.

.3 Employment of inspection/testing agencies does not relax the responsibility to perform Work in accordance with the Contract Documents.

.4 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to the Owner. Pay costs for retesting and reinspection.

1.5 Access to Work

.1 Allow inspection/testing agencies access to the Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.6 Procedures

.1 Notify the appropriate agency and Consultant in advance of the 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 an orderly sequence so as not to cause delay in the Work.

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

1.7 Rejected Work

.1 Refer to GC 33.

.2 Remove defective Work, whether the result of poor workmanship, use of defective products or damage and whether incorporated in the Work or not, which has been rejected by the Consultant as failing to conform to the Contract Documents. Replace or re-execute in accordance with the Contracts Documents.

.3 Make good other Contractor's work damaged by such removals or replacements promptly.

.4 If in the opinion of the Consultant it is not expedient to correct defective Work or Work not performed in accordance with the Contract Documents, the Owner may deduct from the Contract Price the difference in value between the Work performed and that called for by the Contract Documents, the amount of which shall be determined by the Consultant.

1.8 Reports

.1 Submit 4 copies of inspection and test reports to the Consultant.

.2 Provide copies to Subcontractor of work being inspected or tested.

1.9 Tests and Mix Designs

.1 Furnish test results and mix designs as may be requested.

.2 The cost of tests and mix designs beyond those called for in the Contract Documents or beyond those required by the law of the Place of Work shall be appraised by the Consultant and may be authorized as recoverable.

1.10 Mockup

.1 Prepare mock-up for Work specifically requested in the specifications. Include for Work of all Sections required to provide mock-ups.

.2 Construct in all locations acceptable to the Consultant.

.3 Prepare mock-up for Consultant review with reasonable promptness and in an orderly sequence, so as not to cause any delay in the Work.

.4 Failure to prepare mock-up in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, the Consultant will assist in preparing a schedule fixing the dates for preparation.

.6 Mock-up may remain as part of the Work.

1.11 Mill Tests

.1 Submit mill test certificates as may be requested.

1.12 Equipment and Systems

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

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

1 Related Requirements
Specified Elsewhere

.1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Engineer are specified under various sections.

2 Appointment and Payment

.1 Engineer will appoint and pay for services of testing laboratory except for the following:
- .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
- .2 Inspection and testing performed exclusively for Contractor's convenience.
- .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
- .4 Mill tests and certificates of compliance.
- .5 Tests specified to be carried out by Contractor under the supervision of Engineer.
- .6 Additional tests specified in paragraph 2.2.

.2 Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as Engineer may require to verify acceptability of corrected work.

3 Contractor's Responsibilities

.1 Furnish labour and facilities to:
- .1 Provide access to work to be inspected and tested.
- .2 Facilitate inspections and tests.
- .3 Make good work disturbed by inspection and test.
- .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify Engineer sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Engineer.

PART 1 - GENERAL

1.1 Section Includes	.1	Construction aids.
	.2	Traffic controls.
	.3	Office and sheds.
	.4	Project identification.
1.2 Installation and Removal	.1	Provide construction facilities in order to execute work expeditiously.
	.2	Remove from site all such work after use.
1.3 Scaffolding	.1	Provide and maintain scaffolding, ramps, ladders, platforms and temporary stairs.
1.4 Hoisting	.1	Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
	.2	Hoists cranes shall be operated by qualified operator.
1.5 Elevators	.1	Designated permanent elevators may be used by construction personnel and transporting of materials. Co-ordinate use with Owner.
	.2	Provide protective coverings for finish surfaces of cars and entrances.
1.6 Site Storage/ Loading	.1	Refer to GC 29.

1.7 Construction Parking .1 Parking will be permitted on site provided it does not disrupt the performance of work.

1.8 Security .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.9 Offices .1 Provide and maintain in clean condition during progress of work, adequately lighted, heated and ventilated Consultant's temporary office and Contractor's office with space for filling and layout of Contract Documents and Contractor's normal site office staff.

.2 Provide adequate required aid facilities.

.3 Subcontractors may provide their own offices as necessary. Direct location of these offices.

1.10 Equipment, Tool and Materials Storage .1 Provide and maintain, in a 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 a manner to cause least interference with work activities.

1.11Construction Sign .1 Provide and erect, within three weeks of signing Contract, a project sign in a location designated by Owner.

.2 Indicate on sign, Consultant and Contractor of a design style acceptable to Owner.

.3 Maintain sign in good condition for duration of work. Clean periodically.

.4 No other signs or advertisements, other than warning signs, are permitted on site.

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

1 Fires

.1 Fires and burning of rubbish on site not permitted.

2 Disposal of Wastes

.1 Do not bury rubbish and waste materials on site unless approved by Engineer.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

3 Drainage

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

4 Site Clearing and Plant Protection

.1 Protect trees and plants on site and adjacent properties where indicated.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated or designated by Engineer.

5 Work Adjacent to Waterways

.1 Do not operate construction equipment in waterways.

.2 Do not use waterway beds for borrow material without Engineer's approval.

.3 Do not dump excavated fill, waste material or debris in waterways.

.4 Design and construct temporary crossings to minimize erosion to waterways.

.5 Do not skid logs or construction materials across waterways.

.6 Avoid indicated spawning beds when constructing temporary crossings of waterways.

.7 Do not blast under water or within 100 m of indicated spawning beds.

6 Pollution Control

.1 Maintain temporary erosion and pollution control features installed under this contract.

.2 Control emissions from equipment and plant to local authorities emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

PART 1 - GENERAL

1.1 Section Includes

.1 Reference standards.

.2 Product quality, availability, storage, handling, protection, transportation.

.3 Manufacturer's instructions.

.4 Workmanship, coordination and fastenings.

.5 Existing facilities.

1.2 Related Sections

.1 Section 01400 - Quality Control: Quality control and inspection of Work.

1.3 Reference Standards

.1 Within the text of the specifications, reference may be made to the following standards:

ACI	- American Concrete Institute
AISC	- American Institute of Steel Construction
ANSI	- American National Standards Institute
ASTM	- American Society for Testing and Materials
CEC	- Canadian Electrical Code (published by CSA)
CEMA	- Canadian Electrical Manufacturer's Association
CGSB	- Canadian General Standards Board
CISC	- Canadian Institute of Steel Construction
CLA	- Canadian Lumberman's Association
CPCA	- Canadian Painting Contractors' Association
CPCI	- Canadian Prestressed Concrete Institute
CRCA	- Canadian Roofing Contractors Association
CSA	- Canadian Standards Association
FM	- Factory Mutual Engineering Corporation
IEEE	- Institute of Electrical and Electronic Engineers
IPCEA	- Insulated Power Cable Engineers Association
NAAMM	- National Association of Architectural Metal Manufacturers
NBC	- National Building Code
NEMA	- National Electrical Manufacturers Association
OBC	- Ontario Building Code
TTMAC	- Terrazzo, Tile and Marble Association of Canada
ULC	- Underwriters' Laboratories of Canada

.2 Conform to these standards, in whole or in part as specifically requested in the specifications.

.3 If there is question as to whether any product or system is in conformance with applicable standards, the Consultant reserves the right to have such products or systems tested to prove or disprove conformance.

.4 The cost for such testing will be born by the Owner in the event of conformance with Contract Documents or by the Contractor in the event of non-conformance.

.5 Conform to latest date of issue of referenced standards in effect on date of submission of bids, except where a specific date or issue is specifically noted.

1.4 Quality

.1 Refer to GC 27.

1.5 Availability

.1 Immediately upon signing Contract, review Product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of Products are foreseeable, notify the 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 the event of failure to notify the Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Consultant reserves the right to substitute more readily available products of similar character, at no increase in Contract Price.

1.6 Storage, Handling and Protection

.1 Handle and store Products in a 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 the 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 a 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 the satisfaction of the Consultant.

1.7 Transportation

.1 Pay costs of transportation of Products required in the performance of Work.

.2 Transportation cost of Products supplied by the Owner will be paid for by the Owner. Unload, handle and store such Products.

1.8 Manufacturer's Instructions

.1 Unless otherwise indicated in the 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 the Consultant in writing, of conflicts between the specifications and manufacturer's instructions, so that the Consultant may establish the course of action.

.3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes the Consultant to require removal and re-installation at no increase in Contract Price.

1.9 Workmanship

.1 Workmanship shall be the best quality, executed by workers experienced and skilled in the respective duties for which they are employed. Immediately notify the Consultant if required Work is such as to make it impractical to produce required results.

.2 Do not employ any unfit person or anyone unskilled in their required duties. The Consultant reserves the right to require the dismissal from the site, workers deemed incompetent, careless, insubordinate or otherwise objectionable.

.3 Decisions as to the quality or fitness of workmanship in cases of dispute rest solely with the Consultant, whose decision is final.

1.10 Co-ordination

.1 Insure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.11 Concealment

.1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.

.2 Before installation, inform the Consultant if there is a contradictory situation. Install as directed by Consultant.

1.12 Remedial Work

.1 Refer to GC 31

1.13 Location of Fixtures

.1 Consider the location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform the Consultant of a conflicting installation. Install as directed.

1.14 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 noncorrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in the affected specification Section.

.4 Space anchors within their 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.

1.15 Protection of Work in Progress

.1 Adequately protect Work completed or in progress. Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Consultant, at no increase in Contract Price.

.2 Prevent overloading of any part of the building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Consultant.

1.16 Existing Utilities

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with a minimum of disturbance to Work, and/or building occupants and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in a manner approved by authority having jurisdiction, stake and record location of capped service.

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

PART 1 - GENERAL

1.1 Section Includes

.1 Cleaning.

.2 Project record documents.

.3 Spare parts and maintenance materials.

.4 Take over procedures.

1.2 Related Sections

.1 Individual Specifications Sections: Specific requirements for operation and maintenance data.

1.3 Progressive Cleaning

.1 Maintain the Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Owner or other Contractors.

.2 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.3 Remove waste material and debris from the site and deposit in waste container at the end of each working day.

.4 Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.

1.4 Final Cleaning

.1 Refer to GC 30.

1.5 Project Record Documents

.1 Submit one copy of completed volumes in final form 15 days prior to Substantial Performance.

.2 Copy will be returned after final inspection, with Consultant comments. Revise content of documents as required prior to final submittal.

.3 Two weeks prior to Substantial Performance of the Work, submit to the Consultant two final copies of operating and maintenance manuals.

.4 Organize data in the form of an instructional manual in binders of commercial quality, (219 x 279 mm) maximum ring size.

.5 Cover: Identify each binder with typed or printed title "Project Record Documents"; list title of Project, identify subject matter of contents.

.6 Arrange content by systems, under Section numbers and sequence of Table of Contents.

.7 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.8 Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.9 For Each Product or System: List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.10 Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.

1.6 Record Documents - Actual Site Conditions

.1 Record information on a set of black line opaque drawings.

.2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal work until required information is recorded.

.4 Specifications: Legibly mark each item to record actual construction, including manufacturers, trade name, and catalog number of each project actually installed, particularly optional items and substitute items.

.5 Other Documents: Maintain manufacturer's certifications, inspection certifications, field test records, and required by individual specifications sections.

1.7 Spare Parts and Maintenance Materials

.1 Spare parts and maintenance materials provided shall be new, not damaged or defective, and of the same quality and manufacture as Products provided in the Work. If requested, furnish evidence as to type, source and quality of Products provided.

.2 Defective Products will be rejected, regardless of previous inspections. Replace products at own expense.

.3 Store spare parts and maintenance materials in a manner to prevent damage, or deterioration.

.4 Provide spare parts, special tools, maintenance and extra materials in quantities specified in individual specification Sections.

.5 Provide items of same manufacture and quality as items in the Work.

1.8 Final Inspection and Declaration Procedures

.1 Contractor's Inspection: The Contractor and all Subcontractors shall conduct an inspection of the Work, identify deficiencies and defects; repair as required. Notify the Consultant in writing of satisfactory completion of the contractor's Inspection and that corrections have been made. Request a Consultant's Inspection.

.2 Consultant's Inspection: Consultants and the Contractor will perform an inspection of the Work to identify obvious defects or deficiencies. The contractor shall correct Work accordingly.

.3 Final Inspection: When the items noted above are complete, request a final inspection of the Work by the Owner, Consultants, and the Contractor. If Work is deemed incomplete by the Owner, complete the outstanding items and request a reinspection.

.4 Declaration of Substantial Performance: When the Owner consider deficiencies and defects have been corrected and it appears requirements of the Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to General conditions Article GC 13 and 14 for specifics to application.

.5 Commencement of Lien and Warranty Periods: The date of the Owners acceptance of the submitted declaration of Substantial Performance shall be the date for commencement for the warranty period and commencement of the lien period unless required otherwise by the lien statute of the Place of the Work.

.6 Declaration of Total Performance: When the Owner consider final deficiencies and defects have been corrected and it appears requirements of the Contract have been totally performed, make application for certificate of Total Performance. Refer to General Conditions Article GC 13 and 14 for specifics to application. It Work is deemed incomplete by the Owner, complete the outstanding items and request a reinspection.

.7 Final Payment: Following completion of the lien period, submit claim for final payment in accordance with the General Conditions.

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

PART 1 - GENERAL

1.1 Section Includes	.1	Progressive cleaning.
	.2	Final cleaning.
1.3 Project Cleanliness	.1	Maintain the Work in tidy condition, free from accumulation of waste products and debris, other than that caused by the Owner or other Contractors.
	.2	Remove waste material and debris from the site and deposit in waste container at the end of each working day.
	.3	Clean interior areas prior to start of finish work, maintain areas free of dust and other contaminants during finishing operations.
1.4 Final Cleaning	.1	Refer to GC 30.

PART 2 - PRODUCTS Not Used.

PART 3 - EXECUTION Not Used.

1 Manual

.1 An organized compilation of operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of Divisions 02 - 16.

2 General

.1 Assemble, coordinate, bind and index required data into Operation and Maintenance Manual.

.2 Submit complete operation and maintenance manual to Engineer 6 weeks prior to application for Interim Certificate of Completion of project.

.3 Submit 6 copies in English.

.4 Organize data into same numerical order as contract specifications.

.5 Material: label each section with tabs protected with celluloid covers fastened to hard paper dividing sheets.

.6 Type lists and notes.

.7 Drawings, diagrams and manufacturers literature must be legible.

3 Binders

.1 Binders: vinyl, hard covered, 3 "D" ring, loose leaf, sized for 215 x 280 mm paper, with spine pocket.

.2 Identify contents of each binder on spline.

4 Contents

.1 Binder 1:
.1 Cover sheet containing:
.1 Date submitted.
.2 Project title, location and project number.
.3 Names and addresses of Contractor, and all Sub-contractors.
.2 Table of Contents of all binders.
.3 List of maintenance materials as specified.
.4 List of special tools as specified.
.5 List of spare parts as specified.
.6 Warranties, guarantees.
.7 Copies of approvals, and certificates.

.2 Remaining binders:
.1 Cover sheet containing:
.1 Date submitted.
.2 Project title, location and project number.
.2 Table of Contents of individual binder.
.3 Provide data as specified in individual sections of Divisions 02 to 16.
.1 List of equipment including service depot.

.2 Nameplate information including equipment number, make, size, capacity, model number and serial number.
.3 Parts list.
.4 Installation details.
.5 Operating instructions.
.6 Maintenance instructions for equipment.
.7 Maintenance instructions for finishes.

.3 Shop drawings:
.1 Bind separately one complete set of reviewed final shop drawings and product data.

PART 1 - GENERAL

1.1 Related Sections

.1 Refer Division 03 in Structural specifications.

.2 Section 05500 - Metal Fabrications.

1.2 Measurement Procedures

.1 Cast-in-place concrete in sub-structure will be measured in cubic metres calculated from neat dimensions indicated or authorized in writing by Engineer placed beyond dimensions indicated will not be measured.

.2 No deductions will be made for volume of concrete displaced by reinforcing steel, structural steel, or piles.

.3 No deductions will be made for volume of concrete less than 0.1 m″ in cross sectional area displaced by individual drainage openings.

.4 Cast-in-place concrete in superstructure will not be measured but will paid for as a fixed price item.

.5 Heating of water and aggregates and providing cold weather protection will not be measured but considered incidental to work.

.6 Cooling of concrete and providing hot weather protection will not be measured but considered incidental to work.

.7 Supply and installation of anchor bolts, nuts and washers and bolt grouting will not be measured but considered incidental to work.

.8 Supply and installation of waterstops will be measured in lineal metres installed.

1.3 References

.1 ASTM C109-91, Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 in. or 50-mm Cube Specimens).

.2 ASTM C309-93, Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.3 ASTM C332-87(1991), Specification for Lightweight Aggregates for Insulating Concrete.

.4 ASTM C827-87, Test Method for Early Volume Change of Cementitious Mixtures.

.5 ASTM C939-93, Test Method for Flow of Grout for Preplaced-Aggregate Concrete.

.6 ASTM D412-92, Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.

.7 ASTM D624-91, Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.

.8 ASTM D1751-83(1991), Specification for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.9 ASTM D1752-84(1992), Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

.10 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.

.11 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.12 CGSB 81-GP-1M-77, Flooring, Conductive and Spark Resistant.

.13 CAN/CSA-A5-93, Portland Cement.

.14 CAN/CSA-A23.1-M90, Concrete Materials and Methods of Concrete Construction.

.15 CAN/CSA-A23.2-M90, Methods of Test for Concrete.

.16 CAN/CSA-A23.5-M86(R1992), Supplementary Cementing Materials.

.17 CAN3-A266.1-M78, Air-Entraining Admixtures for Concrete.

.18 CAN3-A266.2-M78, Chemical Admixtures for Concrete.

.19 CAN3-A266.4-M78, Guidelines for the Use of Admixtures in Concrete.

.20 CAN/CSA A363-M88, Cementitious Hydraulic Slag.

1.4 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 At least 4 weeks prior to commencing work, inform Engineer of proposed source of aggregates and provide access for sampling.

.3 At least 4 weeks prior to commencing work, submit to Engineer samples of following materials proposed for use:
.1 10 kg of each type of Portland cement.

1.5 Certificates

.1 Minimum 4 weeks prior to starting concrete work submit to Engineer manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
.1 Portland cement.
.2 Blended hydraulic cement.
.3 Supplementary cementing materials.
.4 Grout.
.5 Admixtures.
.6 Aggregates.
.7 Water.
.8 Waterstops.
.9 Waterstop joints.
.1 Joint filler.

.2 Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CAN/CSA-A23.1.

1.6 Quality Assurance

.1 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures for Engineer's approval for following items:
.1 Falsework erection.
.2 Hot weather concrete.
.3 Cold weather concrete.
.4 Curing.
.5 Finishes.
.6 Formwork removal.
.7 Joints.

PART 2 - PRODUCTS

2.1 Materials

.1 Portland cement: to CAN/CSA-A5.

.2 Supplementary cementing materials: to CAN/CSA-A23.5.

.3 Cementitious hydraulic slag: to CAN/CSA-A363.

.4 Water: to CAN/CSA-A23.1.

.5 Aggregates: to CAN/CSA-A23.1. Coarse aggregates to be low density.

.6 Air entraining admixture: to CAN3-A266.1.

.7 Chemical admixtures: to CAN3-A266.2. Engineer to approve accelerating or set retarding admixtures during cold and hot weather placing.

.8 Shrinkage compensating grout: premixed compound consisting of metallic aggregate, Portland cement, water reducing and plasticizing agents.
- .1 Compressive strength: 35 MPa at 28 days or as otherwise indicated.
- .2 Consistency:
  - .1 Fluid: to ASTM C827. Time of efflux through flow cone (ASTM C939), under 30 s.
  - .2 Flowable: to ASTM C827. Flow table, 5 drops in 3 s, (ASTM C109, applicable portion) 125 to 145%.
  - .3 Plastic: to ASTM C827. Flow table, 5 drops in 3 s, (ASTM C109, applicable portions) 100 to 125%.
  - .4 Dry pack to manufacturer's requirements.
- .3 Net shrinkage at 28 days: as indicated.

.9 Non premixed dry pack grout: composition of non metallic aggregate Portland cement with sufficient water for the mixture to retain its shape when made into a ball by hand and capable of developing compressive strength as required by Engineer.

.10 Post-Tensioning ducts: to CAN/CSA-A23.1.

.11 Curing compound: to CAN/CSA-A23.1 white and to ASTM C309, Type 1-chlorinated rubber.

.12 Cushion pads: tough, resilient, weather, moisture, and oil resistant material that will not corrode or cause corrosion, consisting of either layers of approved cotton duck saturated and bound together by approved rubber or synthetic compounds, or made from specially compounded synthetic materials.

.13 Ribbed waterstops: extruded PVC Arctic Grade of sizes indicated with shop welded corner and intersecting pieces with legs.
- .1 Tensile strength: to ASTM D412, method A, Die "C", minimum MPa.
- .2 Elongation: to ASTM D412, method A, Die "C", minimum 275%.
- .3 Tear resistance: to ASTM D624, method A, Die "B", minimum kN/m or approved alternate system

.14 Premoulded joint fillers:
- .1 Bituminous impregnated fiber board: to ASTM D1751.
- .2 Sponge rubber: to ASTM D1752, Type I, flexible grade.
- .3 Self-expanding cork: to ASTM D1752, Type II.

.15 Weep hole tubes: galvanized steel.

.16 Dovetail anchor slots: minimum 0.6 mm thick galvanized steel with insulation filled slots.

PART 3 - EXECUTION

3.1 Preparation

.1 Obtain Engineer's approval before placing concrete. Provide 24 h notice prior to placing of concrete.

.2 Pumping of concrete is permitted only after approval of equipment and mix.

.3 Ensure reinforcement and inserts are not disturbed during concrete 2placement.

.4 Prior to placing of concrete obtain Engineer's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.5 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.6 Do not place load upon new concrete until authorized by Engineer.

3.2 Construction

.1 Do cast-in-place concrete work in accordance with CAN/CSA-A23.1.

.2 Sleeves and inserts.
- .1 No sleeves, ducts, pipes or other openings shall pass through joists, beams, column capitals or columns, except where indicated or approved by Engineer.
- .2 Where approved by Engineer set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated, must be approved by Engineer.
- .3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Engineer before placing of concrete.
- .4 Check locations and sizes of sleeves and openings shown on drawings.
- .5 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.

.3 Anchor bolts.
- .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
- .2 With approval of Engineer, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be minimum 100 mm diameter. Drilled holes to be minimum 25 mm larger in diameter than bolts used.
- .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
- .4 Set bolts and fill holes with shrinkage compensating grout.
- .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.

.4 Drainage holes and weep holes:
- .1 Form weep holes and drainage holes in accordance with drawings. If wood forms are used, remove them after concrete has set.
- .2 Install weep hole tubes and drains as indicated.

.5 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100% contact over grouted area.

.6 Finishing.
- .1 Finish concrete in accordance with CAN/CSA-A23.1.
- .2 Use procedures acceptable to Engineer to remove excess bleed water. Ensure surface is not damaged.
- .3 Use curing compounds compatible with applied finish on concrete surfaces. Applied finish on concrete. Provide written declaration that compounds used are compatible.
- .4 Finish concrete floor to meet requirements of CGSB 81-GP-1M Class.
- .5 Concrete floor to have finish hardness equal or greater than Mohs hardness in accordance with CAN/CSA-A23.1.
- .6 Provide scratch finish where bonded topping is to be applied. Provide depressions to accommodate bonded topping.
- .7 Provide scratch finish unless otherwise indicated.
- .8 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.

.7 Toppings.
- .1 Place monolithic topping before base course has completely set in accordance with CAN/CSA-A23.1 and topping manufacturer's recommendations.
- .2 Place bonded topping over hardener base course in accordance with CAN/CSA-A23.1 and topping manufacturer's recommendations.
- .3 Follow instructions by Engineer in case conflicting requirements arise between CAN/CSA-A23.1 and manufacturer's recommendations.
- .4 Apply cement/sand grout to base course in accordance with CAN/CSA-A23.1 and manufacturer's recommendations before placing bonded topping. Observe manufacturer's safety recommendations.
- .5 Ensure that joints in topping are of the same as those in base course. Also ensure that their locations precisely match those in base course. Provide dividers reinforcing mesh as indicated.

.8 Waterstops.
- .1 Install waterstops to provide continuous water seal. Do not distort or pierce waterstop in such a way as to hamper performance. Do not displace reinforcement when installing waterstops. Use equipment to manufacturer's requirements to field splice waterstops. Tie waterstops rigidly in place.
- .2 Use only straight heat sealed butt joints in field. Use factory welded corners and intersections unless otherwise approved by Engineer.

.9 Joint fillers.

.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Engineer. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.2 Locate and form expansion joints as indicated. Install joint filler.

.3 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

3.4 Field Quality Control

.1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Owner in accordance with CAN/CSA-A23.1.

.2 Owner will pay for costs of tests as specified in Section 01410 - Testing Laboratory Services.

.3 Engineer will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

4 Non-destructive Methods for Testing Concrete shall be in accordance with CAN/CSA-A23.2.

.5 Inspection or testing by Consultant will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 03300 - Cast-in-Place Concrete.

1.2 References

.1 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-25.20- 95, Surface Sealer for Floors.

.2 Canadian Standards Association (CSA)
.1 CSA-A23.1- 94 , Concrete Materials and Methods of Concrete Construction.

1.3 Performance Requirements

.1 Submit written declaration that components used are compatible and will not adversely affect finished flooring products and their installation adhesives.

1.4 Product Data

.1 Submit product data in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Include application instructions for concrete floor treatments .

1.5 Waste Management and Disposal

.1 Separate and recycle waste materials in accordance with the Waste Reduction Workplan.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away for children.

.4 Use chemical hardeners that are non-toxic and have zero or low VOCns.

.5 Dispose of surplus chemical and finishing materials in accordance with federal, provincial and municipal regulations.

.6 Dispose of waste from stripping of floors in a manner that will not have unfavourable effects on the environment.

1.6 Environmental Requirements

.1 Temporary lighting:
.1 Minimum 1200 W light source, placed 2.5 m above floor surface, for each 40 sq m of floor being treated.

.2 Electrical power:
.1 Provide sufficient electrical power to operate equipment normally used during construction .

.3 Work area:
.1 Make the work area water tight protected against rain and detrimental weather conditions.

.4 Temperature:
.1 Maintain ambient temperature of not less than 10 degrees C from 7 days before installation to at least 48 hours after completion of work and maintain relative humidity not higher than 40% during same period.

.5 Moisture:
.1 Ensure concrete substrate is within moisture limits prescribed by flooring manufacturer.

.6 Safety:
.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

.7 Ventilation:
.1 Owner will arrange for ventilation system to be operated during installation. Ventilate area of work as directed by Engineer by use of approved portable supply and exhaust fans.
.2 Ventilate enclosed spaces.
.3 Provide continuous ventilation during and after coating application.

PART 2 - PRODUCTS

2.1 Chemical Hardeners

.1 Type1 - Sodium silicate Type 2 - Magnesium fluosilicate Type 2 - Zinc fluosilicate blend.

.2 Water: potable.

2.2 Sealing Compounds

.1 Acceptable Material
- Lapidolith by Sonneborn
- Sealtight Pena-Lith Hardening and Dustproofing by W.R. Meadows
- Seal hard 400 by Sternson – or approved equal

2.3 Mixes

.1 Mixing, ratios and application in accordance with manufacturers instructions.

PART 3 - EXECUTION

3.1 Examination

.1 Verify that slab substrate site conditions surfaces are ready to receive work and elevations are as indicated on shop drawings and instructed by manufacturer.

3.2 Preparation

.1 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radiused edges unless otherwise indicated.

.2 Saw cut control joints to CSA-A23.1 , 24 hours maximum after placing of concrete.

.3 Use strong solvent to remove chlorinated rubber or existing surface coatings.

.4 Use protective clothing, eye protection and respiratory equipment during stripping of chlorinated rubber or existing surface coatings.

3.3 Application

.1 After floor treatment is dry, seal control joints and joints at junction with vertical surfaces with appropriate sealant.
.1 Sealants Types.

.2 Apply floor treatment in accordance with Sealer manufacturer's written instructions.

.3 Clean overspray. Clean sealant from adjacent surfaces.

3.4 Protection

.1 Protect finished installation in accordance with manufacturer's instructions.

3.5 Schedule

.1 Parking garage slab on grade
.2 Parking garage walls and columns from top of footings to 600mm above floor.

PART 1 – GENERAL

1.1 General Requirements

.1 Conform to Division 01, General Requirements..

1.2 Description

.1 Work Included:
.1 Provide structural precast concrete stairs.

.2 Related work specified elsewhere:
.1 Masonry bearing walls provided by Section 04200, Unit Masonry
.2 Cast-in-place concrete elements provided by Section 03300, Cast-In-Place Concrete
.3 Concrete for this work provided by this Section in conformance with Section 03300, Cast-In-Place Concrete
.4 Sealants and joint filters for this work provided by Section 07900, Joint Sealers
.5 Firestopping provided by Section 07480, Firestopping

1.3 Quality Assurance

.1 Conform to Section 03300, Cast-In-Place Concrete

.2 Conform to Section 07900, Joint Sealers

.3 Qualification of Designer:
.1 Be a Registered Professional Engineer of Ontario

.4 Qualifications of Manufacturers and Designers:
.1 A fully experienced and recognized manufacturer of precast concrete products whose manufacturing plant and facilities are currently certified under CSA A251-M and CSA W55.3

.5 Qualifications of Erector:
.1 A full experienced erector approved for this work by the manufacturer

.6 Requirements of Regulatory Agencies:
.1 Conform to the requirements of the following:
.1 Codes and Authorities:
.1 The Code, Part 4. Structural Design, and Part 3, Use and Occupancy. Provide fire separations called for on Drawings.
.2 CSA Standards:
.1 CAN3-A23.1-M, Concrete Materials and Methods of Concrete Construction;
.2 CAN3-A23.2-M, Methods of Test for Concrete;
.3 CAN3-A23.3-M, Design of Concrete Structures for Buildings;
.4 CAN3-A23.4-M, Precast Concrete – Materials and Construction;

.5 CSA-A251-M, Qualification Code for Manufacture of Architectural and Structural Precast Concrete;
.6 CSA W55.3, Resistances Welding Qualification Code for Fabricators of Structural Members Used in Building

7. Precast Concrete Institutes:
.1 PCI MNL 117, Manual for Quality Control of Plants and Production of Architectural Precast Concrete Products

1.4 Submittals

.1 Shop Drawings:
.1 Submit Shop Drawings in conformance with Section 01340, Submittals

.2 Design Drawings:
.1 Submit design drawings stamped by a Professional Engineer of Ontario

1.4 Product Delivery, Storage and Handling

.1 Protect precast units throughout progress of the work until completed erection against damage

.2 Protect other work from damage by this work

PART 2 – PRODUCTS

2.1 Materials

.1 Concrete Anchors and Reinforcing Steel:
.1 Conform to Section 03300, Cast-In-Place Concrete

.2 Concrete:
.1 28Mpa in transfer, 40 MPa at 28 days

.3 Prestress strand:
.1 Conforming to CAN3-A23.4-M, ASTM A416 and ASTM A421

.4 Touch-up Paint:
.1 For ungalvanized steel: CGSB 1-GP-40M, Primer, Structural Steel, Oil Alkyd Type

2.2 Design

.1 Refer to Drawings for design parameters. Employ the services of a Professional Engineer of Ontario for design and detail

.2 Design stairs with equal runs and equal risers in any flight in conformance with the Drawings and the Building Code, Part 3

.3 Design concrete, reinforce stairs with steel reinforcing sufficient to withstand handling stresses, temperature changes, live and dead loads. If requested, provide Consultant with the justifying calculations for his review.

.4 Prestress and camber stairs to be level in use

.5 Maximum deflection under live load not to exceed span/480

.6 Provide adequate anchorage to substructure

.7 Provide leveling to substructure within +/- 3mm

.8 Provide products adequate to spans

.9 Provide all necessary anchors, hangers and coring for other predetermined requirements

.10 Provide grout channel and bottom stop

2.3 Fabrication

.1 Conform to Section 03300, Cast-In-Place Concrete

.2 Tolerances for precast units shall conform to CAN3-A23.4-M

.3 Provide manufacturer's standard finish with non-slip tread ribs at nosings

.4 Hardware:
.1 After fabrication of hardware, remove all rust, mill scale, grease or other extraneous material and coat, primer paint or galvanize;
.2 Supply for precast units required to be cast into the substructure to Section 04200, Unit Masonry or Section 03300, Cast-In-Place Concrete, as required. Provide such items in ample time to meet construction program. Supply lay-out Drawings, locating accurately the position of cast-in items to be installed by other Sections

2.4 Finishes

.1 Concrete Finish:
.1 Dense, smooth, even concrete free of defects such as honeycombing, voids, loss of fines, and the like. Surfaces shall be smooth from steel forms for treads, risers, and sides. Walking surfaces shall be smooth finished with integral non-slip carborundum ribs to approved design. Soffit of units shall be steel trowel finish

PART 3 – EXECUTION

3.1 Inspection

.1 Prior to installation of precast stairs, check at the Site all dimensions affecting the work of this Section. Bring to the Contractor's attention any discrepancies between design dimensions and field dimensions which could adversely affect installation in strict accordance with the Contract Documents. Do not proceed if such conditions exist until they are corrected or until installation requirements are modified

.2 Inspection of Precast:

.1 Be responsible for any chipping, spalling, cracking or other damage to the precast units;

.2 Incorporate no damaged precast units into the structure. If in the opinion of the Consultant the damaged precast unit can be repaired, repaired prior to installing to the entire satisfaction of the Consultant

3.2 Installation

.1 General:

.1 Employ only competent workmen who are properly trained to handle and erect specified precast concrete stairs

.2 Securely fasten each stair flight in place as indicated on the approved drawings. Adjustments or changes in connection, which could involve additional stress in the product or connections, shall not be permitted without the approval by the Consultant

.3 Unless otherwise stated, dimensional tolerances of the erected units shall be as recommended in PCI MNL 117

.4 Supply and install all necessary fastening devices to secure units including bolts, nuts, washers, shims, lugs, expansion shields, etc.

.5 Provide coring for holes not provided in shop

.6 Seal exposed longitudinal joints in ceiling not requiring firestopping in accordance with Section 07900

.7 Welding:

.1 Make structural welds, where permitted by a certified welder in accordance with the erection drawings and CSA W59-M;

.2 Locate a fire extinguisher, of an approved type and in operating condition, within reach of all burning and welding operations at all times;

.3 Give all weld areas and exposed or accessible steel anchorage devices a coat of specified touch-up paint, immediately after welding operations at all times;

.4 Protect the work of this Section and other Sections from damage caused by welding splatter

3.3 Field Quality Control

.1 Have the Consultants inspect the work after all precast concrete stairs have been set in place and before joint treatment or cleaning

.2 Repair at this time units found to be slightly damaged. Conform to the Consultant's requirements for repairs and make each repair structurally sound as required

PART 1 – GENERAL

1.1 References

.1 ASTM A775/A775M-89a, Specification for Epoxy-Coated Reinforcing Steel Bars.

.2 ASTM D412-87, Test Methods for Rubber Properties in Tension.

.3 ASTM D2240-86, Test Method for Rubber Property-Durometer Hardness.

.4 CAN/CSA-A23.1-M90, Concrete Materials and Methods of Concrete Construction.

.5 CAN3-A23.3-M84, Design of Concrete Structures for Buildings.

.6 CAN3-A23.4-M78, Precast Concrete-Materials and Construction.

.7 CSA A251-M1982, Qualification Code for Manufacturers of Architectural and Structural Precast Concrete.

.8 CAN3-A266.1-M78, Air-Entraining Admixtures for Concrete.

.9 CAN3-A266.2-M78, Chemical Admixtures for Concrete.

.10 CAN3-A266.4-M78, Guidelines for the Use of Admixtures in Concrete.

.11 CSA G30.12-M1977, Billet-Steel Bars for Concrete Reinforcement.

.12 CSA G30.16-M1977, Weldable Low Alloy Steel Deformed Bars for Concrete Reinforcement.

.13 CAN/CSA-G40.21-M87, Structural Quality Steels.

.14 CAN/CSA G164-M1981, Hot Dip Galvanizing of Irregularly Shaped Articles.

.15 CSA G279-M1982, Steel for Prestressed Concrete Tendons.

.16 CSA W48.1-M1991. Carbon Steel Covered Electrodes for Shielded Metal Arc Welding.

.17 CSA W59-M1989, Welded Steel Construction (Metal Arc Welding).

.18 CSA W186-M1990, Welding of Reinforcing Bars in Reinforced Concrete Construction.

.19 CAN/CGSB-1.40-M89, Primer, Structural Steel, Oil Alkyd Type.

.20 CGSB 1-GP-181M-77, Coating, Zinc-Rich, Organic, Ready Mixed.21 CAN/CGSB-51.20-M87, Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.21 CAN/CSA-S6-M88, Design of Highway Bridges.

1.2 Qualifications of Manufacturer

.1 Precast concrete elements to be fabricated and erected by manufacturing plant certified by Canadian Standards Association in appropriate categories according to CSA A251. Precast concrete manufacturer to be certified in accordance with CSA's certification procedures for precast concrete plants prior to submitting tender and to specifically verify as part of tender that plant is currently certified. Only precast elements fabricated in such certified plants to be acceptable to owner, and plant certification to be maintained for duration of fabrication, erection until warranty expires.

1.3 Design Criteria

.1 Design precast elements to CAN3-A23.3 CAN3-A23.4 CAN/CSA-S6 and to carry handling stresses.

.2 Design precast elements to carry loads specified by Engineer or as indicated, in accordance with applicable codes .

.3 Carry out vibration analysis and test if and as required by Engineer.

.4 Design connections/attachments of precast elements to load/forces specified by Engineer.

.5 Submit 6 copies of detailed calculations and design drawings for typical precast elements and connections for Engineer for approval 2 weeks prior to manufacture.

1.4 Tolerances

.1 Tolerance of precast elements to CAN3-A23.4, Section 10.

.2 Length of precast elements not to vary from design length by more than as required by Engineer.

.3 Cross sectional dimensions of precast elements not to vary from design dimensions.

.4 Deviations from straight lines not acceptable.

.5 Precast elements not to vary from true overall cross sectional shape as measured by difference in diagonal dimensions.

1.5 Source Quality Control

.1 Provide Engineer with certified copies of quality control tests related to this project as specified in CAN3-A23.4 and CSA A251.

.2 Inspect prestressed concrete tendons in accordance with CSA G279.

.3 Provide records from in-house quality control programme based upon plant certification requirements to Engineer for inspection and review.

.4 Upon request, provide Engineer with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.

.5 Precast plants should keep complete records of supply source of concrete material, steel reinforcement, prestressing steel and provide to Engineer for review upon request.

1.6 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Produce, deliver and erect where directed by Consultant on project site, full size precast concrete units incorporating required details and showing specified colour, finish and quality for Consultant approval prior to commencement of full production.

1.7 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit shop drawings in accordance with CAN3-A23.4 and CAN3-A23.3. Include the following items:

.1 Design calculations for items designated by manufacturer.
.2 Tables and bending diagrams of reinforcing steel.
.3 Camber.
.4 Finishing schedules.
.5 Methods of handling and erection.
.6 Openings, sleeves, inserts and related reinforcement.

.3 Each drawing submitted shall bear stamp and signature of qualified professional engineer registered or licensed in province of Ontario, Canada.

1.8 Measurement for Payment

.1 Precast elements will be measured in units supplied, delivered, stored and erected.

.2 Precast elements measured as individual units, will include cost, supply, delivery, storage and erection of bearing assemblies, anchor bolts, removal and patching of erection devices transverse connections and field grouting of grout keys between precast members.

1.9 Warranty

.1 The Contractor hereby warrants that the precast architectural elements will not spall or show visible evidence of cracking, except for normal hairline shrinkage cracks, in accordance with GC24, but for 1 years.

PART 2 – PRODUCTS

2.1 Materials

.1 Cement, white cement, aggregates, water, admixtures: to CAN3-A23.4 and CAN/CSA-A23.1.

.2 Exposed aggregate and special facing materials to match selected finish sample.

.3 Use same brands and source of cement and aggregate for entire project to ensure uniformity of colouration and other mix characteristics.

.4 Reinforcing steel: to CSA G30.16 CSA G30.12, epoxy coated.

.5 Prestressing steel: to CAN/CSA-S6 and CSA G279.

.6 Welded wire fabric: to CSA G30.15.

.7 Forms: to CAN3-A23.4.

.8 Hardware and miscellaneous materials: to CAN/CSA-A23.1.

.9 Anchors and supports: to CAN/CSA-G40.21, Type 300W, epoxy coated after fabrication.

.10 Welding materials: to CSA W48.1.

.11 Galvanizing: hot dipped galvanizing with minimum zinc coating of 610 g/m² to CSA G164.

.12 Steel primer: to CAN/CGSB-1.40.

.13 Epoxy coating: to ASTM A775/A775M.

.14 Air entrainment admixtures: to CAN3-A266.1.

.15 Post-tensioning ducts: to CAN/CSA-A23.1.

.16 Bearing pads: smooth, high impact plastic.

.17 Bearing pads: neoprene, durometer hardness to ASTM D2240, and minimum tensile strength to ASTM D412, moulded to size or cut from moulded sheet.

.18 Shims: plastic.

.19 Zinc-rich primer: to CGSB 1-GP-181M.

.20 Surface retardent: to CAN3-A266.2.

.21 Weephole tubes: purpose made galvanized steel.

.22 Insulation: expanded polystyrene to CAN/CGSB-51.20, Type II.

.23 Curing compound: not permitted without prior approval of Engineer.

2.2 Concrete Mixes

.1 Proportion normal density concrete in accordance with CAN/CSA-A23.1, Alternative 1, to give following properties: for all concrete

2.3 Manufacture

.1 Manufacture units in accordance with CAN3-A23.4.

.2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast on part of unit which will not be exposed.

.3 Design and attach anchors and inserts to precast concrete elements to carry design loads.

.4 Galvanize anchors after fabrication and touch up with zinc-rich primer after welding.

2.4 Finishes

.1 Finish and colour of precast units to match sample in Consultant's office.

.2 Fluted finish: achieve finish using grooved form liners.

.3 Smooth finish: as cast using smooth plastic form liners.

.4 Rubbed finish:
- .1 Rub exposed face surface of precast concrete panels with carborundum bricks and water until hollows, lines, form marks, and surplus materials have been removed.
- .2 Leave surface finish uniformly smooth.
- .3 Do not use mortar or grout in rubbing, other than cement paste drawn from green concrete by rubbing process.
- .4 Clean panels.

.5 Exposed aggregate finish:
- .1 Apply uniform coat of retardant to inside face of forms.
- .2 Expose coarse aggregate by washing and brushing away surface mortar.
- .3 Expose aggregate to conform with approved samples which can be viewed at Consultant's office.

.6 Exposed aggregate finish:
- .1 Hand place large facing aggregate on silica sand bed spread over form bottom.
- .2 Remove panels from forms after concrete hardens.
- .3 Expose aggregate by breaking away loose sand.

.7 Sandblasted finish: in order to expose aggregate face, sandblast surface to conform with approved sample which can be viewed at job site.

.8 Smooth float back surface of precast units exposed on both sides.

.9 Protect fluted, smooth or exposed surfaces with 2 coats of sealer as approved by Engineer.

.10 Cast in brick finish. Brick sample to be approved by Consultant

PART 3 – EXECUTION

3.1 General

.1 Do precast concrete work in accordance with CAN3-A23.4 and CAN3-A23.3 CAN/CSA-S6.

3.2 Erection

.1 Erect precast elements within allowable tolerances as indicated.

.2 Non-cumulative erection tolerances in accordance with CAN3-A23.4, Section 10.

.3 Set elevations and alignment between units to within allowable tolerances before connecting units.

.4 Grout underside of unit bearing plates with shrinkage compensating grout.

.5 Fasten precast panels in place as indicated on approved shop drawings.

.6 Secure bolts with tack-weld nut to bolt.

.7 Uniformly tighten bolted connections with torque indicated.

.8 Do not weld or secure bearing plates at sliding joints.

.9 Set units dry, without mortar, attaining specified joint dimension with plastic shims.

.10 Clean field welds with wire brush and touch-up galvanized finish with zinc-rich primer.

.11 Remove shims and spacers from joints of non- load bearing panels after fastening but before sealant is applied.

.12 Apply sealers to precast panels to manufacturer's recommendations unless specified otherwise.

3.3 Welding

.1 Do welding in accordance with CSA W59 for welding to steel structures and CSA W186 for welding of reinforcement.

3.4 Cleaning

.1 Obtain approval of cleaning methods from Engineer before cleaning soiled precast concrete surfaces.

PART 1 - GENERAL

1.1 References

.1 CSA A179-M1976, Mortar and Grout for Unit Masonry.

1.2 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

PART 2 - PRODUCTS

2.1 Materials

.1 Use same brands of materials and source of aggregate for entire project.

.2 Mortar and grout: CSA A179.

.3 Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.

.4 Colour: ground coloured natural aggregates or metallic oxide pigments.

.5 Mortar for exterior masonry above grade:
.1 Loadbearing: Type N based on Proportion specifications.
.2 Non-loadbearing: Type N based on Proportion specifications.
.3 Parapet walls, chimneys, unprotected walls: Type N based on Proportion specifications.

.6 Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: Type M based on Proportion specifications.

.7 Mortar for interior masonry:
.1 Loadbearing: Type N based on Proportion specifications.
.2 Non-loadbearing: Type N based on Proportion specifications.

.8 Following applies regardless of mortar types and uses specified above:
.1 Mortar for calcium silicate brick and concrete brick: Type O based on Proportion specifications.
.2 Mortar for stonework: Type N based on Proportion specifications.
.3 Mortar for grouted reinforced masonry: Type S based on Proportion specifications.
.4 Mortar for pointing: Type N based on Proportion specifications.
.5 Mortar for glass block: 1 part Portland cement, 1 part hydrated lime, 4 parts aggregate by volume.

.9 White mortar: use white Portland cement, and lime to produce mortar type specified.

.10 Coloured mortar: use colouring admixture not exceeding 10% of cement content by mass, or integrally coloured masonry cement, to produce coloured mortar to match approved sample.

.11 Non-staining mortar: use non-staining masonry cement for cementitious portion of specified mortar type.

.12 Grout: to CSA A179, Table 3.

.13 Parging mortar: Type N to CSA A179.

2.2 Mixes

.1 Colour and admixtures: Mix grout to semi-fluid consistency.

.2 Coloured mortars: Incorporate colour and admixtures into mixes in accordance with manufacturer's instructions.
.1 Use clean mixer for coloured mortar.

.3 Pointing mortar: Prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour nor more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.

PART 3 - EXECUTION

3.1 Construction

.1 Do masonry mortar and grout work in accordance with CSA A179 except where specified otherwise.

.2 Apply parging in uniform coating not less than total 10 mm thick.

3.2 Schedule

.1 Use white mortar where indicated.

.2 Use coloured mortar as indicated.

.3 Use non-staining mortar as indicated.

.4 Grout following masonry components as indicated.

PART 1 - GENERAL

1.1References .1 CAN3-A371-M84, Masonry Construction for Buildings.

PART 2 - PRODUCTS

2.1 Materials .1 Control joint filler: purpose-made elastomer durometer hardness to ASTM D 2240 of size and shape indicated.

.2 Lap adhesive: recommended by masonry flashing manufacturer.

.3 Polyethylene flashings.
.1 Reinforced: two .75 mm thick polyethylene films bonded each side of asphalt treated creped kraft paper, reinforced with 12.7 x 12.7 mm fibreglass scrim.

.4 Aluminum flashings.
.1 Aluminum foil, .004 mm thick, asphalt laminated between two sheets of creped kraft paper with one exposed paper surface coated with asphalt-wax treatment.

PART 3 - EXECUTION

3.1 Installation .1 Install continuous control joint fillers in control joints at locations indicated.

3.2 Construction .1 Build in flashings in masonry in accordance with CAN3 A371 as follows:
.1 Install flashings under exterior masonry bearing on foundation walls, slabs, shelf angles, and steel angles over openings. Install flashings under weep hole courses and as indicated.
.2 Lap joints 150 mm and seal with adhesive.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 04051 Masonry Procedures.

.2 Section 04060 Mortar and Masonry Grout.

.3 Section 04080 Masonry Reinforcing and Connectors.

.4 Section 04090 Masonry Accessories.

1.2 References

.1 ASTM C 126-91 Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.

.2 CAN/CSA-A82.1-M87 Burned Clay Brick (Solid Masonry Units Made From Clay or Shale).

.3 CSA A82.3-M1978(R1992) Calcium Silicate (Sand-Lime) Building Brick.

.4 CAN3-A82.8-M78(R1992) Hollow Clay Brick.

.5 CAN3-A165 Series-M85 CSA Standards on Concrete Masonry Units.

1.3 Protection

.1 When work in progress, cover tops of completed masonry elements exposed to weather with non-staining weatherproof covers Covers shall be at least 600mm wider than masonry elements and shall be well secured against displacement.

.2 Protect finished work at corners, sills, projections and other areas likely to be damaged, with suitable coverings until completion of building.

.3 Adequately brace masonry walls and partitions to resist effects of wind and other lateral forces.

1.4 Hot and Cold Weather Work

.1 When outside temperature is below or likely to go below 5ºC provide heat to maintain temperature of materials and surrounding air at 5º or better during laying and for 72 hours thereafter. Submit for approval the proposed method of protecting masonry against low temperatures. Salamanders will not be permitted.

.2 Keep units completely free from ice and frost. Preheat mortar materials and mortar boards. Temperature of mortar to be between 21º and 48ºC. Protect mortar from frost. Do not use admixtures or antifreezes in mortar.

.3 Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in winter.

.4 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

PART 2 - PRODUCTS

2.1 Manufactured Units

.1 Face brick.
- .1 Burned clay brick: to CAN/CSA A82.1.
  - .1 Type: to be confirmed
  - .2 Grade: to be confirmed
  - .3 Size: to be confirmed
  - .4 Colour and Texture: to be approved
  - .5 Mortar: to match brick colour.
- .2 Hollow clay brick: to CAN3-A82.8.
- .3 Calcium silicate brick: to CSA A82.3.
  - .1 Masonry Units to be approved
  - .2 Size: Refer to Drawings.
  - .3 Colour and texture: to match approved sample.
- .4 Concrete brick: to CAN3-A165 Series.
- .5 Ceramic glazed brick: to ASTM C 126.

.2 Back-up brick.
- .1 Burned clay brick: to CAN/CSA A82.1.
  - .1 Type: to be confirmed
  - .2 Grade: to be confirmed
  - .3 Size: to be confirmed
- .2 Hollow clay brick: to CAN3-A82.8.
- .3 Calcium silicate brick: to CSA A82.3.
- .4 Concrete brick: to CSA A165 Series.

.3 Architectural Block
- .1 Product: to be approved by Architect

PART 3 - EXECUTION

3.1 Installation

.1 Lay face brick in ½ running board except where specifically shown otherwise. Provide header, soldier, rowlock and special band courses, where indicated. Provide solid soldier course return units at outside corners; 45º cut units will not be accepted.

.2 Completed brickwork shall appear uniform and well blended, free of contrasting areas. Replace at not cost to Contract, brickwork which does not meet this requirement.

.3 Brick with an absorption rate of over 1g/min./1000mm² when tested in

accordance with ASTM C67 shall be dampened before laying.

.4 Tops of walls which have been left exposed for any period of time shall be dampened before work is commenced again, if required.

.5 Brickwork at different levels shall be stepped in regular proportions between levels.

.6 Brickwork shall be laid up with the shove joint method in full bed of mortar with vertical and horizontal joints filled flush. Slushing mortar into joints after brick is laid, is not permitted.

.7 All joints in brickwork, including bed and collar joints, shall be filled flush as each course is laid. Pull down and rebuild walls/partitions which do not meet this requirement as directed by Consultant and at no extra cost to Contract.

.8 Variations in size of brick shall be evenly distributed in wall so that mortar joints are uniform.

.9 All first brick course over steel lintels place brick directly on membrane flashing without mortar.

3.2 Control Joints and Expansion Joints

.1 Provide control joints in masonry walls supported by foundation walls at Approximately 7.5m o.c. and in masonry walls supported on framed slabs at approximately 4m o.c. and where shown. Confirm actual Locations of control joints with Consultant before starting work.

.2 Provide control joints at intersection of bearing and nonbearing walls.

.3 At cavity walls, offset control joints at outer and inner wythe as shown.

.4 Construct control joints as shown. Unless otherwise shown make Control joints 10 mm wide. Interrupt masonry reinforcement at control joints.

.5 Control joints must be constructed during erection of masonry, and May not be sawcut later.

.6 Construct expansion joints in accordance with details shown. Provide Metal flashing built into masonry.

3.3 Membrane Flasings / Damproof Course

.1 Install damproof course on top of foundation walls, and where shown.

.2 Install membrane flashing at bottom of cavity walls; where shown, and at the following locations:
.1 Door heads
.2 Window heads
.3 immediately above horizontal interruptions within exterior walls

.3 Lap membrane flashing 100mm at joints; seal lap with adhesive.

.4 In all cases extend membrane flashing 13mm beyond outside face of wall or outside edge of steel lintel. Trim as required to Consultant's

approval

.5 Carry membrane flashing up behind air barrier approximately 200mm.

.6 Ensure membrane flashing is fully supported at all locations; provide Metal backing for membrane where required..

3.4 Weep and Vent Holes

.1 Form weep holes by inserting weep / vent hole inserts into exterior with mortar joint immediately above all membrane flashings, and at other locations where shown. Space weep holes at 610mm o.c. horizontally.

.2 Form vent holes by inserting weep / vent hole inserts into exterior wythe mortar joint near top of each cavity air space. Space weep holes at 610mm o.c. horizontally.

.3 Keep face of weep and vent hole inserts back from face of brick minimum 6 mm. Keep weep holes free of mortar..

.4 In all cases extend membrane flashing 13mm beyond outside face of Wall or outside edge of steel lintel. Trim as required to Consultant's Later instruction.

.

3.5 Patching and Cleaning

.1 At completion of work, holes and other defects in masonry joints shall be repaired, and masonry surfaces shall be thoroughly cleaned.

.2 Holes in masonry joints shall be filled with mortar and suitably tooled. Cut out and repoint defective joints. Use coloured mortar to match existing.

.3 Dry brush masonry surfaces at end of each day's work and after all final painting.

.4 Remove mortar smears and droppings from concrete block masonry Surfaces after such smears and droppings have dried. When mortar Joints are dry and hard, clean block masonry surfaces by rubbing down With abrasive blocks and stiff fibre brushes.

.5 Remove mortar particles from clay masonry surfaces with wood paddles. Remove stains from clay masonry surfaces by wet cleaning in Accordance with manufacturer's recommendations.

.6 Upon completion of work, clean blockwork by brushing and washing. In extreme cases a 5º solution of muriatic acid may be used preceded and followed by a copious bath of clean water. Clean blockwork to be painted to suite requirements of Section 09911.

PART 1 - GENERAL

1.1 Related Sections
.1 Section 04090 Masonry Accessories.

1.2 References
.1 CAN3-A165 Series CSA Standards on Concrete Masonry Units.

PART 2 - PRODUCTS

2.1 Materials
.1 Standard concrete block units to CAN3-A165 Series-m (CAN3-A165.1).
.1 Classification: H or S/15A/M
.2 Size: modular.

.2 Fire resistant concrete block units: to CAN3-A165 Series (CAN3-A165.1) as modified below.
.1 Classification: H or S/15/A/M except as modified by fire resistance requirements specified below.
.2 Fire resistant characteristics: aggregate used in units and equivalent thickness of units to the Supplement to the National Building Code of Canada 1995, Chapter 2 for fire-resistance ratings indicated.
.3 Size: modular.

PART 3 - EXECUTION

3.1 Installation
.1 Concrete block units.
.1 Bond: running.
.2 Coursing height: 200 mm for one block and one joint.
.3 Jointing: concave where exposed or where paint or other finish coating is specified.
.4 Jointing: provide concave joints.

.2 Concrete block lintels.
.1 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.
.2 End bearing: not less than 200 mm as indicated on drawings.

3.2 Cleaning

.1 Standard block: Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block and finally by brushing.

.2 Glazed block: Clean masonry as work progresses using soft, clean cloths, within few minutes after laying. Upon completion, when mortar has set so that it will not be damaged by cleaning, clean with soft sponge or clean cloths, brush, and clean water. Polish with soft, clean cloths.

PART 1 - GENERAL

1.1 Section Includes

.1 Glass masonry units.

.2 Mortar bed and pointing.

.3 Joint reinforcement.

.4 Perimeter chase.

1.2 Related Sections

.1 Section 04090 Masonry Accessories.

.2 Section 07900 Joint Sealers.

1.3 References

.1 ASTM A 153-82 Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware

.2 ASTM C 207-79 Hydrated Lime for Masonry Purposes.

.3 CAN/CGSB-19.13-M87 Sealing Compound, One-Component, Elastomeric, Chemical Curing.

.4 CAN3-A5-M83 Portland Cements.

.5 CAN3-A371-M84 Masonry Construction for Buildings.

.6 CAN4-S106-M80 Standard Method for Fire Tests of Window and Glass Block Assemblies.

.7 CSA A179M-1976 Mortar and Grout for Unit Masonry.

.8 CSA A82.56-M1976 Aggregate for Masonry Mortar.

.9 CAN/CSA-G164-M92 Hot Dip Galvanizing of Irregularly Shaped Articles.

.10 CSA G30.3-M1983 Cold-Drawn Steel Wire for Concrete Reinforcement.

.11 CAN/CGSB-37.2-M88 Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing, and for Roof Coatings.

1.4 Submittals

.1 Submit product data, samples, and manufacturer's installation instructions in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Verify field measurements are as shown on drawings.

.3 Submit product data on glass units and accessories.

.4 Samples: submit two glass units 200 x 200 mm in size illustrating size variations, colour, design, and face pattern.

.5 Manufacturer's installation instructions: submit manufacturer's installation instructions to requirements of Section 01601 - Material and Equipment

.6 Closeout submittals: submit maintenance data under provisions of Section 01730 - Operation and Maintenance Manual.
.1 Include instructions for cleaning units.

1.5 Quality Assurance

.1 Perform work in accordance with local recommended practices for masonry construction.

1.6 Qualifications

.1 Manufacturer: company specializing in manufacturing products of this Section with minimum three years experience.

1.7 Regulatory Requirements

.1 Conform to applicable code for fire rated installations.

1.8 Extra Materials

.1 Provide one percent of each type and size of glass units, under provisions of Section 01700 - Contract Closeout.

.2 Supply in original cartons using cushioning materials between units. Attach label identifying:
.1 Project Name
.2 Description of Contents: name of manufacturer, trade name of product, generic description of contents.

PART 2 - PRODUCTS

2.1 Manufactured Units

.1 Hollow glass block: standard end blocks. With joint key for mortar bond.
.1 Pattern and design: transparent.
.2 Outer surfaces: smooth.
.3 Inner surfaces: smooth.

.4 Colour: clear glass.
.5 Edge coating colour: manufacturer's standard white- coloured, latex based edge coating.

.6 Nominal sizes:
.1 Square units: 200 mm square x 200 mm thick.
.2 Corner units: manufacturer's standard sizes designed to join straight units of same height.
.3 End units: manufacturer's standard sizes designed to join straight units of same height.

.2 Solid glass block: standard end blocks. With joint key for mortar bond.
.1 Pattern and design:
.1 Transparent.
.2 Surfaces: smooth.
.3 Colour: clear glass.
.4 Nominal sizes:
.1 Square units: 194 mm square x 194 mm x 7 mm.
.2 Corner units: manufacturer's standard sizes designed to join straight units of same height.
.3 End units: manufacturer's standard sizes designed to join straight units of same height.
.2 Compressive strength: 550 kPa.

2.2 Components

.1 Fire rated separations.
.1 Glass Units: in accordance with CAN4-S106, and as specified. Packaging bearing label of testing authority acceptable to authority having jurisdiction.
.2 Mortar: one part Portland cement, one part hydrated lime and four parts sand by volume.
.3 Joint Reinforcement: as specified.
.4 Expansion Strips: glass fibre or mineral wool.

2.3 Accessories

.1 Asphalt emulsion: to CAN/CGSB-37.2, water-based asphalt emulsion.

.2 Sealant:07900 - Joint Sealers.

.3 Sealant primer: non-staining type recommended by sealant manufacturer.

.4 To Fasteners: steel, 6 mm minimum diameter, galvanized to ASTM A 153, and as follows:
.1 To metal: self-drilling, self-tapping screws.
.2 To concrete and masonry: self-drilling, compression type insert, or self-tapping type screws for pre-drilled holes..
.3 To wood: wood screws

.5 Spacers: plastic, concealed type, allowing pointing mortar without obstruction, of size to provide horizontal and vertical joint width indicated, capable of supporting glass units until mortar set, incorporated into structural design of glass unit masonry.

PART 3 - EXECUTION

3.1 Examination

.1 Examine openings to receive glass unit masonry. Verify correct size, location and readiness to receive work of this Section.

.2 Beginning of installation means acceptance of conditions.

3.2 Preparation

.1 Clean glass units of foreign substances.

.2 Establish and protect lines, levels, and coursing.

.3 Protect elements surrounding work of this Section from damage and disfiguration.

3.3 Installation

.1 Erect glass units and accessories in accordance with manufacturer's instructions.

.2 Install perimeter metal chase.

.3 Coat surface under units with asphalt emulsion as a bond breaker, and allow to dry before placing mortar.

.4 Secure panel anchors to jambs and head, with two fasteners per anchor at horizontal reinforced mortar joints, and at vertical steel reinforcing and at locations indicated. Bend across expansion joints and extend at least 300 mm over joint reinforcement.

.5 Install glass unit spacers to manufacturer's recommendations.

.6 Set glass units with full bond mortar joints. Furrowing not permitted. Remove excess mortar.

.7 Place units to maintain uniform joint width of 6 mm.

.8 Install unit masonry to avoid contact of glass units with metal accessories or frames.

.9 Isolate panel from adjacent construction on sides and top with expansion strips concealed within perimeter trim. Keep expansion joint voids clear of mortar.

.10 Shore assembly until mortar will maintain panel in position without movement.

.11 Joint reinforcement:
- .1 Install reinforcement in accordance with NBC as follows.
- .2 Install horizontal reinforcement:
  - .1 Above first course.
  - .2 Below top course.
  - .3 To glass unit manufacturer's recommendations but not less than 610 mm centres for 98 mm thick units and 406 mm centres for 79 mm thick units as specified for glass units in rated fire separations.
  - .4 Lap joints 150 mm.
- .3 Provide horizontal joint reinforcement at first course above and below openings within glass unit panel.
- .4 Reinforce free standing ends or free standing top of glass unit panels as indicated.
- .5 Install reinforcement continuously from end to end of panels without bridging expansion joints. Lap minimum 150 mm.
- .6 Embed reinforcement between two layer application of mortar bed.

.12 Rated fire separations:
- .1 Install glass units and accessories to NFPA 80 requirements, and as specified.
- .2 Install joint reinforcement every horizontal row of glass units.
- .3 Fill cavity at sides of and above glass unit panels with mineral wool.

3.4 Construction

.1 Joints.
- .1 Tool joints to concave profile, exposing shoulders of glass units.
- .2 Rake out mortar joints to depth equal to joint width and not less than 13 mm, to receive pointing mortar.
- .3 Rake out mortar joints to half of joint width but not less than 5 mm depth, to receive joint sealant.

.2 Application of pointing mortar.
- .1 Neatly tool surface to a concave profile. Expose shoulders of glass units.
- .2 Remove excess mortar.

.3 Application of Sealant.
.1 Install sealant in accordance with Section 07900 - Joint Sealers.
.2 Form surfaces of sealant smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Tool surface to a slight concave profile. Edges of joints to expose shoulders of glass units.
.3 Remove excess sealant.

3.5 Site Tolerances

.1 Variation from specified joint width: plus 2 mm and minimum 0 mm.

.2 Maximum variation from plane of unit to adjacent unit: 1 mm.

.3 Maximum variation from flat plane: 3 mm in 3 m, non-cumulative.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 07272 - Air Barriers.

.2 Section 09250 - Gypsum Board.

1.2 References

SPEC NOTE: Edit 1.2 to suit standards specified in project specification.

.1 ASTM A446M-91, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical Quality).

.2 ASTM A526M-90, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

.3 ASTM A591M-89, Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.

.4 ASTM A792-89, Specification for Steel Sheet, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process, General Requirements.

.5 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 CSA W47.1-92, Certification of Companies for Fusion Welding of Steel Structures.

.7 CSA W55.3-1965, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

.8 CSA-W59-M1989, Welded Steel Construction (Metal Arc Welding).

.9 CAN/CSA-S136-M89, Cold Formed Steel Structural Members.

.10 CAN/CGSB-1.181-92, Ready-Mixed Organic Zinc-Rich Coating.

.11 Canadian Sheet Steel Building Institute CSSBI 50M-1987, Lightweight Steel Framing Manual.

1.3 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate design loads, member sizes, materials, design thickness exclusive of coatings, coating specifications, connection and bracing details, screw sizes and spacing, and anchors.

.3 Indicate locations, dimensions, openings and requirements of related work.

.4 Indicate welds by welding symbols as defined in CSA W59.

1.4 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit samples of framing components and fasteners to Engineer.

PART 2 - PRODUCTS

2.1 Materials

.1 Steel: to CAN/CSA-S136, fabricated from ASTM A446M, Grade A to D steel.

.2 Zinc coated steel sheet: commercial quality to ASTM A526, with Z275 designation zinc coating.

.3 Aluminum-zinc alloy coated steel sheet: to ASTM A792, commercial quality, grade 33 with AZ150 coating, regular spangle surface, chemically treated for unpainted finish.

.4 Electrolytic zinc coated, chromate treated, steel sheet: to ASTM A591, commercial quality with proprietary coating comprised of 31.1 g/mzinc total mass both sides, unpainted finish.

.5 Welding materials: to CSA W59 and certified by Canadian Welding Bureau.

.6 Screws: pan head, self-drilling, self-tapping sheet metal screws, corrosion protected to minimum requirements of CSSBI.

.7 Anchors: concrete expansion anchors or other suitable drilled type fasteners.

.8 Bolts, nuts, washers: hot dipped galvanized to CAN/CSA-G164, 380 g/mzinc coating.

.9 Touch up primer: zinc rich, to CGSB 1-GP-181M.

2.2 Steel Stud Designations

.1 Colour code steel studs in accordance with CSSBI 50M.

2.3 Metal Framing

.1 Steel studs: to CAN/CSA S-136, fabricated from zinc coated steel, depth as indicated. Minimum steel thickness of 1.52 mm or as approved by engineer.

.2 Stud tracks: fabricated from same material and finish as steel studs, depth to suit.
.1 Bottom track: single piece.
.2 Top track: two piece telescoping.
.3 Separator: neoprene, sized to suit.

.3 Bridging: fabricated from same material and finish as studs, 38 x 12 x 1.22 mm minimum thickness.

.4 Angle clips: fabricated from same material and finish as studs, 38 x 38 mm x depth of steel stud, 1.22 mm minimum thickness.

.5 Tension straps and accessories: as recommended by manufacturer.

2.4 Source Quality Control

.1 Prior to commencement of work, submit:
.1 2 certified copies of mill reports covering material properties.

PART 3 - EXECUTION

3.1 General

.1 Do welding in accordance with CSA W59.

.2 Companies to be certified under Division 1 or 2.1 of CSA W47.1 for fusion welding of steel structures and/or CSA W55.3 for resistance welding of structural components.

.3 Do work in accordance with CSSBI 50M.

3.2 Erection

.1 Erect components to requirements of reviewed shop drawings.

.2 Anchor tracks securely to structure at 800 mm oc maximum, unless lesser spacing prescribed on shop drawings.

.3 Erect studs plumb, aligned and securely attached with 2 screws minimum, or welded in accordance with manufacturer's recommendations.

.4 Seat studs into bottom tracks and two-piece telescoping top track.

.5 Install 50.0 mm minimum telescoping track at top of walls where required to accommodate vertical deflection. Nest top track into deflection channel a minimum of 30.0 mm and a maximum of 40.0 mm. Do not fasten tracks together. Stagger joints and install neoprene separator.

.6 Install studs at not more than 50.0 mm from abutting walls, openings, and each side of corners and terminations with dissimilar materials.

.7 Brace steel studs with horizontal internal bridging. Fasten bridging to steel clips fastened to steel studs with screws or by welding.

.8 Frame openings in stud walls to adequately carry loads by use of additional framing members and bracing as detailed on shop drawings.

.9 Touch up welds with coat of zinc rich primer.

3.3 Erection Tolerances

.1 Plumb: not to exceed 1/500th of member length.

.2 Camber: not to exceed 1/1000th of member length.

.3 Spacing: not more than 3.0 mm from design spacing.

.4 Gap between end of stud and track web: not more than 4.0 mm.

3.4 Cutouts

.1 Maximum size of cutouts for services as follows:

Member Depth	Across Member Depth	Along Member Length (mm)	Centre to Centre Spacing
92	40 max.	105 max.	600 min.
102	40 max.	105 max.	600 min.
152	65 max.	115 max.	600 min.

.2 Limit distance from centerline of last unreinforced cutout to end of member to less than 300 mm.

PART 1 - GENERAL

1.1 Related Sections

.1 Masonry Reinforcing and Connectors: Installation of anchors.

.2 Installation of steel angle lintels.

.3 Structural Steel.

.4 Steel Joists.

.5 Section 05510 Metal Stairs and Ladders.

.6 Section 09911 Interior Painting.

1.2 References

.1 CAN/CSA-G40.21-M92, Structural Quality Steels.

.2 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

1.3 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 Protection

.1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.

.2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

PART 2 - PRODUCTS

2.1 Materials

.1 Steel sections and plates: to CAN/CSA-G40.21, Grade 300W.

.2 Grout: non-shrink, non-metallic, flowable, 24h, MPa 15, pull-out strength 7.9 MPa.

2.2 Fabrication

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 Finishes

.1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m″ to CAN/CSA-G164.

.2 Shop coat primer: to CAN/CGSB-1.40.

.3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

.4 Bituminous paint: to CAN/CGSB-1.108.

2.4 Isolation Coating

.1 Isolate aluminum from following components, by means of bituminous paint:
.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
.2 Concrete, mortar and masonry.
.3 Wood.

2.5 Shop Painting

.1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

.2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7°C.

.3 Clean surfaces to be field welded; do not paint.

2.6 Pipe Railings

.1 Steel pipe: 30 to 43 mm nominal outside diameter, formed to shapes and sizes as indicated.

.2 Galvanize exterior pipe railings after fabrication. Shop coat prime interior railings after fabrication.

2.7 Corner Guards

.1 Steel with 3 anchors each guard.

.2 Prime paint for interior.

2.8 Access Ladders

.1 Stringers: steel to size indicated in drawings.

.2 Steel Rungs: 25 mm diameter, welded to stringers at 300 mm oc.

.3 Brackets: sizes and shapes as indicated, weld to stringers at 200 mm c.c., complete with fixing anchors.

.4 Prime paint for interior.

.5 Galvanize exterior ladders after fabrication.

2.9 Trench Covers and Frames

.1 Steel fabricate from 6 mm thick raised pattern plate set in L55 x 55 x 6 frame. Include anchors at 1200 mm oc for embedding in concrete. Supply trench covers in 1200 mm removable lengths.

.2 Finish: galvanized.

PART 3 - EXECUTION

3.1 Erection

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Engineer such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Provide components for building by other sections in accordance with shop drawings and schedule.

.6 Make field connections with bolts to CAN/CSA-S16.1, or weld.

.7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

.8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.

.9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

3.2 Pipe Railings

.1 Install pipe railings to stairs balconies as indicated on drawings.

.2 Set railing standards in concrete. Grout to fill hole. Trowel surface smooth and flush with adjacent surfaces.

3.3 Corner Guards

.1 Install corner guards in locations as indicated.

3.4 Access Ladders

.1 Install access ladders in locations as indicated.

.2 Erect ladders clear of wall on bracket supports.

3.5 Trench Covers

.1 Install trench covers in locations as indicated.

3.6 Channel frames

.1 Install steel channel frames to openings as indicated.

PART 1 - GENERAL

1.1 Related Sections

.3 Section 05500 Metal Fabrications: Pipe railings.

.4 Section 05500 Metal Fabrications: Steel ladders.

1.2 References

.1 CAN/CSA-G40.21-M92, General Requirements for Rolled or Welded Structural Quality Steel.

.2 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA W59-M1989, Welded Steel Construction (Metal Arc Welding).

.4 The National Association of Architectural Metal Manufactures NAAMM, Metal Stair Manual. Steel Structures Painting Council (SSPC), Systems and Specifications Manual, 1989.

1.3 Design Requirements

.1 Design metal stair, balustrade and landing construction and connections to NBC vertical and horizontal live load requirements.

.2 Detail and fabricate stairs to NAAMM Metal Stairs Manual.

1.4 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate construction details, sizes of steel sections and thickness of steel sheet.

.3 Submit shop drawing bearing stamp of a qualified professional engineer registered in Province of Ontario.

PART 2 - PRODUCTS

2.1 Materials

.1 Steel sections: to CAN/CSA-G40.21, Grade 300W.

.2 Steel plate: to CAN/CSA-G40.21, Grade 260W.

.3 Floor plate: to CAN/CSA-G40.21, Grade 260 W.

.4 Steel pipe: to ASTM A53, standard weight, schedule 40, seamless black.

.5 Steel tubing: to CAN/CSA-G40.21, sizes and dimensions as indicated.

.6 Metal bar grating: to ANSI/NAAMM MBG 531, steel, Type W-19-4, with nosings.

.7 Welding materials: to CSA W59.

.8 Bolts: to ASTM A307.

.9 High strength bolts: to ASTM A325M.

2.2 Fabrication

.1 Fabricate to NAAMM, Metal Stair Manual.

.2 Weld connections where possible, otherwise bolt connections. Countersink exposed fastenings, cut off bolts flush with nuts. Make exposed connections of same material, colour and finish as base material on which they occur.

.3 Accurately form connections with exposed faces flush; mitres and joints tight. Make risers of equal height.

.4 Grind or file exposed welds and steel sections smooth.

.5 Shop fabricate stairs in sections as large and complete as practicable.

2.3 Grating Stairs

.1 Form steel grating treads and landings from metal bar grating to profile indicated and secure to stringers and supports as indicated. Form landings of steel grating and reinforce as required.

.2 Form stringers from MC 310 x 15.8.

2.4 Balustrades

.1 Construct balusters and handrails from steel pipe

.2 Cap and weld exposed ends of balusters and handrails.

.3 Terminate at abutting wall with end flange.

2.5 Bar Balustrades

.1 Construct bar balustrades as follows:
- .1 Balusters: 25 x 25 mm bar.
- .2 Top rail: 30 x 10 mm bar.
- .3 Bottom rail: 25 x 10 mm bar.
- .4 Pickets: 15 mm diam. bar at 100 mm oc.

.2 Fabricate supports for wood balustrade from 38 x 38 mm steel tubing with both ends capped and welded.

.3 Weld balustrades to stringers as indicated.

2.6 Finishes

.1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m″ to CAN/CSA-G164.

.2 Shop coat primer: to CAN/CGSB-1.40.

.3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

2.7 Shop Painting

.1 Clean surfaces in accordance with Steel Structures Painting Council SSPC-SP2.

.2 Apply one coat of shop primer except interior surfaces of pans.

.3 Apply two coats of primer of different colours to parts inaccessible after final assembly.

.4 Use primer as prepared by manufacturer without thinning or adding admixtures. Paint on dry surfaces, free from rust, scale, grease, do not paint when temperature is below 7°C.

.5 Do not paint surfaces to be field welded.

PART 3 - EXECUTION

3.1 Installation of Stairs

.1 Install in accordance with NAAMM, Metal Stair Manual.

.2 Install plumb and true in exact locations, using welded connections wherever possible to provide rigid structure. Provide anchor bolts, bolts and plates for connecting stairs to structure.

.3 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.

.4 Do welding work in accordance with CSA W59 unless specified otherwise.

.5 Touch up shop primer to bolts, welds, and burned or scratched surfaces at completion of erection.

PART 1 – GENERAL

1.1 Scope

.1 Provide materials, labour and equipment for the installation of guardrails as shown on the drawings, described herein, or as necessary to complete the work.

.2 This specification is based on guardrail and balcony divider systems.

1.2 Standards

.1 Aluminum Sections to CSA HA-Series-M.

.2 Design to the latest issues of the following:

- Ontario Building Code
- National Building Code
- CSA Standard CAN3-S157-M Strength Design in Aluminum
- ASTM E985 Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
- ASTM E894 Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings

.3 Welding to CSA Standard W59.2-M-1991.

.4 Certification of companies for fusion welding of aluminium to CSA Standard W47.2-M1987.

.5 Testing to CAN3-S157-M and ASTM E935 Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings.

1.3 Samples

.1 Submit a mock-up sample of the railing section for review prior to fabrication.

.2 Submit paint samples to the Owner and/or Owner's representative for selection of all colour for all prefinished aluminium components.

1.4 Shop Drawings

.1 Submit 5 copies of shop drawings prior to commencement of fabrication, clearly showing:

.2 Shop drawings shall bear the signed stamp of a professional structural engineer registered in Ontario.

.3 Shop drawings shall show cuts, connections, holes, fasteners, anchors, types, sizes, spacing of posts, welds and all relevant dimensions.

1.5 Protection

.1 Before shipment, protect railings and finish surfaces against damage, crate, wrap or package for shipment and storage.

.2 Take all necessary precautions to ensure paint surfaces are not scratched during hoisting and erection.

.3 Maintain squareness of railings during hoisting and installation.

PART 2 – PRODUCTS

2.1 Materials

.1 Aluminum: CSA, Type 6005T6 or Type 6351-T6. Color to be approved by Architect.

.2 Sheet Aluminum: CSA. Type 3000 series.

.3 Fasteners, anchors: Stainless Steel Type 304.

.4 6 mm tempered glass to conform to CAN/CGSB-12.1-M. Color to be approved by Architect

.5 The top handrail shall be rounded profile. All changes in direction of the top handrail (ie. At corners, returns etc.) shall be equipped with a prefabricated sleeve to splice the sections of the top handrail together. Miter joints of adjacent sections of the handrail will not be accepted.

.6 All components of the guardrails and balcony divider shall be fabricated of similar metal. All associated hardware including shims, anchor bolts, screws, washers, nuts etc. shall be corrosion resistant material.

2.2 Fabrication

.1 Fabricate railings square, plumb, straight and true with all joints neatly and accurately aligned and fastened and protected with sleeves.

.2 Remove burrs from cut sections.

.3 Make punched or drilled holes in components clean and accurately spaced without deformation to components.

.4 Fabrication practices shall follow those for steel, as in CSA-CAN3-S16.1-M except as otherwise modified by CSA-CAN3-S157-M83.

2.3 Finishes

.1 Finish all aluminum components by polyester electrostatic powder coating.

.2 Petreat all metal components as recommended by coating manufacturer and apply coating in strict accordance with manufacture's printed directions.

.3 Ensure appearance is visibly free from flow lines, streaks, sags, and blisters.

PART 3 – EXECUTION

3.1 Installation

.1 Give at least three (3) days notice to the owner before starting work onsite.

.2 Conform to all the latest Ministry of labour, Occupational Health and Safety Act requirements during installation of the work.

.3 Take site measurements to ensure that railings are fabricated to fit surrounding construction, around obstructions and projections in place, as shown on the drawings, and to suite service locations.

.4 Install railings plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding construction.

.5 Provide stainless steel anchor bolts, washers, nuts, sleeves, brackets, clips and other items necessary for secure installation of the railings.

3.2 Cleaning and Completion

.1 Repair areas of bare metal, welds and shop applied finishes in field only with the approval of the Consultant.

.2 Clean off dirt on surfaces resulting from installation.

.3 Touch up coating where damaged during transport or installation. Use material approved by the manufacturer.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 07510 - Built-up Bituminous Roofing: Fiberboard cants.

1.2 References

.1 CAN/CSA-A82.27-M91 Gypsum Board.

.2 CSA A123.2-M1979(R1992) Asphalt Coated Roofing Sheets.

.3 CAN/CSA-A247-M86 Insulating Fiberboard.

.4 CSA B111-1974 Wire Nails, spikes and Staples.

.5 CAN/CSA-G164-M92 Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 CAN3-O86-M84 Engineering Design in Wood (Working Stress Design).

.7 CSA O112 Series-M1977 CSA Standards for Wood Adhesives.

.8 CSA O121-M1978 Douglas Fir Plywood.

.9 CAN/CSA-O141-91 Softwood Lumber.

.10 CSA O151-M1978 Canadian Softwood Plywood.

.11 CSA O153-M1980 Popular Plywood.

.12 CAN3-O188.1-M78 Interior Mat-Formed Wood Particleboard.

.13 CAN3-O188.2-M82 Exterior-Bond Mat-Formed Wood Particleboard.

.14 CAN/CSA-O325.0-92 Construction Sheathing.

.15 CAN3-O437.0/O437.1-M85 Waferboard and Strandboard/Test Method for Waferboard and Strandboard.

.16 CAN/CGSB-11.3-M87 Hardboard.

.17 CAN/CGSB-51.20-M87 Thermal Insulation, Plystyrene, Boards and Pipe Covering.

.18 CGSB 51-GP-21M-78 Thermal Insulation, Urethane and Isocyanurate, Unfaced.

.19 CAN/CGSB-51.26-M86 Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.

.20 CAN/CGSB-51.32-M77 Sheathing, Membrane, Breather Type.

.21 CAN/CGSB-51.34-M86 Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.22 CAN/CGSB-71.26-M88 Adhesive for Field-Gluing Plywood to Lumber Framing and Metal Studs.

.23 National Lumber Grades Authority (NLGA) Special Products Standard for Fingerjoined Structural Lumber SPS 1991.

.24 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber 1991.

1.3 Quality Assurance

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood identification: by grade mark in accordance with applicable CSA standards.

PART 2 - PRODUCTS

2.1 Lumber Material

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
.1 CAN/CSA-O141.
.2 NLGA Standard Grading Rules for Canadian Lumber.

.2 Glued end-jointed (finger-jointed) lumber is not acceptable NLGA Special Products Standard are acceptable.

.3 Framing and board lumber: in accordance with NBC.

.4 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers:
.1 S2S is acceptable.
.2 Board sizes: "Standard" or better grade.
.3 Dimension sizes: "Standard" light framing or better grade.
.4 Post and timbers sizes: "Standard" or better grade.

2.2 Panel Materials

.1 Construction sheathing: to CAN/CSA-O325.0.

.2 Douglas fir plywood (DFP): to CSA O121, standard construction.

.3 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.4 Poplar plywood (PP): to CSA O153, standard construction.

.5 Interior mat-formed wood particleboard: to CAN3-O188.1.

.6 Waferboard: to CAN3-O188.2.

.7 Mat-formed structural panelboards (waferboard and strandboard): to CAN3-O437.0.

.8 Hardboard: to CAN/CGSB-11.3.

.9 Insulating fiberboard sheathing: to CAN/CSA-A247.

.10 Glass fibre board sheathing: non-structural, rigid, faced, fiberglass, insulating exterior sheathing board.

.11 Urethane sheathing: to CGSB 51-GP-21M, CAN/CGSB-51.26, faced.

.12 Expanded polystyrene sheathing: to CAN/CGSB-51.20.

.13 Gypsum sheathing: to CSA A82.27.

2.3 Accessories

.1 Exterior wall sheathing paper: to CAN/CGSB-51.32 single ply type as indicated.

.2 Polyethylene film: to CAN/CGSB-51.34, Type 6 mil thick.

.3 Roll roofing: to CSA A123.2, Type S.

.4 Air seal: closed cell polyurethane or polyethylene.

.5 Sealants: Type 1.

.6 Subflooring adhesive: to CGSB 71-GP-26M, cartridge loaded.

.7 General purpose adhesive: to CSA O112 Series.

.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.

.12 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal formed to prevent dishing. Bell or cup shapes not acceptable.

.13 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, extruded 6063-T6 aluminum alloy type approved by Engineer.

2.4 Finishes

.1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for.

.2 Stainless steel: use stainless steel.

2.5 Wood Preservative

.1 Surface-applied wood preservative: clear copper napthenate or 5% pentachlorophenol solution, water repellent preservative.

PART 3 - EXECUTION

3.1 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.

.4 Treat all material as indicated:
.1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.
.2 Wood furring for on outside surface of exterior masonry concrete walls.
.3 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

3.2 Installation

.1 Comply with requirements of NBC 1985 Part 9 supplemented by following paragraphs.

.2 Install members true to line, levels and elevations, square and plumb.

.3 Construct continuous members from pieces of longest practical length.

.4 Install spanning members with "crown-edge" up.

.5 Select exposed framing for appearance. Install [lumber] [and] [panel] materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.

.6 Install subflooring with panel end-joints located on solid bearing, staggered at least 800 mm.
.1 In addition to mechanical fasteners, apply subflooring adhesive under panels installed on wood joists. Place continuous adhesive bead in accordance with manufacturer's instructions, single-bead on each joist and double-bead on joists where panel ends butt. When weather conditions are unsuitable for adhesive, use drywall screws for mechanical fasteners.
.2 Use wood screws for mechanical fasteners when weather conditions are unsuitable for subflooring adhesive.

.7 Install wall sheathing in accordance with manufacturer's printed instructions.

.8 Install roof sheathing in accordance with requirements of NBC.

.9 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.

.10 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.

.11 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.12 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.

.13 Install sleepers as indicated.

3.3 Erection

.1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.2 Countersink bolts where necessary to provide clearance for other work.

.3 Use nailing disks for soft sheathing as recommended by sheathing manufacturer.

3.4 Schedules

.1 Roof sheathing:
.1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, T&G edge, 12.7 mm thick.
.2 Waferboard, grade P-sheathing, 12.7 mm thick.
.3 Construction sheathing product: end use mark 1R24.
.4 Mat-formed structural panelboard, Type R-1.

.2 Exterior wall sheathing:
.1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, T&G edge, 15.9 mm thick.
.2 Waferboard, grade P-sheathing, 15.9 mm thick.
.3 Insulating fiberboard, Type II-Sheathing, multiple-ply, surface coated, 25 mm thick.
.4 Glass fibre sheathing, RSI indicated, 38 mm thick.
.5 Expanded polystyrene sheathing, Type II, RSI indicated, shiplapped edges, 40 mm thick.
.6 Gypsum sheathing, panel edge, 12.7 mm thick.
.7 Construction sheathing product: end use mark W24.
.8 Mat-formed structural panelboard, Type R-1.

.3 Subflooring:
- .1 Plywood, DFP or CSP sheathing grade or PP standard sheathing grade, T&G edge, 15.9 mm thick.
- .2 Waferboard, grade P-sheathing, 15.9 mm thick.
- .3 Construction sheathing product: end use mark 1F24.
- .4 Mat-formed structural panelboard, Type R-1.

.4 Underlay:
- .1 Plywood, DFP or CSP sheathing grade, or PP standard sheathing grade, square edge 12.7 mm thick.
- .2 Waferboard, grade P-sheathing, 12.7 mm thick.
- .3 Hardboard, 12.7 mm thick.
- .4 Particleboard, 12.7 mm thick.
- .5 Construction sheathing product: end use mark 1F24.
- .6 Mat-formed structural panelboard, Type R-1.

.5 Electrical equipment mounting boards:
- .1 Plywood, DFP or CSP sheathing grade, or PP standard sheathing grade, square edge 19 mm thick.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 06666 Plastic Laminates: Laminated plastic work.

.2 Section 06400 Architectural Woodwork: Architectural woodwork.

.3 Section 08715 Cabinet and Miscellaneous Hardware: Supply of finishing hardware.

.4 Section 09911 Interior Painting: Painting and finishing.

1.2 References

.1 CSA B111-1974 Wire Nails, Spikes and Staples.

.2 CAN/CSA-G164-M92 Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA O115-M1982 Hardwood and Decorative Plywood.

.4 CSA O121-M1978 Douglas Fir Plywood.

.5 CAN/CSA O141-91 Softwood Lumber.

.6 CSA O151-M1978 Canadian Softwood Plywood.

.7 CSA O153-M1980 Poplar Plywood.

.8 CAN3-O188.1-M78 Interior Mat-Formed Wood Particleboard.

.9 CAN4-S104-M80(R1985) Fire Tests of Door Assemblies.

.10 CAN4-S105-M85 Fire Door Frames.

.11 CAN/CGSB-11.3-M87 Hardboard.

.12 ANSI A208.1-1989 Particleboard, Matformed Wood.

.13 AWMAC Quality Standards for Architectural Woodwork 1991.

.14 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber 1987.

.15 National Hardwood Lumber Association (NHLA) Rules for the Measurement and Inspection of Hardwood and Cypress January 1986.

1.3 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

1.4 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate details of construction, profiles, jointing, fastening and other related details.

.3 Indicate all materials, thicknesses, finishes and hardware.

1.5 Requirements of Regulatory Agencies

.1 Wood fire rated frames and panels: listed and labelled by an organization accredited by Standards Council of Canada in conformance with CAN4 S104M and CAN4 S105M for ratings specified or indicated.

1.6 Product Delivery, Storage, and Handling

.1 Protect materials against dampness during and after delivery.

.2 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

PART 2 - PRODUCTS

2.1 Lumber Material

.1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
.1 CAN/CSA O141.
.2 NLGA Standard Grading Rules for Canadian Lumber.
.3 AWMAC premium grade, moisture content as specified.

.2 Machine stress-rated lumber is acceptable for all purposes.

.3 Hardwood lumber: moisture content in accordance with following standards:
.1 National Hardwood Lumber Association (NHLA).
.2 AWMAC premium grade, moisture content as specified.

2.2 Panel Material

.1 Douglas fir plywood (DFP): to CSA O121, standard construction.

.2 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.3 Hardwood plywood: to CSA O115.

.4 Poplar plywood (PP): to CSA O153, standard construction.

.5 Interior mat-formed wood particleboard: to CAN3-O188.1.

.6 Hardboard: to CAN/CGSB-11.3.

.7 Medium density fibreboard (MDF): to ANSI A208.2, density 769 kg/m≥.

.8 Melamine overlaid panelboards:
- .1 Melamine overlay, heat and pressure laminated with phenolic resin to 12.7 mm thick particleboard.
- .2 Overlay bonded to both faces where exposed two sides, and when panel material require surface on one side only, reverse side to be overlaid with a plain (buff) balancing sheet.
- .3 Furniture finish: wood grain pattern Consultant.
- .4 Edge finishing: matching melamine and polyester overlay edge strip with self-adhesive edge filler to provide a smooth surface for paint finish.

2.3 Accessories

.1 Nails and staples: to CSA B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber; plain finish elsewhere.

.2 Wood screws: to CSA B35.4, type and size to suit application.

.3 Splines: wood.

.4 Adhesive: recommended by manufacturer.

PART 3 - EXECUTION

3.1 Installation

.1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

.2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.

.3 Form joints to minimize the effects of shrinkage.

3.2 Construction

.1 Fastening.
- .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.

.2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.
.4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.2 Standing and running trim.
.1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.
.2 Fit backs of baseboards and casing snugly to wall surfaces to minimize cracks at junction of base and casing with walls.
.3 Make joints in baseboard, where necessary using a 45scarfe type joint.
.4 Install door and window trim in single lengths without splicing.

.3 Interior and exterior frames.
.1 Set frames with plumb sides and level heads and sills and secure.

.4 Panelling.
.1 Secure panelling and perimeter trim using adhesive recommended for purpose by manufacturer. Fill nail holes caused by temporary fixing with filler matching wood in colour.
.2 Secure panelling and perimeter trim using concealed fasteners.
.3 Secure panelling and perimeter trim using counter sunk screws plugged with matching wood plugs.

.5 Stairs.
.1 Install stairs to location and details as indicated.

.6 Handrails, wallrails and bumper rails.
.1 Make joints hair line, dowelled and glued.
.2 Support brackets will be provided under Section 05500 for installation under this Section.
.3 Install brackets at ends and at maximum at intermediate spacings recommended by Manufacurer.
.4 Install metal backing plates between studs at bracket locations to ensure proper support for brackets and bolts or self-tapping screws.
.5 Secure using counter sunk screws plugged with matching wood plugs.

.7 Shelving.
.1 Install shelving on edgers.

.8 Hardware.
.1 Install door numbers, door signs, coat hooks, closet rod brackets, baluster screws, handrail brackets and valance brackets.

3.3 Schedules

.1 Standing and running trim.
- .1 Exterior:
  - .1 Grade.
  - .2 Solid stock.
- .2 Interior:
  - .1 Grade.
  - .2 Solid stock.
  - .3 Veneered stock: veneer, grade, cut.

.2 Exterior frames. .
- .1 Grade.
- .2 Frames to be solid wood.
- .3 Construction: AWMAC Design Detail Sheet as detailed.

.3 Interior frames.
- .1 Grade.
- .2 Frames to be solid wood.
- .3 Construction:
  - .1 Profile: AWMAC Design Detail Sheet, Type as detailed.
  - .2 Corner: AWMAC Design Detail Sheet as detailed.

.4 Fire rated frames.
- .1 Grade.
- .2 Frames to be solid wood.
- .3 Construction:
  - .1 Profile: AWMAC Design Detail Sheet, Type as detailed.
  - .2 Corner: AWMAC Design Detail Type as detailed.
- .4 Fire rating: 20 min., 45 min or 1.5 hr

.5 Flush panelling-veneer.
- .1 Hardwood plywood:
  - .1 Thickness: 6 mm.
  - .2 Number of plies.
  - .3 Face veneer: species, grade, cut.
  - .4 Back veneer: species, grade, cut.
  - .5 Core.
  - .6 Bond: Type II.
  - .7 Sanding: touch sanding.
  - .8 Grain direction vertical.
- .2 Panel face assembly: running match.
- .3 Matching of adjacent panels: warehouse matched sets.
- .4 Flitch selection: flitches to be selected by Consultant from sample flitches.
- .5 Labelling: classified as to surface burning characteristics as follows:
  - .1 Flame spread: 150
  - .2 Smoke developed: 300.
  - .3 Fuel contributed.

.6 Stile and rail panelling.
- .1 Grade.
- .2 Solid wood.
- .3 Hardwood plywood:
  - .1 Number of plies.
  - .2 Face veneer: species, grade, cut.
  - .3 Back veneer: species, grade, cut.
  - .4 Core.
  - .5 Bond: Type II.
  - .6 Sanding: no sanding.
  - .7 Grain direction vertical.
- .4 Type of moulding: applied.
- .5 Type of panel: flat.

.7 Stairwork and handrails.
- .1 Treads and nosings: species, grade.
- .2 Risers: species, grade.
- .3 Stringers: species, grade.
- .4 Skirts: species, grade.
- .5 Balusters: species, grade.
- .6 Handrail: species, grade.
- .7 Newel posts: species, grade.

.8 Wallrails and bumper rails.
- .1 Species, grade veneer stock, grain direction vertical.

.9 Shelving.
- .1 Softwood and popular plywood DFP or CSP or PP finished grade, square] edge, 19 mm thick.
- .2 Hardwood plywood:
  - .1 Thickness: 19 mm.
  - .2 Number of plies.
  - .3 Face veneer: species, grade, cut.
  - .4 Back veneer: species, grade, cut.
  - .5 Core.
  - .6 Bond: Type II.
  - .7 Sanding: touch sanding.
  - .8 Grain direction vertical.
- .3 Particleboard, grade 19 mm thick.
- .4 Solid wood: species, grade, 19 mm thick.
- .5 Melamine.
- .6 Edge banding: provide 10 mm thick solid matching wood strip on plywood edges 12 mm or thicker, exposed in final assembly. Strips same width as plywood.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 06666 - Plastic Laminates.

.2 Section 07900 - Joint Sealers.

1.2 References

.1 CAN3-A172-M79 High Pressure Paper Base, Decorative Laminates.

.2 CSA B111-1974 Wire Nails, Spikes and Staples.

.3 CSA O115-M1982 Hardwood and Decorative Plywood.

.4 CSA O121-M1978 Douglas Fir Plywood.

.5 CAN/CSA O141-91 Softwood Lumber.

.6 CSA O151-M1978 Canadian Softwood Plywood.

.7 CSA O153-M1980 Poplar Plywood.

.8 CAN3-O188.1-M78 Interior Mat-Formed Wood Particleboard.

.9 CAN/CGSB-11.3-M87 Hardboard.

.10 ANSI A208.2-1986 Medium Density Fiberboard for Interior Use.

.11 AWMAC Quality Standards for Architectural Woodwork 1984.

.12 National Lumber Grades Authority (NLGA) Standard Grading Rules for Canadian Lumber 1991.

.13 National Hardwood Lumber Association (NHLA) Rules for the Measurement and Inspection of Hardwood and Cypress January 1986.

1.3 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate details of construction, profiles, jointing, fastening and other related details.
.1 Scale: profiles full size, details 1/2 full size.

.3 Indicate all materials, thicknesses, finishes and hardware.

.4 Indicate locations of all service outlets in casework, typical and special installation conditions, and all connections, attachments, anchorage and location of exposed fastenings.

1.4 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit duplicate samples.

.3 Submit duplicate colour samples of laminated plastic for colour selection.

.4 Submit duplicate samples of laminated plastic joints, edging, cutouts and postformed profiles.

1.5 Mock-ups

.1 Construct mock-ups in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Shop prepare one base cabinet unit wall cabinet counter top shelving unit complete with hardware and shop applied finishes, and install on project at designated location.

.3 Allow 24 hours for inspection of mock-up by Consultant before proceeding with this work.

.4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.6 Delivery, Storage, and Handling

.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.

PART 2 - PRODUCTS

2.1 Materials

.1 Softwood lumber: unless specified otherwise, S4S, moisture content 15% or less in accordance with following standards:
- .1 CAN/CSA O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.
- .3 AWMAC premium grade, moisture content as specified.

.2 Machine stress-rated lumber is acceptable for all purposes.

.3 Hardwood lumber: moisture content in accordance with following standards:
- .1 National Hardwood Lumber Association (NHLA).
- .2 AWMAC premium grade, moisture content as specified.

.4 Douglas fir plywood (DFP): to CSA O121, standard construction.

.5 Canadian softwood plywood (CSP): to CSA O151, standard construction.

.6 Hardwood plywood: to CSA O115.

.7 Poplar plywood (PP): to CSA O153, standard construction.

.8 Interior mat-formed wood particleboard: to CAN3-0188.1.

.9 Birch plywood: to AWMAC Paint Grade.

.10 Hardboard: to CAN/CGSB-11.3.

.11 Medium density fibreboard (MDF): to ANSI A208.2, density 769 kg/m≥.

.12 Laminated plastic: to CAN3-A172.

.13 Melamine.

.14 Nails and staples: to CSA B111.

.15 Wood screws: type and size to suit application.

.16 Splines: wood.

.17 Sealant: Type 5.

2.2 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 is acceptable.
  - .2 Board sizes: "Standard" or better grade.
  - .3 Dimension sizes: "Standard" light framing or better grade.
- .3 Framing species, NLGA NHLA grade.
- .4 Case bodies (ends, divisions and bottoms).
  - .1 Softwood and poplar plywood DFP or CSP or PP grade, square edge, 15.9 mm thick.
  - .2 Hardwood plywood:
    - .1 Thickness: 15.9 mm.
    - .2 Number of plies.
    - .3 Face veneer: species, grade, cut.
    - .4 Back veneer: species, grade, cut.
    - .5 Core.
    - .6 Bond: Type II.
    - .7 Sanding: touch sanding.
    - .8 Grain direction vertical.
  - .3 Particle board, grade.
  - .4 Solid wood: species, grade.
- .5 Backs.
  - .1 Softwood and poplar plywood DFP or CSP or PP grade, square edge, 15.9 mm thick.
  - .2 Hardwood plywood:
    - .1 Thickness: 15.9 mm.
    - .2 Number of plies.

.3 Face veneer: species, grade, cut.
.4 Back veneer: species, grade, cut.
.5 Core.
.6 Bond: Type II.
.7 Sanding: touch sanding.
.8 Grain direction vertical.
.3 Particleboard, grade 15.9 mm thick.
.4 Waferboard, grade P-15.9 mm thick.
.5 Hardboard, Type 15.9 mm thick.
.6 Fibreboard, 15.9 mm thick.
.7 Solid wood: species, grade.

.6 Shelving.
.1 Softwood and poplar plywood DFP or CSP or PP grade, square edge.
.2 Hardwood plywood:
.1 Thickness.
.2 Number of plies.
.3 Face veneer: species, grade, cut.
.4 Back veneer: species, grade, cut.
.5 Core.
.6 Bond: Type II.
.7 Sanding: touch sanding.
.8 Grain direction.
.3 Particle board, grade.
.4 Solid wood: species, grade.
.5 Edge banding: provide 10 mm thick solid matching wood strip on plywood edges 12 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 grade, square edge.
.2 Hardwood plywood:
.1 Thickness.
.2 Number of plies.
.3 Face veneer: species, grade, cut.
.4 Back veneer: species, grade, cut.
.5 Core.
.6 Bond: Type II.
.7 Sanding: touch sanding.
.8 Grain direction.
.3 Fibreboard.
.4 Solid wood: species, grade.
.3 Bottoms.
.1 Softwood and poplar plywood DFP or CSP or PP grade, square edge.
.2 Hardwood plywood:
.1 Thickness.
.2 Number of plies.
.3 Face veneer: species, grade, cut.
.4 Back veneer: species, grade, cut.
.5 Core.
.6 Bond: Type II.

.7 Sanding: touch sanding.
.8 Grain direction.
.3 Hardboard, Type.
.4 Solid wood: species, grade.

.4 Fronts.
.1 Softwood and poplar plywood DFP or CSP or PP grade, square edge.
.2 Hardwood plywood:
.1 Thickness.
.2 Number of plies.
.3 Face veneer: species, grade, cut.
.4 Back veneer: species, grade, cut.
.5 Core.
.6 Bond: Type II.
.7 Sanding: touch sanding.
.8 Grain direction.
.3 Particleboard, grade.
.4 Solid wood: species, grade.

.3 Casework Doors
.1 Fabricate doors to AWMAC premium grade supplemented as follows:
.2 Softwood and poplar plywood DFP or CSP or PP grade, square edge.
.3 Hardwood plywood:
.1 Thickness.
.2 Number of plies.
.3 Face veneer: species, grade, cut.
.4 Back veneer: species, grade, cut.
.5 Core.
.6 Bond: Type II.
.7 Sanding: touch sanding.
.8 Grain direction.
.4 Particleboard, grade.
.5 Hardboard, Type.
.6 Solid wood: species, grade.

2.3 Fabrication

.1 Set nails and countersink screws, apply plain 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.

2.4 Finishing

.1 Paint finish.

.2 Stain Finish

PART 3 - EXECUTION

3.1 Installation

.1 Do architectural woodwork to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

.2 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.

.3 Fasten and anchor millwork securely. Provide 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.

.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 directions.

3.2 Cleaning

.1 Clean millwork and cabinet work inside cupboards and drawers and outside surfaces.

3.3 Protection

.1 Protect millwork and cabinet work from damage until final inspection.

PART 1 - GENERAL

1.1 Related Section

.1 Section 06200 Finish Carpentry.

.2 Section 06400 Architectural Woodwork: Cabinet and base units.

1.2 References

.1 CAN3-A172-M79 High Pressure, Paper Base, Decorative Laminates.

.2 CSA O112.4-M1977 Polyvinyl Adhesives for Wood.

.3 CSA O112.5-M1977 Urea Resin Adhesives for Wood (Room- and High-Temperature Curing).

.4 CSA O112.7-M1977 Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room- and Intermediate-Temperature Curing).

.5 CSA O121-M1978 Douglas Fir Plywood.

.6 CSA O151-M1978 Canadian Softwood Plywood.

.7 CSA O153-M1980 Poplar Plywood.

.8 CAN3-O188.1-M78 Interior Mat-Formed Wood Particle Board.

.9 CAN/CGSB-71.20-M88 Adhesive, Contact, Brushable.

1.3 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit duplicate samples of joints, edging, cutouts and postformed profiles.

1.4 Closeout Submittals

.1 Provide maintenance data for laminate work for incorporation into manual specified in Section 01700 - Contract Closeout.

1.5 Storage and Protection

.1 Maintain relative humidity between 25 and 60% at 22° C during storage and installation.

PART 2 - PRODUCTS

2.1 Materials

.1 Laminated plastic for flatwork: to CAN3-A172, Grade GP Type HD, based on solid colour range with gloss and satin finish.

.2 Laminated plastic for postforming work: to CAN3-A172, Grade PF, Type HD based on solid colour range with gloss finish.

.3 Laminated plastic backing sheet: Grade BK, Type S not less than 0.5 mm thick or same thickness and colour as face laminate.

.4 Laminated plastic liner sheet: Grade GP, Type HD, whitecolour.

.5 Plywood core: to CSA O121 solid two sides, Grade 19 mm thick.

.6 Particleboard core: to CAN3-O188.1, Grade, sanded faces, of thickness indicated.

.7 Laminated plastic adhesive: contact adhesive to CAN/CGSB-71.20.

.8 Sealer: water resistant sealer or glue acceptable to laminate manufacturer.

.9 Sealants: Type 5.

.10 Draw bolts and splines: as recommended by fabricator.

2.2 Fabrication

.1 Comply with CAN3-A172, Appendix 'A'.

.2 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.3 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.4 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 2400 mm. Keep joints 600 mm from sink cutouts.

.5 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.

.6 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.

.7 Apply laminate backing sheet to reverse side of core of plastic laminate work.

.8 Apply laminated plastic liner sheet where indicated.

PART 3 - EXECUTION

3.1 Installation

.1 Install work plumb, true and square, neatly scribed to adjoining surfaces.

.2 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.

.3 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm oc, 75 mm from edge. Make flush hairline joints.

.4 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.

.5 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.

.6 Site apply laminated plastic to units as indicated. Adhere laminated plastic over entire surface. Make corners with hairline joints. Use full sized laminate sheets. Make joints only where approved. Slightly bevel arises.

.7 For site application, offset joints in plastic laminate facing from joints in core.

3.2 Protection

.1 Cover finished laminated wood veneered surfaces with heavy kraft paper or put in cartons during shipment. Protect installed laminated surfaces by approved means. Do not remove until immediately before final inspection.

PART 1 – GENERAL

1.1 Related Work	.1.	Section 03300: Cast-In-Place Concrete
1.2 Submittals	.1	Submit laboratory tests or data that validate product compliance with performance criteria specified.
1.3 Quality Assurance	.1	Manufacturer qualifications: Company regularly engaged in manufacturing and marketing of products specified in this section.
	.2	Contractor qualifications: Qualified to perform work specified by reason of experience or training provided by product manufacturer.
1.4 Delivery, Storage, and Handling	.1	Deliver products in original factory packaging bearing identification of product, manufacturer, batch number, and expiration date as applicable. Provide Material Safety Data Sheets for each product.
	.2	Store products in location protected from dampness, freezing, damage, construction activity, precipitation and direct sunlight in strict accordance with manufacturer's recommendations.
	.3	Handle all products with appropriate precautions and care as stated on Material Safety Data Sheet.
	.4	Condition products to 21 degrees C plus or minus 5 degrees for use in accordance with manufacturer's recommendations.
1.5 Project Conditions	.1	Do not use products under conditions of precipitation or freezing weather. Do not apply material at temperatures below 4 or above 32 degrees C. Use appropriate measures for protection and supplementary heating to ensure proper curing conditions in accordance with manufacturer's recommendations if application during inclement weather occurs.
	.2	Protect all adjacent work from contamination due to mixing, handling, and application of polymer modified product.

PART 2 – PRODUCTS

2.1 Performance Criteria

.1 Properties of mixed cementitious waterproofing material:
1. Working time: 15 - 20 minutes at 70 degrees F
2. Color: Concrete gray or white

.2 Properties of cured cementitious waterproofing material:

1.	Compressive Strength:	ASTM C109	
		7 days:	4000 psi
		28 days:	6000 psi
2.	Tensile Strength:	ASTM C190	
		7 days:	300 psi
		28 days:	350 psi
3.	Flexural Strength:	ASTM C348	
		7 days:	600 psi
		28 days:	750 psi
4.	Tensile Adhesion:	1 day:	100 psi
1.	Hydrostatic Pressure Resistance:	Positive:	200 foot head
		Negative:	100 foot head

2.2 Materials

.1 SONOBLOCK, two component, polymer-modified cementitious waterproofing by Sonoguard
1. Contain blend of selected Portland cements, specially graded aggregates, water-reducing agents, admixtures for control of set time and shrinkage to produce waterproofing mortar suitable for vertical or overhead application below, on, or above grade levels.
2. Be breathable and resist positive and negative hydrostatic pressure.

.2 Permaquick Super 20 Slurry by Permaquik Corporation

.3 or approved equal

PART 3 – EXECUTION

3.1 Examination

.1 Inspect all areas involved in work to establish extent of work, access, and need for protection of surrounding construction.

.2 Protect all surroundings from polymer modified cementitious waterproofing to include, but not be limited to, windows, roofs, walkways, drives, and landscaping.

3.2 Preparation

.1 Prepare surfaces in accordance with manufacturer's instructions.

3.3 Application .1 Apply coating to manufacturer's standards.

3.4 Curing .1 Curing to manufacturer's standards. Wet cure waterproofing when temperatures are above 29 degrees C, or relative humidity is below 30 percent, or wind speed exceeds 15 mph, when or waterproofing is exposed to direct sunlight for 72 hours after placement.

3.5 Cleaning .1 Clean tools and equipment. Remove cured materials mechanically.

.2 Clean up and properly dispose of all debris remaining on job site related to application.

3.6 Schedule .1 Provide cementitious waterproofing to inside of elevator pit and inside the Storm Water retention tank or as indicated on drawings.

PART 1 - GENERAL

1.1 Related Work

.1 Underslab dampproofing: Section 03300, Cast-in-Place Concrete.

1.2 References

.1 CAN/CGSB-51.34-M86 Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

1.3 Job Mock-Up

.1 Submit mock-ups in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.

.3 Allow 24 h for inspection of mock-up by Consultant before proceeding with vapour barrier work.

PART 2 - PRODUCTS

2.1 Sheet Vapour Barrier

.1 Polyethylene film: to CAN/CGSB-51.34, 6 mil thick.

2.2 Accessories

.1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer], 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.

.2 Sealants: Type 6.

.3 Staples: minimum 6 mm leg.

.4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

PART 3 - EXECUTION

3.1 Installation

.1 Ensure services are installed and inspected prior to installation of retarder.

.2 Install sheet vapour retarder on warm side of insulation prior to installation of gypsum board to form continuous retarder.

.3 Use sheets of largest practical size to minimize joints.

.4 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.2 Exterior Surface Openings

.1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

3.3 Perimeter Seals

.1 Seal perimeter of sheet vapour barrier as follows:
- .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
- .2 Lap sheet over sealant and press into sealant bead.
- .3 Install staples through lapped sheets at sealant bead into wood substrate.
- .4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 Lap Joint Seals

.1 Seal lap joints of sheet vapour barrier as follows:
- .1 Attach first sheet to substrate.
- .2 Apply continuous bead of sealant over solid backing at joint.
- .3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
- .4 Install staples through lapped sheets at sealant bead into wood substrate.
- .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 Electrical Boxes

.1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:
- .1 Install moulded box vapour barrier or Wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.
- .2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

PART 1 - GENERAL

1.1 References

.1 ASTM B117-85 Method of Salt Spray (Fog) Testing.

.2 ASTM C501-84 Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser.

.3 ASTM D323-82 Test Method for Vapor Pressure of Petroleum Products (Reid Method).

.4 ASTM D412-87 Test Methods for Rubber Properties in Tension.

.5 ASTM D573-88 Test Method for Mar Resistance of Plastics.

.6 ASTM D822-86 Recommended Practice for Operating Light-and Water-Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products.

.7 ASTM D903-49(1983) Test Method for Peel or Stripping Strength of Adhesive Bonds.

.8 ASTM D1004-66(1988) Test Method for Initial Tear Resistance of Plastic Film and Sheeting.

.9 ASTM D1149-86 Test Method for Rubber Deterioration - Surface Ozone Cracking in a Chamber (Flat Specimens).

.10 ASTM D2240-86 Test Method for Rubber Property - Durometer Hardness.

.11 ASTM E96-80 Test Methods for Water Vapor Transmission of Materials.

.12 CGSB 37-GP-50M-78 Asphalt, Rubberized, Hot Applied, for Roofing and Waterproofing.

.13 CGSB 37-GP-56M-80 Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.14 CAN/CGSB 37.65-M88 Mastic Asphalt (Hot Process) for Flooring.

1.2 Design Criteria

.1 Design topping to allow for structural movement or deflection of building, and span cracks in substrate surfaces to maximum 1.5 mm wide which may occur after installation of topping.

.2 Design topping for pedestrian and / or vehicular traffic as indicated on drawings.

1.3 Job Mock-up

.1 Construct mock-ups in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Do first 10 m″ or one day's work located as directed by Consultant. Do not proceed further without approval of Consultant.

1.4 Environmental Requirements

.1 Do not install traffic topping when ambient air temperature or substrate temperature is less than 5°C.

.2 Maintain air temperatures and structural base temperature of traffic topping installation area above 5°C for 12 hours before, during and 72 hours after installation.

.3 Provide forced air circulation during curing period for enclosed applications to control dangerous vapour buildup, odours and fumes.

PART 2 - PRODUCTS

2.1 Materials

.1 Liquid applied elastomeric traffic topping to following physical properties:
- .1 Hardness (indentation): to ASTM D2240, Type A durometer, base coat 58, top coat 89.
- .2 Tensile strength: to ASTM D412 Method A, base coat minimum kPa, top coat minimum 1840 to 2040psi.
- .3 Elongation: to ASTM D412 Method A, base coat minimum 595% top coat minimum 305%.
- .4 Adhesion: to ASTM D903
- .5 Moisture vapor transmission: to ASTM E96 procedure B.
- .6 Weathering resistance: to ASTM D822, slight chalking acceptable.
- .7 Salt spray resistance: to ASTM B117
- .8 Abrasion resistance: to ASTM C501, no change in mass.
- .9 Tear resistance: to ASTM D1004, base coat minimum 74 pit, top coat minimum 74 pit.
- .10 Heat resistance: to ASTM D573,
- .11 Ozone resistance: to ASTM D1149, no cracking, slight bleaching acceptable.
- .12 Chemical resistance: to ASTM D323 no effect on finished surface.
- .13 Service temperature range.
- .14 Colour: as selected by Consultant.
- .15 Acceptable material:
  - Sonoguard by Sonneborn
  - Vulkem 350/351 by Mameco International Inc.
  - AutoGard by Neoguard
  - or approved equal

.2 Rubberized asphalt membranes: to CGSB 37-GP-50M.
- .1 Refer to section 07561 Hot Applied Rubberized waterproofing.

.3 Joint and crack sealant: to manufacturer's standard.

.4 Joint and crack membrane: to manufacturer's standard.

.5 Aggregates: manufacturer's standard.

.6 Surface conditioner: to manufacturer's standard.

PART 3 - EXECUTION

3.1 Examination

.1 Examine surfaces to receive traffic topping to ensure they are smooth, dry, and free from conditions that will adversely affect execution, permanence, or quality of work.

.2 Install traffic topping after other work which penetrates membrane has been completed.

3.2 Preparation

.1 Prepare surfaces to receive traffic topping in accordance with manufacturer's instructions.

3.3 Installation

.1 Reinforce joints and cracks greater than 1 mm and less than 3 mm to manufacturer's standard.

.2 Prepare joints as per Manufacture’s standard.

.3 Apply surface conditioner at rate specified by Manufacturer.

.4 Apply mastic asphalt in accordance with CAN/CGSB-37.65 including Appendix A, of minimum 15 mm thickness and with matt surface finish.

.5 Apply topping to manufacturer's recommended thickness.

.6 Flash pipes, conduits and other penetrations to manufacturer's standards.

.7 Incorporate aggregate in topping at rate recommended by manufacturer.

.8 Extend topping up walls and columns as indicated.

3.4 Flood Testing

.1 Plug drains on horizontal surfaces and restrict run-off.

.2 Flood topping with water to depth of 80 mm, allow to stand at least one hour.

.3 If leaks occur repair and retest.

3.5 Temporary Protection

.1 Provide temporary barriers to protect topping membrane during curing period.

.2 Apply temporary protection board to protect topping membrane from construction activity.

PART 1 - GENERAL

1.1 Product data

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Product data: manufacturer's printed product literature, specifications and application instructions for repellent materials.

1.2 Storage and Handling

.1 Protect products from freezing.

1.3 Environmental Conditions

.1 Maintain substrate temperature at water repellent installation area in accordance with water repellent manufacturer's printed instructions.

.2 Apply coating during dry weather. Allow surfaces to dry minimum of 3 days after rainfall or cleaning before applying further coats.

1.4 Protection

.1 Protect plants and vegetation which might be damaged by water repellent coating.

.2 Protect surfaces not intended to have application of water repellent coatings.

PART 2 - PRODUCTS

2.1 Materials

.1 Solvent base coating: colourless, penetrating, silane, alkylakoxy silane.
.1 Acceptable material
.1 Hydrozo 100 by Hydrozo
.2 Penetrating Sealer 40 VOC by Sonneborn
.3 or approved equal

PART 3 - EXECUTION

3.1 Preparation	.1	Prepare and clean substrate surfaces in accordance with water repellent manufacturer's printed instructions.
3.2 Application	.1	Apply water repellent coating using low pressure spraying apparatus in accordance with manufacturer's printed instructions.
3.3 Field Quality Control	.1	After water repellent coating has dried, spray coated surfaces with water to verify coating coverage to satisfaction of Consultant
3.4 Schedules	.1	Provide water repellent coatings for concrete walls and columns in underground parking garage levels to a minimum height of 600 mm above floor as indicated on drawings.

PART 1 - GENERAL

1.1 Certification

.1 Provide 1 copy of Applicator Certification Card completed in accordance with Appendix A, CSA A101, to Consultant, signed by applicator to verify that pneumatically placed loose mineral fiber type insulation has been installed in compliance with requirements stated by manufacturer.

1.2 References

.1 CSA A101-M1983 Thermal Insulation, Mineral Fiber, for Buildings.

.2 CGSB 51-GP-27M-79 Thermal Insulation, Polystyrene Loose Fill.

.3 CGSB 51-GP-60M-79 Thermal Insulation, Cellulose Fiber, Loose Fill.

.4 CAN4-S604-M82 Factory-Built, Type A Chimneys.

.5 CAN/CGA-B149.1-M86 Natural Gas Installation Code.

.6 CAN/CGA-B149.2-M86 Propane Installation Code.

.7 ASTM C516-80(1985) Specification for Vermiculite Loose Fill Insulation.

.8 ASTM C549-81(1986) Specification for Perlite Loose Fill Insulation.

PART 2 - PRODUCTS

2.1 Materials

.1 Granular insulation: vermiculite to ASTM C516-80, Type II, water repellent treated, for pour application.

.2 Mineral fiber insulation: to CSA A101, Type 4 / 5.
.1 Acceptable material.

.3 Cellulose fiber insulation: to CGSB 51-GP-60M.
.1 Acceptable material.

.4 Polystyrene insulation: to CGSB 51-GP-27M, Type 1 / 2.

PART 3 - EXECUTION

3.1 Inspection

.1 Ensure that wall cavity is not obstructed.

3.2 Loose Fiber Installation

.1 Pneumatically place loose fiber insulation above ceiling between joists to provide minimum thermal resistance value RSI as indicated.

.2 Ensure ceiling, roof areas exposed to outside air are insulated.

.3 Ensure unobstructed air circulation to eave vents.

.4 Install baffles as indicated to prevent insulation from spilling over top of exterior wall and causing blockage of soffit vents, and to prevent displacement of insulation by wind entering vents.

.5 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from side walls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 07160 - Sheet Vapour Barriers: Vapour retarder.

1.2 References

.1 Canadian Standards Association (CSA)
- .1 CSA A101-M1983 Thermal Insulation, Mineral Fiber, for Buildings.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.20-M87 Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .2 CGSB 51-GP-21M-78 Thermal Insulation, Urethane and Isocyanurate, Unfaced.
- .3 CAN/CGSB-51.25-M87 Thermal Insulation, Phenolic, Faced.
- .4 CAN/CGSB-51.26-M86 Thermal Insulation, Urethane and Isocyanurate, Boards, Faced.
- .5 CAN/CGSB-51.38-92, Cellular Glass Thermal Insulation.
- .6 CGSB 71-GP-24M-77 Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.

.3 Canadian Gas Association (CGA)
- .1 CAN/CGA-B149.1-M95 Natural Gas Installation Code.
- .2 CAN/CGA-B149.2-M91 Propane Installation Code.

.4 Underwriters Laboratories of Canada (ULC)
- .1 CAN4-S604-M82 Factory-Built, Type A Chimneys.

.5 American Society for Testing and Materials (ASTM)
- .1 ASTM E 96-96 Test Methods for Water Vapor Transmission of Materials.

PART 2 - PRODUCTS

2.1 Insulation

.1 Expanded polystyrene: to CAN/CGSB-51.20, Type 2 & 3, thickness as indicated, ship lapped vented edges. Only polystyrene insulation's listed on CGSB Qualified Products List (41 GP Series) are acceptable for use on this project. Acceptable materials include:
- .1 Styrofoam Brand Cavitymate by the Dow Chemical Company
- .2 FOAMULAR® Extruded Polystyrene Rigid Insulation by Owens Corning
- .3 or approved equal

.2 Mineral fiber: to CSA A101, Type 1 density 48 kg/m≥ thickness as indicated.
- .1 Breather membrane for type 2: minimum permeance 300 ng/(Pa.s.m″).

.2 Vapour barrier for type 3: maximum permeance 60 ng/(Pa.s.m″).
.3 Acceptable material Roxul AFB insulation.

.3 Cellular glass: to CAN/CGSB-51.38 thickness as indicated. Only cellular glass insulation's listed on CGSB Qualified Products List are acceptable for use on this project.

.4 Phenolic faced insulation: to CAN/CGSB-51.25, Type1, Facing, Thickness as indicated.
.

2.2 Adhesive

.1 Adhesive (for polystyrene): to CGSB 71-GP-24, compatible with polystyrene insulation.

2.3 Accessories

.1 Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.

PART 3 - EXECUTION

3.1 Workmanship

.1 Install insulation after building substrate materials are dry.

.2 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.

.5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

.6 Offset both vertical and horizontal joints in multiple layer applications.

.7 Do not enclose insulation until it has been inspected and approved by Consultant.

3.2 Examination

.1 Examine substrates and immediately inform Consultant in writing of defects.

.2 Prior to commencement of work ensure:
.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.3 Rigid Insulation Installation

.1 Apply polystyrene mineral fiber insulation board by notched trowel in accordance with manufacturer's recommendations.

.2 Imbed insulation boards into vapor barrier type adhesive, applied as specified, prior to skinning of adhesive.

.3 In addition to adhesive, install mineral fiber insulation boards with insulation clips and disk, 2 per 600 x 1200 mm board minimum, fit boards tight, cut off fastener spindle 3 mm beyond disk.

.4 Leave insulation board joints unbounded over line of expansion and control joints. Bond a continuous 150 mm wide 0.15 mm polyethylene strip over expansion and control joints using compatible adhesive before application of insulation.

3.4 Perimeter Foundation Insulation

.1 Interior application: extend boards vertically below bottom of finish floor slab as indicated, installed on inside face of perimeter foundation walls.

.2 Exterior application: extend boards minimum below finish grade as indicated to top of footing. Install on exterior face of perimeter foundation wall with adhesive.

.3 Under slab application: extend boards in from perimeter foundation wall as indicated. Lay boards on level compacted fill.

.4 Perimeter heating duct application: compact walls of heating duct trench to form solid backing. Attach insulation boards to perimeter foundation wall extending from underside of finish floor to 100 mm below bottom of heating duct. Lay insulation boards in bottom of heating duct trench, extend to 150 mm beyond heating duct 600 mm minimum from inside face of perimeter foundation wall. Secure insulation in place to prevent displacement.

3.5 Cavity Wall Installation

.1 Install polystyrene insulation boards on outer surface of inner wythe of wall cavity over impaling clips.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 07160 Sheet Vapour Barriers: Sheet vapour retarder.

1.2 References

.1 Canadian Standards Association (CSA)
- .1 CSA A101-M1983, Thermal Insulation, Mineral Fiber, for Buildings.
- .2 CSA B111-1974, Wire Nails, Spikes and Staples.

.2 Canadian Gas Association (CGA)
- .1 CAN/CGA-B149.1-M95, Natural Gas Installation Code.
- .2 CAN/CGA-B149.2-M91, Propane Installation Code.

.3 Underwriters Laboratories of Canada (ULC)
- .1 CAN4-S604-M82, Factory-Built, Type A Chimneys.

PART 2 - PRODUCTS

2.1 Insulation

.1 Batt and blanket mineral fiber: to CSA A101, Type 1 as indicated.
- .1 Acceptable material:
  - Roxul AFB mineral wool insulation
  - Owens Corning Fiberglas batt insulation
  - CertaPro™ Commercial Sustainable Insulation® AcoustaTherm™ Batts by CertainTeed Insulation
  - or approved equal

2.2 Accessories

.1 Insulation clips:
- .1 Impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.

.2 Nails: galvanized steel, length to suit insulation plus 25 mm, to CSA B111.

.3 Staples: 12 mm minimum leg.

.4 Tape: as recommended by manufacturer.

PART 3 - EXECUTION

3.1 Insulation Installation

.1 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.2 Install insulation with factory applied vapour barrier facing warm side of building spaces and vapour permeable membrane facing cold side. Lap ends and side flanges of membrane over framing members. Retain in position with staples installed as recommended by manufacturer. Tape seal butt ends and lapped side flanges. Do not tear or cut vapour barrier.

.3 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.

.4 Do not compress insulation to fit into spaces.

.5 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.

.6 Do not enclose insulation until it has been inspected and approved by Consultant.

PART 1 - GENERAL

1.1 Related Work

.1 Vapour retarder: Section 07160 Sheet Vapour Barriers.

1.2 References

.1 CGSB 51-GP-23M-78 Thermal Insulation, Urethane, Spray in Place.

.2 CGSB 51-GP-39M-79 The Installation of Spray Foam-in-Situ Urethane Insulation for Residential Building Construction.

.3 CGSB 51-GP-46MP-80 Manual for: Installers of Spray Urethane Foam Thermal Insulation.

1.3 Test Reports

.1 Submit test reports, verifying qualities of insulation meet or exceed requirements of this specification, in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

1.4 Mock-up

.1 Construct mock-up in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Construct mock-up 10 m″ minimum, of spray in place urethane foam insulation including one inside corner and one outside corner. Mock-up may be part of finished work.

.3 Allow 24 h for inspection of mock-up by Consultant before proceeding with waterproofing work.

1.5 Protection

.1 Ventilate area in accordance with Section 01535 - Temporary Facilities.

.2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

.4 Protect workers as recommended by insulation manufacturer.

.5 Protect adjacent surfaces and equipment from damage by over-spray, fall-out, and dusting of insulation materials.

.6 Dispose of waste foam daily in location designated by Consultant and decontaminate empty drums in accordance with foam manufacturer's instructions.

1.6 Environmental Requirements

.1 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

PART 2 - PRODUCTS

2.1 Materials

.1 Insulation: spray polyurethane to CGSB 51-GP-23M, Class 1.

.2 Primers: in accordance with manufacturers recommendations for surface conditions.

PART 3 - EXECUTION

3.1 Application

.1 Apply insulation to clean surfaces in accordance with CGSB 51-GP-39M CGSB 51-GP-46MP and manufacturer's printed instructions. Use primer where recommended by manufacturer.

.2 Apply sprayed foam insulation in thickness as indicated.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 07272 Air Barriers: Air barriers.

.2 Section 07620 Metal Flashing and Trim: Metal flashing.

.3 Section 07900 Joint Sealers: Sealants.

.4 Section 09250 Gypsum Board: Gypsum board.

1.2 References

.1 CAN/CSA-A5-M88 Portland Cement.

.2 CSA A82.56-M1976 Aggregate for Masonry Mortar.

.3 CAN/CGSB-1.162-M90 Stucco and Masonry Coating, Emulsion Type.

.4 CAN/CGSB-19.24-M90 Multicomponent, Chemical-Curing Sealing Compound.

.5 CAN/CGSB-51.20-M87 Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.6 CAN/ULC-S101-M89 Fire Endurance Tests of Building Construction and Materials.

.7 CAN/ULC-S102-M88 Surface Burning Characteristics of Building Materials and Assemblies.

.8 CAN4-S114-M80(R1985) Determination of Non-Combustibility in Building Materials.

.9 ASTM B117-90 Test Method of Salt Spray (Fog) Testing.

.10 ASTM C67-91 Method of Sampling and Testing Brick and Structural Clay Tile.

.11 ASTM C1002-88 Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.

.12 ASTM D968-81(1991) Test Method for Abrasion Resistance of Organic Coatings by the Falling Abrasive.

.13 ASTM D5034-90 Test Method for Breaking Force and Elongation of Textile Fabrics (Grab Test).

.14 ASTM D5035-90 Test Method for Breaking Force and Elongation of Textile Fabrics (Slip Test).

.15 ASTM E72-80 Method for Conducting Strength Tests of Panels for Building Construction.

.16 ASTM E96-92 Test Methods for Water Vapor Transmission of Materials.

.17 ASTM E695-79(1991) Method for Measuring Relative Resistance of Wall, Floor, and Roof Constructions to Impact Loading.

.18 ASTM G53-91 Practice for Operating Light-and Water-Exposure Apparatus (Fluorescent UV-Condensation Type) for Exposure of Nonmetallic Materials.

1.3 System Description

.1 Exterior insulation and finish system to be a panelized system, mechanically and chemical fastening, single layer, polymer-base ("soft coat").

1.4 Design Requirements

.1 Design panels in accordance with Ontario Building Code with design hourly wind pressure as required.

1.5 Performance Requirements

.1 Installed modified polymer (soft) coat wall system to have following performance properties:

.1 Fire hazard classification of installed system tested to CAN/ULC-S102, flame spread 11, fuel contributed 5, smoke developed 5 and shall remain in place minimum 15 minutes when tested to CAN/ULC-S101.
.2 Abrasion resistance, falling sand method to ASTM D968, no deleterious effects.
.3 Salt spray resistance to ASTM B117, after 300 hours' exposure to 5% salt spray solution - no effects.
.4 Moisture resistance to U.S. Federal test 141A 6201, after 14 days exposure - no deleterious effects.
.5 Accelerated weathering to CAN/CGSB-1.162 ASTM G53, 2000 hours - no effect.
.6 Impact resistant to ASTM E72, only slight dents observed up to 108.465J.
.7 Bond strength to CAN/CGSB-1.162 ASTM D5034 and ASTM D5035.
.8 Permeability to CAN/CGSB-1.162 ASTM E96, 5.93 perms.

.2 Installed modified base (hard) coat wall system to have following performance properties:

.1 Fire hazard classification of installed system tested to OBC 3.1.5.5 for combustible cladding 3.1.4.2 and 3.1.5.11(2) for non-combustible cladding and shall remain in place minimum 15 minutes when tested to CAN/ULC-S101.
.2 Abrasion resistance, falling sand method to ASTM D968, no deleterious effects.
.3 Salt spray resistance to ASTM B117, after 1000 hours exposure to 5% salt spray solution - no effects.

.4 Freeze-thaw resistance: to ASTM C67, 50 cycles of 20 hours of freezing at -9°C and 4 hours of thawing in water at 24°C +/- 6°C, no visible damage, negligible weight gain.
.5 Accelerated weathering: to CAN/CGSB-1.162 ASTM G53, 2000 hours - no effect.
.6 Impact resistant to ASTM E695, 13.6 kg. weight, twelve impacts, pendulum swing from 152 mm to 1800 mm, drop heights at 152 mm increments.
.7 Bond strength: to CAN/CGSB-1.162.
.8 Permeability to CAN/CGSB-1.162 ASTM E96.

1.6 Product Data

.1 Submit product data in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit product data sheets for system materials. Include product characteristics, performance criteria, limitations and colours.

1.7 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate wall layout, details, connections, expansion joints, finish system, installation sequence, including interface with doors, windows, air barriers, vapour retarders and other components.

1.8 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit one 300 x 300 mm sample of each colour of finished wall system prior to fabrication of mock-up.

1.9 Qualifications

.1 Installation of exterior insulation and finish wall system by applicators certified by manufacturers of system used.

.2 Submit certification Consultant prior to commencement of work.

1.10 Mock-ups

.1 Construct mock-up in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Construct mock-up where directed.

.3 Allow 24 hours for inspection of mock-up by Consultant before proceeding with work.

.4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

1.11 Delivery, Storage, and Handling

.1 Deliver and store materials and prefabricated panels in accordance with manufacturer's instructions.

.2 Protect adhesives and base finish materials from freezing.

1.12 Environmental Conditions

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and material safety data sheets acceptable to Labour Canada.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content and temperature for application of both of the base coat and finish coat material including any special conditions governing use.

.5 Consultant will arrange for ventilation system to be operated on maximum outdoor air and exhaust during installation of base and finish coats. Ventilate area of work as directed by Consultant by use of approved portable supply and exhaust fans.

1.13 Warranty

.1 For work of this Section 07240 - Exterior Insulation and Finish System the 12 months warranty period prescribed in subsection GC 32.1 of General Conditions "C".

PART 2 - PRODUCTS

2.1 Materials

.1 Load bearing steel metal studs as indicated.

.2 Sheathing: Section 06100 - Rough Carpentry.

.3 Sheathing screws: to ASTM C1002, Type S, corrosion resistant, 9.5 mm penetration into steel, 38 mm diameter washers.

.4 Substrate Conditioner: water base, clear conditioner/sealer compatible with system materials, recommended by system manufacturer.

.5 Primer: water base, colour white, compatible with system materials, recommended by system manufacturer.

.6 Portland cement: to CAN/CSA-A5, Type 10.

.7 Sand: dry bag.
- .1 For white cement: silica sand, 30-50 mesh.
- .2 For grey cement: mortar sand to CSA A82.56.

.8 Water: potable.

.9 Chemical bonding system: adhesive type compatible with system materials and substrate, recommended by system manufacturer to fully laminate the specified sheathing or insulation to substrate.

.10 Rigid insulation:
- .1 Expanded polystyrene bead board to CAN/CGSB-51.20, type 2, RSI indicated.
- .2 Extruded polystyrene to CAN/CGSB-51.20, type 3, RSI indicated.

.11 Insulation fasteners:
- .1 For masonry and concrete: expansion anchors, electroplated steel nail, 100 mm long, minimum 25 mm penetration into substrate, 38 mm
  washers, nylon sheath.
- .2 For steel: screws to ASTM C1002, Type S, 9.5 mm penetration into steel, 38 mm diameter washers.

.12 Reinforcing mesh: balanced, open weave glass fiber fabric made from twisted multi-end strands, treated, alkali resistant, compatible with chemical bonding system base coat and finish coat.

.13 Base coat:
- .1 Modified polymer, premixed base coat system.
- .2 Modified, cementitious base coat system: Portland cement, silica sand aggregate, polymer base acrylic liquid admixture, 13.2% acrylic to cement ratio, texture and colour as selected by Owner.

.14 Finish coat:
- .1 Modified polymer finish coat system: acrylic resins in dispersion, silica aggregate, integral mineral pigmentation and additives, colour selected by Consultant.
- .2 Modified finish coat system: synthetic stucco, acrylic type, Portland cement, silica sand aggregate, integral mineral pigmentation and additives, colour and exposed aggregate texture finish, selected by Consultant to match sample.

.15 Accessories: vinyl corner beads, casing beads, stop beads and accessories, as recommended by exterior insulated wall system manufacturer to suit system components.

.16 Expansion joints: PVC.

.17 Sealant and sealant primer: compatible with system materials, recommended by system supplier.
.1 Weather seals: multi-component, chemical curing to CAN/CGSB-19.24, Type 2, Class B.

.2 Panel joints: multi-component, chemical curing to CAN/CGSB-19.24, Type 2, Class B.

.18 Joint filler: extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 - 200 kPa, outsized 30 to 50%.

PART 3 - EXECUTION

3.1 Preparation

.1 Ensure environmental and site conditions are suitable for installation of system.

.2 Prepare new surfaces in accordance with manufacturer's written instructions.

.3 Protect adjacent surfaces from damage resulting from work of this section.

.4 Protect finished work at end of each day or on completion of each section of work from water penetration.

.5 Protect completed installation from moisture for 48 hours minimum.

.6 Protect top of [parapet walls, and openings until flashings and trim, are installed.

3.2 Application

.1 Securely adhere insulation in place.

.2 Mechanically fasten insulation in place maximum 300 mm oc vertically and 400 mm oc horizontally, as recommended by exterior insulated wall system manufacturer.

3.3 Installation

.1 Install deep V control joints to divide wall area into maximum 14m″ panels with maximum 5.5 linear meters in any direction] at floor lines at dissimilar substrates at masonry wall joints.

.2 Install shallow V surface mount control joints as shown on drawings.

.3 Install expansion joints at isolation joints in substrate where movement is expected to be greater than 6 mm.

.4 Mix base coat and finish coat to manufacturer's written instructions.

.5 Do not commence coating work until base coat and finish coat are tested and approved by Consultant.

3.4 Construction

.1 Construct and install panels in accordance with shop drawings and manufacturer's instructions.
- .1 Frames: welded, galvanized steel, touch up welds with galvanized primer.
- .2 Sheathing: butt gypsum board joints tight over studs, long dimension perpendicular to studs, align sheathing edge with panel frame edge, mechanically fasten with galvanized or non-ferrous, self drilling, self tapping fasteners.
- .3 Clean sheathing of dust and foreign materials.
- .4 Precut and install insulation on substrate. Install mesh.
- .5 Apply cover coat, colour and texture selected by Consultant.

3.5 Construction: Site

.1 Construct exterior insulated wall system, insulation, mesh, base and cover coats in accordance with manufacturer's written instructions.

.2 Cover coat: uniform in colour and texture, free from defects detrimental to appearance and performance.

PART 1 - GENERAL

1.1 Section Includes

.1 Performance criteria to achieve a continuous building enclosure air seal.

1.2 Related Sections

.1 Section 07120: Below grade waterproofing membrane.

.2 Section 07561: Roofing membrane and vapour retardant.

.3 Section 07900 - Joint Sealers: Sealant materials and installation techniques.

.4 Section 08110: Door frames.

.5 Section 08500 - Aluminum Windows.

.6 Section 09250 - Gypsum Wallboard.

.7 Section 09911 - Interior Painting.

1.3 References

.1 AAMA 501 - Methods of Test for Metal Curtain Walls.

.2 ASTM E283-84 - Test Method For Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.

.3 ASTM E330-84 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

1.4 Requirements

.1 Select and install wall and roof components and assemblies to resist air leakage caused by static air pressure across exterior wall, soffits and roof assemblies, including windows, glass, doors, roof hatches and skylights and other interruptions to integrity of wall and roof systems; to a maximum air leakage rate of L/s.m″ when subjected to a pressure differential of 75 Pa as measured in accordance with ASTM E283 ASTM E330.

.2 Select and install wall and roof components and assemblies to resist air leakage caused by dynamic air pressure across exterior wall, soffits and roof assemblies, including windows, glass, doors, roof hatches and skylights and other interruptions to integrity of wall and roof systems; to a maximum air leakage rate of L/s.m″ when subjected to hourly wind design loads in accordance with NBC, using a 1 in 10 year probability, as measured in accordance with ASTM E283.

	.3	Provide continuity of air seal materials and assemblies in conjunction with materials described in Sections 03300, 07212, 07900.
1.5 Submittals	.1	Manufacturer's Installation Instructions: Indicate preparation, installation requirements and techniques, product storage and handling criteria.
1.6 Shop Drawings	.1	Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.
	.2	Provide drawings of special joint conditions.
1.7 Mock-Up	.1	Construct mock-up in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.
	.2	Locate where directed.
	.3	Mock-up may remain as part of the Work.
	.4	Allow 24 h for inspection of mock-up by Consultant before proceeding with air barrier work.
1.8 Pre- Installation Conference	.1	Convene one week prior to commencing work of this section.
1.9 Sequencing	.1	Sequence work to permit installation of materials in conjunction with related materials and seals.
1.10 Coordination	.1	Coordinate work of this section with all sections referencing this section.
1.11 Warranty	.1	Provide a one year warranty under provisions of CCDC 2 Article GC 24 of the General Conditions.
	.2	Warranty: Include coverage of installed sealant and sheet materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

.3 For sealant and sheet materials the 12 months warranty period prescribed in subsection GC 32.1 of General Conditions "C" is extended to 24 months.

PART 2 - PRODUCTS

2.1 Materials

.1 Materials: As required to achieve specified performance criteria; functionally compatible with adjacent materials and components.

PART 3 - EXECUTION

3.1 Preparation

.1 Prepare substrate surfaces in accordance with air seal material manufacturer's instructions.

3.2 Installation

.1 Install seal materials in accordance with manufacturer's instructions.

.2 Install sealant materials in accordance with manufacturer's instructions.

.3 Apply sealants within recommended application temperature ranges.

3.3 Protection of Finished Work

.1 Do not permit adjacent work to damage work of this section.

PART 1 - GENERAL

1.1 Related Work

.1 Metal flashing: Section 07620 Metal Flashing and Trim.

.2 Prefabricated roof expansion joints: Section 07712 Prefabricated Roof Expansion Joints.

1.2 References

.1 CSA A82.27-M91, Gypsum Board Products.

.2 CAN3-A231.2-M85, Precast Concrete Pavers.

.3 CAN/CSA-A247-M86, Insulating Fiberboard.

.4 CSA O121-M1978, Douglas Fir Plywood.

.5 CSA O151-M1978, Canadian Softwood Plywood.

.6 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.

.7 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing.

.8 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.

.9 CAN/CGSB-37.50-M89, Hot Applied, Rubberized Asphalt for Roofing and Waterproofing.

.10 CAN/CGSB-37.51-M90, Application for Hot-Applied Rubberized Asphalt, for Roofing and Waterproofing.

.11 CAN/CGSB-51.20-M87, Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.12 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.13 CRCA Canadian Roofing Contractors Association.

.14 ASTM D2178-89 Specification for Asphalt Glass (Felt) Used in Roofing and Waterproofing.

1.3 Shop Drawings

.1 Submit shop drawings in accordance with Section 1340 - Shop Drawings, Product Data, Samples and Mock-ups.

1.4 Mock-up	.1	Construct mock-up in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.
	.2	Allow 24 hours for inspection of mock-up by Consultant before proceeding with roofing and waterproofing work.
1.5 Storage and Handling	.1	Provide and maintain dry, off-ground weatherproof storage.
	.2	Stand roll materials on end.
	.3	Remove only in quantities required for same day use.
	.4	Store insulation protected from sunlight and weather and deleterious materials.
	.5	Store materials in accordance with manufacturers written instructions.
1.6 Environmental Requirements	.1	Do not install HARA membrane when air and substrate temperature remains below 5°C, or when wind chill gives equivalent cooling effect.
	.2	Install HARA membrane on dry substrate, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into system.
	.3	Ensure that temperature of substrate and its moisture content conforms to manufacturer's minimum requirements, before proceeding with work.
1.7 Warranty	.1	Contractor hereby warrants that Hot Applied Rubberized Asphalt Roofing and Waterproofing will stay in place and remain leak proof in accordance with GC24, but for 24 months and be assignable to the Condominium Corporation.
1.8 Compatibility	.1	Compatibility between components of system and adjacent materials is essential. Provide written declaration to Consultant stating that materials and components, as assembled in system, meet this requirement.
1.9 Source Quality Control	.1	Submit laboratory test reports in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

PART 2 - PRODUCTS

2.1 Deck Sheathing

.1 Gypsum board: to CSA A82.27, Water-resistant, thickness as indicated.

.2 Plywood: to CSA O121 or CSA O151, Sheathing Grade, thickness as indicated.

.3 Sand: natural silica sand passing 1-18 mm sieve.

2.2 Primers

.1 Asphalt primer: to CGSB 37-GP-9Ma.

2.3 Rubberized Asphalt

.1 Hot applied rubberized asphalt: to CAN/CGSB-37.50.
.1 Acceptable material.
.1 Hydrotech 6125 by Hydrotech
.2 PQ6100 by Permquik
.3 Belalastic 1213 BDM by Bemac Products
.4 or approved equal

2.4 Reinforcement

.1 Membrane reinforcement: fabric, glass mat or spun-bonded polyester as recommended by membrane manufacturer.

.2 Crack and joint reinforcement: elastomeric sheet, Butyl, EPDM or Chloroprene rubber, uncured neoprene thickness minimum 1.19 mm.

2.5 Separation Sheet

.1 Asphalt impregnated glass felt: to ASTM D2178, Type IV.

.2 Polyethylene film: to CAN/CGSB-51.34, Type 1, 0.125 mm thick.

2.6 Polystyrene Insulation

.1 To CAN/CGSB-51.20, Type 4, thickness as indicated, shiplapped edges. Only polystyrene insulations listed on CGSB Qualified Products List (41 GP Series) are acceptable for use on this project.

2.7 Extruded Polystyrene Composite Insulation (Concrete Topping)

.1 Polystyrene: to CAN/CGSB-51.20, Type 4, thickness as indicated.

.2 Concrete topping: latex modified concrete, 10 mm thick, smooth surface, colour grey.

.3 Maximum size 600 x 1200 mm, tongue and groove edges.

2.8 Sealers

.1 Plastic cement: to CAN/CGSB cutback asphalt type hot rubberized asphalt membrane.

.2 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.

.3 Sealants: Type 4.

2.9 Fasteners

.1 Sheathing to steel substrate: No. 10 flat head, self tapping, Type A or AB, cadmium plated screws to CSA B35.3.

2.10 Filter Fabric

.1 UV resistant, black woven polyolefin fabric for installation between insulation and stone ballast in protected membrane system. Fabric to meet recommendation of insulation manufacturer.

2.11 Ballast

.1 Stone: 19 to 32 mm size, well graded crushed stone, opaque, non-porous, washed, free from fines, splinters, ice and snow.

.2 Paving slabs: to CAN3-A231.2, of sizes indicated natural precast concrete paving slabs having non-slip finish with 51 mm plain margin around perimeter.

2.12 Paver Pedestals

.1 Pedestals and levelling plates made of high density polyethylene with integral spacer ribs on upper surface.

2.13 Fixing Bars

.1 Metal bars galvanized for corrosion resistant 3 mm thick x 25 mm wide, predrilled for fasteners at 225 mm oc.

2.14 Clamping Rings

.1 Adjustable, non corrosive metal rings.

2.15 Joint Tape

.1 Tape: pressure sensitive heat resistant fiberglass reinforced type.

2.16 Latex Filler

.1 Filler: latex modified cement.

2.17 Pitch Pockets

.1 Pitch pockets (pans) (plastic pans) in accordance with Section 07620 - Metal Flashing and Trim.

2.18 Protection Board

.1 Insulating fibreboard: to CAN/CSA A247, Type II, 9.5 mm thick.

PART 3 - EXECUTION

3.1 Protection

.1 Cover walls and adjacent work where materials hoisted or used.

.2 Use warning signs and barriers. Maintain in good order until completion of work.

.3 Clean off drips and smears of bituminous material immediately.

.4 Dispose of rain water away from face of building until drains or hoppers installed and connected.

.5 Protect from traffic and damage. Comply with precautions deemed necessary by Consultant.

.6 Place plywood runways over work to enable movement of material and other traffic.

.7 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed work and materials out of storage.

.8 Seal and ballast exposed edges.

3.2 Substrate Examination

.1 Examine substrates and immediately inform Consultant in writing of defects.

.2 Prior to commencement of work ensure:

.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, contamination and swept clean of dust and debris.
.2 Curbs have been built.
.3 Drains have been installed at proper elevations relative to finished surfaces.
.4 Sleeves, vents, pipes and other items passing through substrates receiving work of this Section are properly and rigidly installed.
.5 Plywood and lumber nailer plates have been installed to walls and parapets as indicated.

3.3 Preparation - General

.1 Free substrates from curing compounds, dust and loose particles, grease, paint, frost, form oil and other material detrimental to bond of membrane materials.

.2 Heat membrane in double shell indirect fired melter using high flash point oil as heat transfer medium. Equip melter with positive mechanically operated agitator, and thermometers. Under no circumstances is membrane material to be heated in direct heating kettle.

.3 Reinforce substrate cracks less than 3 mm wide with layer of hot rubberized asphalt 300 mm wide centred on crack and 150 mm wide fabric reinforcing sheet embedded into it.

.4 Reinforce substrate cracks larger than 3 mm with layer of hot rubberized asphalt 300 mm wide centred over crack and 225 mm wide strip of standard thickness elastomeric reinforcing sheet embedded into it.

.5 At expansion joints, loop heavy duty elastomeric reinforcing sheet down into joint, embedded into 3 mm thick layer to membrane. ensure that depth of loop is minimum 1.5 mm. Extend reinforcing sheet minimum 150 mm on each side of joint. Cap end joints min. of 150 mm and seal with 3 mm coat of membrane. Fill loop with membrane. Secure top of reinforcing sheet with continuous fixing bar at vertical wall locations.

.6 At mechanical vent and pipe flashings, provide standard elastomeric reinforcing sheet around vent pipes and protrusions through membrane. Set and seal with membrane and clamping ring. Install prefabricated metal sleeves for substrate perforations.

.7 At pitch pockets place pan on top of membrane. Set standard elastomeric reinforcing sheet into membrane over top at flange. Fill pitch pocket with membrane or plastic cement in order to shed water.

.8 At drain flashings, extend membrane and standard elastomeric reinforcing into upper surface of drain base and ensure a watertight seal between membrane and drain. Apply clamping ring exerting sufficient pressure to affect a seal between clamping ring and membrane. Temporarily block all drains during application of ballast, or other materials which might block the drains. Remove blocking when work is not in progress and upon completion.

3.4 Preparation of Wood Deck

.1 Verify flatness and tight joints of wood decking.

.2 Seal joints of plywood with tape.

.3 Fill knot holes with latex filler.

.4 Reinforce joints with fabric reinforcing sheet. Embed fabric into 3 mm coat of membrane, squeeze out any air pockets. Allow to cool before application of second coat.

3.5 Preparation of Concrete Deck

.1 Fill surface honeycomb depressions and voids with latex filler.

.2 Apply primer to dry substrate in accordance with CAN/CGSB-37.51.

3.6 Preparation of Precast Concrete Deck

.1 Ensure that side and end joints are grouted prior to installation of membrane.

.2 Reinforce joints along length of units with 3 mm thick coat of membrane and strip of 150 mm wide fabric reinforcing sheet, extending 75 mm beyond sheet edges.

.3 At joints occurring along width of precast units, reinforce with minimum 300 mm wide standard elastomeric reinforcing sheet, embedded between two 3 mm layers of membrane.

3.7 Deck Sheathing

.1 Lay gypsum board with tightly butted joints. Longitudinal joints must be at right angles to flute direction. Joints occurring along widths of board to be continuously supported on top flange of metal deck.

.2 Mechanically fasten deck covering to steel deck with self-tapping, non-corroding screws, screws spaced 200 mm oc each way and to only top flanges of steel deck.

.3 Reinforce joints with minimum 150 mm wide fabric reinforcement, completely embedded in layer of membrane 75 mm joint tape, centered on joints.

3.8 Membrane

.1 Install hot applied rubberized asphalt, reinforcement fabric and flashings in accordance with CAN/CGSB-37.51.

.2 Ensure continuity of building envelope air barrier.

3.9 Separation Sheet

.1 Place separation sheet in asphalt while still hot enough to assure a good bond but not so hot as to damage sheet.

.2 Begin application at low end, lapping sheets 50 mm.

.3 Carry sheet up vertical faces over rubberized asphalt while still warm.

3.10 Protection Board

.1 Install protection board while rubberized asphalt membrane is still "tacky". Lap 10 to 25 mm to ensure complete coverage.

3.11 Insulation Application

.1 Apply insulation loose laid immediately after application of separation sheet. Butt insulation boards tightly, in parallel rows with staggered end joints. Cut and fit around peripheries and items passing through insulation.

.2 Install concrete topped insulation in accordance with manufacturer's recommendations. Secure perimeter edge slabs and corner slabs to suit design with mechanical fixing metal flashing additional ballast.

3.12 Filter Fabric Application

.1 Apply continuous layer of filter fabric unbonded over installed insulation lapping joints 300 mm minimum.

.2 Cut fabric around drains, vents and other penetrations and extend up protrusions and place under metal flashings.

3.13 Ballast and ProtectiveCovering

.1 Apply stone ballast, as soon as possible after placement of fabric insulation, at minimum rate of 75 kg/m″.

.2 Spread stone ballast to an even thickness over entire area. Extend ballast over base of metal flashings by 100 mm.

.3 Spread additional stone ballast around perimeter for width of 1200 mm to increase ballast weight.

.4 Install paving slabs over fabric on paver levelling pads accurately aligned and levelled. Shim up as required to obtain smooth surface transition from slab to slab. Allow space between slabs to permit drainage of surface water. Cut pavers to fit irregularly shaped areas and around protrusions.

3.14 Walkways

.1 Install walkway concrete paving slabs in accordance with manufacturer's instructions and as indicated.

3.15 Field Quality Control

.1 Inspection and testing of HARA membrane application will be carried out by testing laboratory designated by Engineer.

.2 Contractor will pay for tests as specified in Section 01410 - Testing Laboratory Services.

.3 Inspection and testing of HARA membrane application will be carried out by testing laboratory designated by Owner.

.4 Costs of tests will be paid by Contractor.

3.17 Protection of Completed Work

.1 Ensure membrane is undamaged before application of protection board.

.2 Apply protection board to cover membrane at locations as indicated.

3.18 Cleaning

.1 Clean work in accordance with Section 01711 - Cleaning.

.2 Clean to Consultant's approval, soiled surfaces, spatters, and damage caused by work of this Section.

.3 Check area drains to ensure cleanliness and proper function, and remove debris, equipment and excess material from site.

PART 1 - GENERAL

1.1 Related Work

.1 Installation of recessed Section cap flashing.

.2 Wood cant strips, blocking, curbs, and nailing strips: Section 06101 Rough Carpentry.

.3 Asphalt shingle roofing: Section 07311 Asphalt Shingles.

.4 Painting: Section 09911 Interior Painting.

1.2 References

.1 ASTM A167-88 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 ASTM A526M-85 Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

.3 ASTM A591-77(1983) Specification for Steel Sheet, Cold-Rolled, Electrolytic Zinc-Coated.

.4 ASTM A606-85 Specification for Steel Sheet and Strip, Hot-Rolled and Cold-Rolled, High Strength, Low-Alloy, with Improved Atmospheric Corrosion Resistance.

.5 ASTM A792M-85a Specification for Steel Sheet, Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.6 ASTM B32-89 Specification for Solder Metal.

.7 ASTM B370-88 Specification for Copper Sheet and Strip for Building Construction.

.8 ASTM D523-85 Test Method for Specular Gloss.

.9 ASTM D822-86 Recommended Practice for Operating Light - and water - Exposure Apparatus (Carbon-Arc Type) for Testing Paint, Varnish, Lacquer, and Related Products.

.10 CSA A123.3-M1979 Asphalt or Tar Saturated Roofing Felt.

.11 CSA B111-1974 Wire Nails, Spikes and Staples.

.12 CAN/CGSB-37.5-M89 Cutback Asphalt Plastic Cement.

.13 CAN/CGSB-51.32-M77 Sheathing, Membrane, Breather Type.

.14 CAN/CSA-A440-M90 Windows.

.15 CAN/CGSB-93.1-M85 Sheet, Aluminum Alloy, Pre-finished, Residential.

.16 Aluminum Association Designation System for Aluminum Finishes - 1980.

.17 Aluminum Association Aluminum Sheet Metal Work in Building Construction - 1971.

.18 Canadian Roofing Contractors Association (CRCA).

1.3 Samples

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit 50 x 50 mm samples of each type of sheet metal material, colour and finish.

PART 2 - PRODUCTS

2.1 Sheet Metal Materials

.1 Zinc coated steel sheet: commercial quality to ASTM A526M, with Z275 designation zinc coating.

.2 Aluminum-zinc alloy coated steel sheet: to ASTM A792M, commercial quality, grade 33 with AZ150 coating, regular spangle surface, not chemically treated for paint finish.

.3 Textured stainless steel sheet: proprietary flat rolled stainless steel sheet product, random pebble pattern, standard mill product number

.4 Weathering steel sheet: to ASTM A606 high strength low alloy hot rolled architectural use grade, 1.2 mm minimum thickness.

.5 Aluminum sheet: proprietary utility sheet plain.

2.2 Pre-finished Steel Sheet

.1 Pre-finished steel with factory applied polyvinylidene fluoride.
- .1 Class F1S.
- .2 Colour selected by Consultant from manufacturer's standard range.
- .3 Specular gloss: 30 units +/- in accordance with ASTM D523.
- .4 Coating thickness: not less than 22 micrometers.
- .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:
  - .1 Outdoor exposure period 2500 hours.
  - .2 Humidity resistance exposure period 5000 hours.

.2 Pre-finished steel with factory applied polyvinyl chloride.

.1 Class F1S.
.2 Colour selected by Consultant from manufacturer's standard range.
.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
.4 Coating thickness: not less than 200 micrometers.
.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D822 as follows:
.1 Outdoor exposure period 5000 hours.
.2 Humidity resistance exposure period 5000 hours.

.3 Pre-finished steel with factory applied silicone modified polyester.
.1 Class F1S.
.2 Colour selected by Consultant from manufacturer's standard range.
.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
.4 Coating thickness: not less than 25 micrometers.
.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D822 as follows:
.1 Outdoor exposure period 5000 hours.
.2 Humidity resistance exposure period 5000 hours.

2.3 Aluminum Finishes

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
.1 As fabricated or mill finish: designation AA.
.2 Clear anodic finish: designation AA.
.3 Integral colour anodic finish: designation AA, colour to match Consultant's sample.
.4 Impregnated colour anodic finish: designation AA, colour to match Consultant's sample.
.5 Electrolytically deposited colour anodic finish: designation AA, colour to match Consultant's sample.

.2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative shall meet requirements of CAN/CSA-A440, for coating Classes 1, 2 and 3 respectively.

2.4 Pre-finished Aluminum Sheet

.1 Finish: factory applied coating to CAN/CGSB-93.1 supplemented and amended as follows:
.1 Type 1.
.2 Class F1S.
.3 Colour selected by Consultant from manufacturer's standard range.
.4 Specular gloss.
.5 Coating thickness: not less than 25 micrometers.
.6 Outdoor exposure period in paragraph 6.11 years.
.7 Exposure period for humidity resistance in paragraph 6.9.
.8 Exposure period for salt spray resistance in paragraph 7.2.6.

.2 Thickness specified for pre-finished aluminum sheet applies to base metal.

2.5 Accessories

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CGSB 37-GP-5Ma.

.3 Underlay for metal flashing: dry sheathing to CAN/CGSB-51.32.

.4 Sealants: Type 3.

.5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.6 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.

.7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.8 Solder: to ASTM B32, alloy composition Sn.

.9 Flux: rosin, cut hydrochloric acid, or commercial preparation suitable for materials to be soldered.

.10 Touch-up paint: as recommended by pre-finished material manufacturer.

2.6 Fabrication

.1 Fabricate metal flashing and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.

.2 Fabricate aluminum flashing and other sheet aluminum work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.

.3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.

.4 Hem exposed edges on underside 12 mm. Miter and seal corners with sealant.

.5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.7 Metal Flashing

.1 Form flashings, copings and fascias to profiles indicated of pre-finished mill finish anodized pre-finished aluminum.

2.8 Pans

.1 Form pans to receive roofing plastic from galvanized sheet metal with minimum 75 mm upstand above finished roof and 100 mm continuous flanges with no open corners. Solder joints. Make pans minimum 50 mm wider than member passing through roof membrane.

2.9 Reglets and Cap Flashings

.1 Form recessed reglets metal cap flashing of sheet metal to be built-in concrete for base flashings as detailed. Provide slotted fixing holes and steel/plastic washer fasteners. Cover face and ends with plastic tape.

2.10 Eaves Troughs and Down Pipes

.1 Form eaves troughs and down pipes from sheet metal.

.2 Sizes and profiles as indicated.

.3 Provide goosenecks, outlets, strainer baskets and necessary fastenings.

.4 Form 600 x 600 mm concrete or plastic splash pans from pre-finished sheet metal.

2.11 Scuppers

.1 Form scuppers from galvanized or prefinished sheet metal.

.2 Sizes and profiles as indicated.

.3 Provide necessary fastenings.

.4 Form 600 x 600 mm concrete or plastic splash pans from sheet metal.

PART 3 - EXECUTION

3.1 Installation

.1 Install sheet metal work in accordance with CRCA FL series details, FL Aluminum Sheet Metal Work in Building Construction as detailed.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.

.4 Counterflash bituminous flashings at intersections of roof with vertical

surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips.

.5 Lock end joints and caulk with sealant.

.6 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.

.9 Caulk flashing at reglet cap flashing with sealant.

.10 Install pans, where shown around items projecting through roof membrane.

3.2 Eaves Troughs and Downpipes

.1 Install eaves troughs and secure to building at 750 mm oc with eaves trough spikes through spacer ferrules. Slope eaves troughs to downpipes as indicated. Seal joints watertight.

.2 Install down-pipes and provide goosenecks back to wall. Secure down-pipes to wall with straps at 1800 mm oc; minimum two straps per down-pipe. Connect down-pipes to drainage system and seal joint with plastic cement.

.3 Install splash pans as indicated.

3.3 Scuppers

.1 Install scuppers as indicated.

PART 1 - GENERAL

1.1 Related Work

.1 Wood blocking: Section 06100 Rough Carpentry.

.2 Metal flashings: Section 07620 Metal Flashing and Trim.

1.2 References

.1 CSA B111-1974 Wire Nails, Spikes and Staples.

1.3 Design

.1 Design prefabricated roof expansion joints to maintain soundness of roofing membrane and protect building roof slab expansion joints from weather and moisture infiltration.

1.4 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate size and description of components, attachment devices, and construction details.

1.5 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.3 Submit 500 mm long sample of expansion joint complete with attachments, fastened to plywood backing to show joint details and end termination (end cap) details.

PART 2 - PRODUCTS

2.1 Materials

.1 Exterior cover: of 1 mm thick aluminum with joint width of 25 mm, for roof to roof construction, preformed end caps and chance in direction components.

.2 Cover insulation: closed cell flexible foam of synthetic rubber.

.3 Flanges: aluminum.

.4 Bond adhesive: type as recommended by product manufacturer.

.5 Roof nails: standard type to CSA B111.

.6 Anchors: manufacturer's standard to suit roof deck or curb.

2.2 Fabrication

.1 Factory assemble, preform crown shape with prefabricated corner intersections and splicings and roof to fascia transitions.

PART 3 - EXECUTION

3.1 Installation

.1 Ensure roofing felts membrane or other weathering surfaces are applied over wood nailers as indicated.

.2 Ensure continuity of building envelope air barrier and vapour retarder systems.

.3 Apply adhesive for joining expansion joints cover in curb and cant construction.

.4 Fasten expansion joint cover strip as indicated at 400 mm oc.

PART 1 - GENERAL

1.1 Related Work

.1 Metal roof flashings: Section 07620 Metal Flashing and Trim.

.2 Field painting: Section 09911 Interior Painting.

1.2 References

.1 ASTM A506-91 Specification for Steel Sheet and Strip, Alloy, Hot-Rolled and Cold-Rolled, Regular Quality and Structural Quality.

.2 ASTM A525M-91b Specification for General Requirements for Steel Sheet Zinc-Coated (Galvanized) by the Hot-Dip Process Metric.

.3 ASTM A526M-90 Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

.4 ASTM B370-88 Specification for Copper Sheet and Strip for Building Construction.

.5 CSA B111-1974 Wire Nails, Spikes and Staples.

.6 CAN/CGSB-1.105-M91 Quick-Drying Primer.

1.3 Design Criteria

.1 Roof hatches to withstand snow load of indicated and wind uplift indicated and cold temperature damage deformation to seals.

1.4 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate size and description of components, materials, attachment devices, description of frame and finish, and construction details.

1.5 Maintenance Data

.1 Provide maintenance data for hardware complete with pertinent details, spare parts lists and warnings against harmful maintenance materials and practices for incorporation into manual specified in Section 01730 - Operation and Maintenance Manual.

PART 2 - PRODUCTS

2.1 Materials

.1 Steel sheet: regular quality alloy steel to ASTM A506.

.2 Galvanized steel sheet: commercial quality to ASTM A526M, with ASTM A525, Z275 designation zinc coating.

.3 Aluminum sheet: mill finish plain utility sheet.

.4 Aluminum: extruded sections of AA6063-T5 alloy, all components one piece without splices.

.5 Copper sheet: to ASTM B370 cold rolled.

.6 Gaskets: extruded resilient vinyl, with full recovery after 50% compression.

.7 Fasteners: nails to CSA B111 screws to manufacturers standard.

.8 Sealants: Type 3.

.9 Prime paint for steel: to CAN/CGSB-1.105.

.10 Isolation coating: alkali resistant bituminous paint or epoxy solution.

2.2 Hatch Cover

.1 Metal Cover:
.1 Preformed, galvanized steel.

2.3 Curbed Frame

.1 Concrete.

2.4 Accessories

.1 Screws: galvanized steel for curb to structure and for hatch lip frame to outer attachment.

.2 Hinges: type recommended by roof hatch manufacturer.

.3 Latch: positive snap with turn handles inside and out and padlock hasps inside.

.4 Securing latch: hold open operating arm with vinyl grip handle to permit one-handed release.

.5 Resilient gasket/seal to inner face of lid in contact with hatch lid support frame and to skylight in contact with hatch lid.

2.5 Fabrication

.1 Fabricate components free of twists, bends, or visual distortion and insulated. Weld corners and joints.

.2 Assemble roof hatch components as indicated.

.3 Ensure continuity of weather-tight seal.

.4 Design flashings extrusions to collect and lead off condensation accumulated.

.5 Zinc plate hardware and attachments and shop prime ready for field painting.

PART 3 - EXECUTION

3.1 Installation

.1 Erect components plumb, level and in proper alignment.

.2 Ensure continuity of building envelope air barrier and vapour retarder systems.

.3 Adjust and seal assembly with provision for expansion and contraction of components.

.4 Secure prefabricated curb assembly brake formed metal curb to structure.

.5 Coat aluminum and copper in contact with dissimilar materials, with isolation coating.

.6 Secure and seal frame to curb.

PART 1 - GENERAL

1.1 Test Reports

.1 Submit product data including certified copies of test reports verifying fireproofing applied to substrate as constructed on project will meet or exceed requirements of Specification.

.2 Submit test results in accordance with CAN4-S101-M82 for fire endurance and CAN4-S102-M83 for surface burning characteristics.

.3 For assemblies not tested and rated, submit proposals based on related designs using accepted fireproofing design criteria.

1.2 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit duplicate 300 x 300 mm size sample of exposed fireproofing for approval of texture and colour.

1.3 Mock-up

.1 Erect mock-up in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Apply fireproofing to approximately 10 m″ area of surfaces of mock-up-matching surface to be treated.

.3 Allow 24 hours for inspection of mock-up by Consultant before proceeding with fireproofing work.

1.4 Protection

.1 At outdoor temperatures less than 5°C, ensure that a 5°C air and substrate temperature is maintained during and for 24 h after application. Ensure that natural ventilation to properly dry the fireproofing during and subsequent to its application is provided. In enclosed areas lacking openings for natural ventilation, ensure that interior air is circulated and exhausted to the outside.

.2 Provide temporary enclosures to prevent spray from contaminating air beyond application area.

.3 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of fireproofing materials.

PART 2 - MATERIALS

2.1 Materials

.1 Sprayed fireproofing: ULC certified cementitious or asbestos-free mineral fiber fireproofing qualified for use in ULC Designs specified.

.2 Thin-Film Intumescent Coatings qualified for use in ULC Designs specified.

.3 Curing compound: type recommended by fireproofing manufacturer, qualified for use in ULC Designs specified.

.4 Sealer: type recommended by fireproofing manufacturer, qualified for use in ULC Design specified.

PART 3 - EXECUTION

3.1 Preparation

.1 Substrate shall be free of material, which would impair bond.

.2 Verify that painted substrate are compatible and have suitable bonding characteristics to receive fireproofing.

.3 Remove incompatible materials.

.4 Ensure that items required to penetrate fireproofing are placed before installation of fireproofing.

.5 Ensure that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is completed.

3.2 Application

.1 Apply bonding adhesive or primer to substrate if recommended by manufacturer.

.2 Apply fireproofing to correspond with tested assemblies, or acceptable calculation procedures to provide following fire resistance ratings.

.3 Apply fireproofing over substrate, building up to required thickness to cover substrate with monolithic blanket of uniform density and texture.

.4 Apply fireproofing directly to open web joists without use of expanded lath.

.5 Tamp smooth, surfaces visible in finished work as indicated.

.6 Apply curing compound to surface of cementitious fireproofing as required by manufacturer.

.7 Apply sealer to surface of mineral fiber fireproofing as required by manufacturer as indicated.

3.3 Inspection and Testing

.1 Inspection and testing of fireproofing will be carried out by Testing Laboratory designated by Consultant.

.2 Owners will pay costs for testing, as specified in Section 01410 - Testing Laboratory Services.

3.4 Patching

.1 Patch damage to fireproofing caused by testing or by other trades before fireproofing is concealed, or if exposed, before final inspection.

PART 1 - GENERAL

1.1 Related Work

.1 Fire stopping and smoke seals within mechanical assemblies (i.e inside ducts, dampers) and electrical assemblies (i.e. inside cable trays) are specified in Division 15 and 16 respectively.

1.2 References

.1 CAN4-S115-M85, Standard Method of Fire Tests of Firestop Systems.

1.3 Samples

.1 Submit samples in accordance with Section 01340 Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit duplicate 300 x 300 mm samples showing actual firestop material proposed for project.

1.4 Shop Drawings

.1 Submit shop drawings and product data in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.

.3 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation.

PART 2 - PRODUCTS

2.1 Materials

.1 Fire stopping and smoke seal systems: in accordance with CAN4-S115.
- .1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of CAN4-S115 and not to exceed opening sizes for which they are intended.
- .2 Firestop system rating: F.

.2 Service penetration assemblies: certified by ULC in accordance with CAN4-S115 and listed in ULC Guide No. 40 U19.

.3 Service penetration firestop components: certified by ULC in accordance with CAN4-S115 and listed in ULC Guide No. 40 U19.13 and ULC Guide No. 40 U19.15 under the Label Service of ULC.

.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 Preparation

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. 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 interuption to vapour barrier.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.2 Installation

.1 Install fire stopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions.

.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 a neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

3.3 Inspection

.1 Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.4 Schedule

.1 Firestop and smoke seal at:

.1 Edge of floor slabs and partywalls at curtain wall and precast concrete panels (exterior wall assembly).
.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.

.2 Firestop and smoke seal at all locations required by the Ontario Building Code as amended

3.6 Clean Up

.1 Remove excess materials and debris and clean adjacent surfaces immediately after application.

.2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

PART 1- GENERAL

1.1 Description

.1 Contractor shall provide all items, articles, materials, operations or method listed, mentioned or scheduled on the drawings and/or herein, including all labour, materials, equipment and incidentals necessary and required for the completion of caulking.

1.2 Qualifications

.1 Installation of sealant and caulking work shall be carried out by a recognized specialized applicator having skilled mechanics, thoroughly trained and competent in all phases of caulking work.

1.3 Reference

.1 ASTM C834 – Standard Specification for Latex Sealants

.2 ASTM C919 – Standard Practice for use of Sealants in Acoustical Applications

.3 ASTM C920 – Standard Specification for Elastomeric Joint Sealants

.4 ASTM C1330 – Standard Specification for Cylindrical Sealant Backing for use with Cold Liquid Applied Sealants.

.5 ASTM C1382 – Standard Specification for Adhesion Properties of Sealant when used in Exterior Insulation and finish Systems (EIFS) Joints.

.6 ASTM C1311 – Standard Specification for Solvent Release Sealants.

.7 CAN/CGSB-19.24 – Multicomponent, Chemical-Curing Sealing Compound.

1.4 Delivery, Storage and Handling

.1 Deliver all materials to the jobsite in their original unopened containers, with all labels intact.

.2 Store materials in strict accordance with manufacturer’s recommendations.

1.5 Environmental Conditions and Safety Requirements

.1 Apply sealants only to completely dry surfaces, and at air, substrate and material temperatures above minimum established by manufacturer’s specifications.

.2 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labeling and provision of material safety data sheets acceptable to Labour Canada.

.3 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.4 Engineer will arrange for ventilation system to be operated on maximum outdoor air and exhaust during installation of caulking and sealants. Ventilate area of work as directed by Engineer by use of approved portable supply and exhaust fans.

.5 The VOC content of adhesives, sealants and sealant primers used must be less than the VOC content limits of the State of California's South Coast Air Quality Management District (SCAQMD) Rule #1168, October 2003.

1. Unless otherwise specified in paragraph (c)(2), a person shall not apply any adhesives, adhesive bonding primers, adhesive primers, or any other primer which have a VOC content in excess of 250g/L less water and less exempt compounds.

2. A person shall not apply adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, or any other primer which have a VOC content in excess of the limits specified below:

Table 1: California South Coast Air Quality Management District Rule #1168

Adhesive and Sealant Applications
VOC Limit*, Less Water and Less Exempt Compounds in Grams per Litre

Architectural Applications	**Current VOC Limit**
Indoor Carpet Adhesives	50
Carpet Pad Adhesives	50
Outdoor Carpet Adhesives	150
Wood Flooring Adhesive	100
Rubber Floor Adhesives	60
Subfloor Adhesives	50

Architectural Applications	**Current VOC Limit**
Ceramic Tile Adhesives	65
VCT and Asphalt Tile Adhesives	50
Dry Wall and Panel Adhesives	50
Cove Base Adhesives	50
Multipurpose Construction Adhesives	70
Structural Glazing Adhesives	100
Single Ply Roof Membrane Adhesives	250

Table 2: California South Coast Air Quality Management District Rule #1168
VOC limit*, Less Water and Less Exempt Compounds in Grams per Litre

Specialty Applications	**VOC Limits and Effective Dates****			
	Current VOC Limit	6-7-02	1-1-03	1-1-05
PVC Welding	510			285
CPVC Welding	490			270
ABS Welding	400			
Plastic Cement Welding	350			250
Adhesive Primer for Plastic	650			250
Computer Diskette Manufacturing	350			
Contact Adhesive	250		80	
Special Purpose Contact Adhesive	250			
Tire Retread	100			
Adhesive Primer for Traffic Marking Tape	150			
Structural Wood Member Adhesive	140			
Sheet Applied Rubber Lining Operations	850			
Top and Trim Adhesive	250			

**The specified limits remain in effect unless revised limits are listed in subsequent columns.

Substrate Specific Applications	**Current VOC Limit**
Metal to Metal	30
Plastic Foams	50
Porous Material (except wood)	50
Wood	30
Fiberglass	80

If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.

Sealants	**Current VOC Limit**
Architectural	250
Marine Deck	760
Nonmembrane Roof	300
Roadway	250
Single-Ply Roof Membrane	450
Other	420

Sealant Primers	**Current VOC Limit**
Architectural	
Non Porous	250
Porous	775
Modified Bituminous	500
Marine Deck	760
Other	750

For low-solid adhesives or sealants the VOC limit is expressed in grams per liter of material as determined in paragraph (b)(32); for all other adhesives and sealants, VOC limits are expressed as grams of VOC per liter of adhesive or sealant less water and less exempt compounds as determined in paragraph (b)(31).

1.6 Submittals

.1 Submit samples of sealant and backing, if requested, for architect's approval.

1.7 Mock-Up

.1 Construct mock-ups where directed to show location, size, shape, colour and depth of joints complete with back-up material, primer and sealant. Mock-up may be part of finished work.

.2 Allow sealant to cure sufficiently for cut / bond testing of Mock-up work before proceeding with work.

1.8 Compatibility

.1 Ensure that all materials used are compatible.

.2 Declaration of Materials Compatibility: Submit written declaration stating that sealant materials are compatible with adjacent materials and substrates, including adjacent existing sealant materials to remain, where new sealant is sealed to existing, and are acceptable to the sealant manufacturer. Include a list of materials, suppliers, and manufacturers. If required, sealant manufacturer to review mock-up.

1.9 Warranty

.1 Submit a warranty of the work of this section covering a period of two (2) years from date of Substantial Performance of the Contract.

.2 Defective work shall include, but not be restricted to, joint leakage, cracking, crumbling, melting, running, loss of adhesion, loss of cohesion, or staining of adjoining or adjacent work.

PART 2 - PRODUCTS

2.1 Materials

.1 Colours of sealant to be selected by the *Owner* from the range of manufacturer's standard colours.

.2 Primer: Specifically designed for use with sealant compounds on surfaces encountered and as specified by the compound manufacturer to assure adhesion of compound and to prevent staining of substrate materials.

.3 Joint backing: ASTM C1330; Round, solid section, closed cell, skinned surface, soft polyethylene foam gasket stock, compatible with primer and sealant materials. Bond breaker type surface.

.4 Bond breaker, where joint configuration does not allow for proper depth/width ratio (see section 3.2.5)- a pressure sensitive plastic tape, which will not bond to the sealant such as 3M #226 or #481 or Valley Industries #40 shall be placed at the back of the joint or as recommended by sealant manufacturer.

.5 Use sealant(s) specified below:

Type 1: Conforming to ASTM C 920-05, Type S or M, Grade NS, Class 25 minimum, Use M, A and O. Dymeric 240 by Tremco Ltd., Sikaflex 2C NS by Sika Canada Inc., DC CWS by Dow Corning Corporation, SilPruf NB SCS9000 or SWS by Momentive Performance Materials (GE) or approved alternate. To be used for joints in Brick, pre-cast, joints from brick or pre-cast to windows.

Type 2: Low-modulus sealant conforming to ASTM C920-05, Type S or M, Grade NS. Spectrum 1 or 3 by Tremco Ltd, DC CCS or 790 by Dow Corning, or Sikaflex 15LM by Sika Canada Inc, or SCS 2700 by Momentive Performance Materials (GE). Use on all EIFS joints and at other locations as shown on drawings.

Type 3: Conforming with, ASTM C920-05, Type S or M, Grade NS, Use I, A and M. Dymonic or Vulkem 931 by Tremco, or approved alternate.

Type 4: Conforming with, ASTM C920-05, Type S or M, Grade NS, Use G and A. Spectrum 2 by Tremco Ltd., Dow 795 by Dow-Corning Corporation or SCS 9000 by Momentive Performance Materials. Use in glass-to-glass, glass-to-metal, and metal-to-metal curtain wall joints in curtain wall fabrication.

Type 5: Multi-component or single component self-leveling or slope grade polyurethane sealant. Meeting the specified requirements of A.S.T.M. C920-05, Type M, Grade P, Class 25. Use T, M, A and O. THC 900 or THC 901 hybrid, Vulkem 245 or Vulkem 45 polyurethane by Tremco Ltd. Use in exterior and interior horizontal traffic joints. For areas where the slope of the deck makes self-leveling material impractical, THC 901 by Tremco may be used.

Type 6: Mildew resistant, one component neutral cure silicone sealant. Meeting the specified requirements of specification CAN/CGSB-19.22-M99. Tremsil 600 White by Tremco Ltd. or Dow 786 by Dow Corning Corporation, GE SCS 1700 or Silicone II “Kitchen & Bath” by Momentive Performance Materials (formerly GE Sealants & Adhesives). Use on fixtures, bathtubs and vanity tops.

Type 7: One component, non-skinning, non-hardening acoustical sealant. Meeting the specified requirements of specification CAN/CGSB-19.21-M99. Acoustical Sealant by Tremco Ltd or DC756 by Dow Corning. Use at all vapour barrier joints and openings in drywall systems as shown on the drawings or specified.

Type 8: One component, paintable acrylic latex sealant. Meeting the specified requirements of specification CAN/CGSB-19.17-M90. Tremflex 834 by Tremco Ltd., GE Silicone II XST by Momentive performance Materials (GE Adhesives & Sealants). Use in interior non-moving joints that may be painted.

Type 9: Ultra low modulus, one component, moisture curing silicone sealant. Meeting the specified requirements of specification CAN/CGSB-19.13-M87, Classification MCG-2-40-B-N, A.S.T.M. C920-05, Type S, Grade NS. Spectrum 1 by Tremco Ltd., Dow 790 by Dow Corning Corporation.

Type 10: Window frame joinery sealant Tremsill 600 or Gutter Seal by Tremco Ltd or DC795 or DC CWS by Dow Corning or approved alternate.

.6 Cleaning material for surfaces to receive sealant as recommended by the manufacturer of sealant.

PART 3 - EXECUTION

3.1 Examination

.1 Verify at the site that all joints and surfaces have been provided and that joint conditions will not adversely affect execution, performance or quality of completed work; and that they can put into acceptable condition by means of preparation specified in this section.

.2 Ascertain that sealers and coatings applied to sealant substrates are compatible with sealant used and that full bond of the sealant and substrate is attained. Request samples of the sealed or coated substrate from their fabricators for testing of compatibility and adhesion, if necessary.

.3 Verify that specified environmental conditions specified by material manufacturer or within this section, exist before commencing work.

.4 Ensure that releasing agents, coatings, or other treatments have either not been applied to joint surfaces or that they are entirely removed.

.5 Defective work resulting from application to unsatisfactory joint conditions will be considered the responsibility of those performing the work of this Section.

3.2 Preparation

.1 Remove dust, paint, loose mortar and other foreign matter and dry joint surfaces.

.2 Remove dust, silt, scale and coatings from ferrous metals by wire brush, grinding or sandblasting.

.3 Remove oil, grease and other coatings from non-ferrous metals with approved cleaning solvent.

.4 Clean down caulked metal surfaces with clean cellulose sponges or rages soaked in solvent recommended by sealant manufacturer, and wipe dry with clean cloths. Ensure that solvent is not injurious to paint surfaces.

.5 Examine joint sizes and correct as required to allow for anticipated movement and to achieve proper width/depth ratio per manufacturer's recommendations for specified sealant.

.6 Install joint backing material or apply bond breaker tape to achieve correct joint depth and prevent three-sided adhesion.

.7 Where necessary to protect adjacent surfaces, mask adjacent surfaces with tape prior to priming and/or caulking.

.8 Use primer as recommended by sealant manufacturer.

.9 Before any caulking or sealing is commenced, a test of the materials shall be made for indications of staining, poor adhesion or other undesirable effects.

3.3 Application

.1 Apply sealants in accordance with manufacturer's instructions ensuring to fill voids and joints completely, to recommended joint profile and depth.

.2 Neatly tool surface to a slight concave profile. Surface of sealant to be smooth, free from ridges, wrinkles, air pockets and embedded impurities.

.3 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess and droppings using recommended cleaners as work progresses. Remove masking tape immediately after tooling joints.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 07900 Joint Sealers: Caulking of joints between frames and other building components.

.2 Section 08710 Door Hardware: Supply of finish hardware, including weather-stripping and mounting heights.

.3 Section 08800 Glazing: Glazing.

.4 Section 09911 Interior Painting.

.5 Section 10200 Louvres and Vents: Door louvres.

1.2 References

.1 Canadian Standards Association (CSA).
- .1 CSA A101-M1983, Thermal Insulation, Mineral Fiber, for Buildings.
- .2 CAN/CSA-G40.21-M92, Structural Quality Steels.
- .3 CSA W59-M1989, Welded Steel Construction (Metal Arc Welding).

.2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-1.181-92, Ready-Mixed Organic Zinc-Rich Coating.
- .2 CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.
- .3 CAN/CGSB-51.20-M87, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .4 CGSB 51-GP-21M-78, Thermal Insulation, Urethane and Isocyanurate, Unfaced.

.3 American Society for Testing and Materials (ASTM).
- .1 ASTM A 525M-91b, Specification for General Requirements for Steel Sheet Zinc-Coated (Galvanized) by the Hot-Dip Process [Metric].
- .2 ASTM A 526M-90, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
- .3 ASTM A 527M-90, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality.
- .4 ASTM B 29-92, Specification for Pig Lead.
- .5 ASTM B 749-85(1991), Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .6 ASTM E 152-81a, Methods for Fire Tests of Door Assemblies.

.4 Underwriters' Laboratories of Canada (ULC).
- .1 CAN4-S104M-M80, Fire Tests of Door Assemblies.
- .2 CAN4-S105M-M85, Fire Door Frames.

.5 Canadian Steel Door and Frame Manufacturers' Association, (CSDFMA).
- .1 CSDFMA, Specifications for Commercial Steel Doors and Frames, 1990.
- .2 CSDFMA, Recommended Selection and Usage Guide for Commercial Steel Doors, 1990.

.6 National Fire Protection Association (NFPA).
.1 NFPA 80-1992, Fire Doors and Windows.
.2 NFPA 252-1990, Door Assemblies Fire Tests of.

1.3 Design Requirements

.1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.

1.4 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate each type of door, material, steel core thickness, mortises, reinforcements, location of exposed fasteners, openings, glazed louvred, arrangement of hardware and fire rating and finishes.

.3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing firerating finishes.

.4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

1.5 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit one 300 x 300 mm [top butt corner sample of each type door.

.3 Submit one 300 x 300 mm corner sample of each type of frame.
.1 Show butt cutout glazing stops 300 mm long removable mullion connection Snap-On trim with clips.

1.6 Requirements of Regulatory Agencies

.1 Steel fire rated doors and frames: labeled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M NFPA 252 for ratings specified or indicated.

.2 Provide fire labeled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with CAN4-S104, ASTM E 152 or 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.

PART 2 - PRODUCTS

2.1 Materials

.1 Hot dipped galvanized steel sheet: to ASTM A 526M ASTM A 527M coating designation to ASTM A 525M, ZF75, minimum base steel thickness in accordance with CSDFMA Table 1 - Thickness for Component Parts.

.2 Reinforcement channel: to CAN/CSA-G40.21, Type 44W, coating designation to ASTM A 525M, ZF75.

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≥ minimum sanded to required thickness.

.2 Stiffened: face sheets laminated welded, honeycomb uninsulated insulated core.
.1 Fiberglass: to CSA A101, semi-rigid Type 11 density 24 kg/m≥.
.2 Expanded polystyrene: CAN/CGSB-51.20, Type 11, density 16 to 32 kg/m≥.

.3 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door to 250°C at 30 minutes. Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, ASTM E 152 or 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 Primers

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

2.5 Accessories

.1 Door silencers: single stud rubber/neoprene type.

.2 Exterior and interior top and bottom 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 Door bottom seal.

.5 Metallic paste filler: to manufacturer's standard.

.6 Fire labels: metal riveted.

.7 Sealant: Type 2.

.8 Glazing:as indicated.

.9 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 dry glazing of Snap-On type.
- .2 Design exterior glazing stops to be tamperproof.

2.6 Frames
Fabrication General

.1 Fabricate frames in accordance with CSDFMA specifications.

.2 Fabricate frames to profiles and maximum face sizes as indicated.

.3 Exterior frames: 1.6 mm welded thermally broken type construction.

.4 Interior frames: 1.6 mm welded knocked-down slip-on type construction.

.5 Blank, reinforce, drill and tap frames for mortised, template hardware, and 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.

2.7 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 o.c. maximum.

2.8 Frames: Welded Type

.1 Welding in accordance with CSA W59.

.2 Accurately miter or mechanically joint frame product and securely weld on inside of profile.

.3 Cope accurately and securely weld butt joints of mullions, transom bars, center rails and sills.

.4 Grind welded joints and corners to a flat plane, fill with metallic paste and sane 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 Fabricate frame products for openings in sections.

.8 Securely attach lead to inside of frame profile from return to jamb soffit (inclusive) on door side of frame only.

2.9 Frames: Knocked-Down Type

.1 Ship knocked-down type frames unassembled.

.2 Provide frames with mechanical joints which inter-lock securely and provide functionally satisfactory performance when assembled and installed in accordance with CSDFMA Recommended Installation Guide for Steel Doors and Frames.

.3 Securely attach floor anchors to inside of each jamb profile.

2.10 Frames: Slip-on Type

.1 Ship slip-on type frames unassembled.

.2 Provide frames with mechanical joints which inter-lock securely and provide functionally satisfactory performance when installed in accordance with CSDFMA Recommended Installation Guide for Steel Doors and Frames and manufacturers' instructions.

.3 Provide slip-on frames with manufacturers' proprietary design of wall anchorage comprising single, adjustable tension type per jamb and provision for secure attachment of each jamb base to stud runners.

2.11 Door Fabrication General

.1 Doors: swing type, flush, with provision for glass and/or louver openings as indicated.

.2 Exterior doors: honeycomb construction. Interior doors: hollow steel construction.

.3 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E 330.

.4 Blank, reinforce, drill doors and tap for mortised, template hardware and 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 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 labeled doors for those openings requiring fire protection ratings, as scheduled. E 15 Test such products in strict conformance with CAN4-S104, ASTM 2 or 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.

2.12 Doors: Honeycomb Core Construction

.1 Form each face sheet for exterior doors from 1.6 mm sheet steel with honeycomb core laminated under pressure to face sheets.

.2 Form each face sheet for interior doors from 1.6 mm sheet steel with honeycomb - temperature rise rated core laminated under pressure to face sheets.

2.13 Hollow Steel Construction

.1 Form each face sheet for exterior doors from 1.6 mm sheet steel.

.2 Form each face sheet for interior doors from 1.6 sheet steel.

.3 Reinforce doors with vertical stiffeners, securely weldedto each face sheet at 150 mm on center maximum.

.4 Fill voids between stiffeners of exterior doors with polystyrene core.

.5 Fill voids between stiffeners of interior doors with honeycomb core.

2.14 Thermally Broken Doors and Frames

.1 Fabricate thermally broken doors by using insulated core and separating exterior parts from interior parts with continuous interlocking thermal break.

.2 Thermal break: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.

.3 Fabricate thermally broken frames separating exterior parts form interior parts with continuous interlocking thermal break.

.4 Apply insulation.

PART 3 - EXECUTION

3.1 Installation General

.1 Install labeled steel fire rated doors and frames to NFPA 80 except where specified otherwise.

.2 Install doors and frames to CSDFMA Installation Guide.

3.2 Frame Installation

.1 Set frames plumb, square, level and at correct elevation.

.2 Secure anchorage's 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 center 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 and vapor retarder.

3.3 Door Installation

.1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08710 - 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, and thresholds: 13 mm.

.3 Adjust operable parts for correct function.

.4 Install louvres.

3.4 Finish Repairs

.1 Touch up with primer finishes damaged during installation.

.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

3.5 Glazing

.1 Install glazing for doors and frames in accordance with Section 08800 - Glazing.

PART 1 - GENERAL

1.1 General

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

.2 Execute work to the highest standards of workmanship in the industry by fully trained applicators, in strict accordance with the written application instructions from the manufacturer.

1.2 Scope of Work

.1 Supply all materials, labour, plant and equipment required to complete all window installation work as specified and as shown on the drawings.

1.3 System Description and Performance Requirements

.1 Performance: Installed door units shall meet or exceed the performance requirements including those outlined for air and water leakage, wind load resistance, forced entry resistance and condensation resistance given in the CAN/CGSB-82.5-M88, and the current edition of the Ontario Building Code. Driving Rain Wind Pressure requirements are to be determined using Appendix SB1 of the Ontario Building Code (as amended).

.3 Door Construction: Door units must meet all the prescriptive requirements outlined in the CAN/CGSB-82.5-M88. Acceptable frame materials include: extruded 6063 aluminum. Door frames must be compatible with window wall system.

.4 Tolerances:

.1 Fabricate units to a tolerance of ± 1.5 mm for vertical, horizontal, and diagonal dimensions of units under 1830 mm, and ± 3 mm for dimensions greater than 1830 mm.

.2 Fabricate mullions to ensure under specified wind loads a maximum deflection of L/175 of mullion span or 12 mm, whichever is less.

.4 Allow minimum 12 mm perimeter clearance around door framing, in addition to clearance required for structural deflection.

.5 Glazed doors shall be designed in accordance with requirements of the OBC.

1.4 General Requirements

.1 Examine thoroughly all Drawings, site conditions, and all other factors influencing design and performance of building envelope and be fully aware of requirements.

.2 Design and engineer window system to comply with all applicable requirements given in CAM/CGSB-82.5-M88, current edition of the Ontario Building Code and all other relevant standards.

.3 Door frames should not be used to support other components, except for the weight of window components. Including but not limited to:

.1 Resistance to pressure differentials.

.2 Adequate provision for thermal movement without thermal fractures.

.3 Adequate provision for live and dead loads without failures, distortion or fracture.

.4 Adequate support and anchorage of components taking into consideration all loading factors.

.5 A water tight installation with gaskets, seals, and sealants to effectively prevent water entry into building.

.6 Continuous air and vapour seals to control transfer of moisture vapour into insulated glass units.

.7 For drained fixed window a heel bead is employed continuous around the entire glass perimeter using a compatible sealant.

.8 When galvanic corrosion represents a possible problem, design shall include preventative measures.

1.5 Submittals

.1 Samples:

.1 250 mm long samples of each type of extrusion and finish.

.2 250 mm x 250 mm samples of insulating glass unit.

.2 Documentation:

.1 Prior to installation work, submit to the Owner's Representative for review test documentation as required to verify that the window assemblies specified meet the requirements of the CAN/CGSB-82.5-M88. Information must be supplied by the manufacturer that all requirements of the standard are satisfied. Additional testing may be required to illustrate that the specifications are satisfied. Test reports submitted without drawings and comprehensive description of the door tested are not acceptable. All testing must be carried out by an SCC accredited laboratory.

.2 Submit to the Owner's Representative, as a matter of record, manufacturer's internal quality control specifications and standards.

.3 Submit to the Owner's Representative the manufacturer's installation instructions.

.4 Submit to the Owner's Representative the manufacturer's maintenance instructions / data.

.3 Shop Drawings:

.1 Submit shop drawings to the Owner's Representative showing all components of the door assemblies in as large a scale as practical, showing construction, methods of joining, bonding, fastening, sealing, anchorage, as well as type of material, thickness, finishes and other pertinent details.

.2 Shop drawings shall be stamped by a Professional Engineer licensed to practice in the Province of Ontario, confirming compliance with applicable Ontario Building Code structural and safety requirements.

.3 Show details of connecting work of this Section with the building. Provide specific details of window head, sill and jamb configurations. Drawings must also indicate without being limited to the following:

.1 Type and properties of metal alloy used for all extrusions.

.2 Vertical and horizontal sections through mullions and frames.

.3 Thicknesses, profiles, etc., of all extrusions and members.

.4 Door schedule and layout dimensioned to indicate the number and spacing of anchors.

.5 Location of setting blocks and edge blocks should be clearly indicated.

.6 Type of glazing and sealants.

.7 Hardware, including (without being limited to) handles, latches and locking devices, hinge assemblies, tilt-in hardware, rollers spring assemblies and weather-stripping.

1.6 Quality Assurance

.1 Manufacturer Qualifications: Provide fabrications specified in this Section only by a fabricator / erector who has adequate plant, equipment, and skilled tradesmen to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five years.

.2 Welder Qualifications: Perform welding of structural components only by fabricators certified by Canadian Welding Bureau to CSA welding qualification codes; CSA Standard W47.1 for welding of steel, and CSA Standard W47.2 for welding of aluminum.

1.7 Project / Site Environmental Requirements

.1 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

1.8 Related By-Laws, Codes and Standard Specifications

.1 Code

.1 Conform with the requirements of the Ontario Building Code, (latest edition) and all amendments

.2 By-laws

.1 Conform with all local, municipal and provincial building by-laws and ordinances.

.3 Standard Specifications

.1 Except where exceeded by the requirements of section of the contract documents, the specifications listed below shall govern.

Standard No.	**Title**
CAN/CGSB-82.5-M88	Insulated Steel Doors
CGSB12.20 M89	Structural Design of Glass for Buildings
CSA G164-M1981	Hot-Dip Galvanizing of Irregularly Shaped Articles
CSAW47.1-1994	Certification of Companies for Fusion Welding of Steel Structures.
CGSB1-GP-108M	Paint, Acid and Alkali Resistant, Black.
CGSB1-GP-181M	Coating, Zinc Rich, Organic, Ready Mix
CSA W47.2-1967	Aluminum Welding Qualification Code.
CSA S-157-05	Strength Design In Aluminum

1.9 Inspection and Testing

.1 The Owner Representative will be engaged to perform field testing of representative window installations. Unsuccessful tests will be at the expense of the door manufacturer

.2 The following field tests may be performed:

.1 Air Infiltration: ASTM E783

.2 Water Resistance: ASTM E1105 with a pressure differential as determined using Appendix SB1 of the 2006 Ontario Building Code and test duration of 5 minutes.

1.10 Delivery, Storage and Handling

.1 Brace frame units to prevent distortion in shipment and handling, and protect finished surfaces with appropriate protective coverings that do not bond when exposed to the sun.

.2 Employ methods for handling, storing and installing material without causing damage.

.3 Damaged doors may be rejected

1.11 Warranty

.1 Submit a **written warranty to the Owner Representative for the fabrication and installation of work specified in this Section covering a period of five (5)** years from date of the Certificate for Substantial Performance.

.2 Defects in the fabrication and installation of units specified in this Section shall include, but not be limited to: uncontroled water leakage, excessive air leakage, loosening of whole or of parts of units, breakage or deformation of metalwork, glass breakage from excessive stresses developed within the glazed unit or the glass, and fading or discolouration of factory applied finishes.

.3 Warranties shall include the prompt remedy of defect(s) upon written notification from the Owner. Remedy shall include labour, materials, equipment, and services required to make good defective areas of the work, and in the case of the factory-fabricated components, to supply and install new components, at no cost to the Owner. Warranties shall also include, making good other adjoining parts and finishes or other Owner's property damaged as a result of any defects, or disturbed in the process of remedying defects.

.4 The cost of warranty shall be included in the Contract price.

PART 2 -PRODUCTS

2.1 Materials

.1 Materials: to CAN/CGSB-82.5-M88 and supplemented as follows:

.2 All materials shall be compatible.

.3 Aluminum:

.1 Extrusions: AA6063, alloy and temper for framing, and where not exposed to suit specified and fabricator's requirements.

.2 Exposed Sheet and Plate: AA1100-H14, alloy and temper.

.4 Aluminum Finish:

.1 Enamel coating on interior aluminum shall be “Duracron” as manufactured by PPG, or an approved equivalent. The finish shall be certified by the manufacturer of the finished metal in accordance with Section 6.2 of CAN/CSA-A440-00. Colour to be selected by Owner.

.2 Enamel coating on exterior aluminum shall be at minimum “Acrynar” as manufactured by PPG or an approved equivalent. The finish shall be certified by the manufacturer of the finished metal in accordance with AAMA2604. Colour to be selected by Owner.

.5 Glass: To meet specified requirements of Section 08 80 00.

.6 Glazing Materials: To meet specified requirements of Section 08 80 00.

.7 Sealant: To meet specified requirements of Section 07 92 00.

.8 Bituminous Paint: To meet specified requirements of CGSB Specification 1-GP-108.

.9 Thermal Break: Solid or hollow extruded sections with a durometer hardness between Shore "A" 75 and 85, to be rolled in.

.10 Screens: To meet the specified requirements of CAN/CGSB-79.1-M91. Extruded aluminum frame with finish to match window framing. Plastic coated fibrous glass screening with an 18 x 16 mesh count.

.11 Weatherstripping: Durable, non-absorbing material resistant to deterioration by weathering and aging. Fin Seal High-Fin for inner sash as manufactured by Schlegel Canada Inc. or an approved equivalent.

.12 Hardware: Stainless steel with satin finish, aluminum with satin finish (except for wearing surfaces). Standard hardware for horizontal slider window unit. Samples to be submitted for approval.

.14 Self Adhering Membrane: Composite self adhering membrane comprised of rubberized or modified asphalt and polyethylene such as Exo Air 110 by Tremco, Blueskin SA as manufactured by Bakor Inc. or an approved equivalent. Primer and sealant as supplied or recommended by the membrane manufacturer.

2.2 Fabrication

.1 Members:

.1 Fabricate generally to dimensions and profiles indicated on reviewed shop drawings and to meet specified requirements. Determine window dimensions from site measurements. Maintain sight lines indicated and clearances to other construction components.

.2 Reinforce members for attachment of hardware.

.3 Ensure that glazing rebate is provided with depth and width to accommodate specified glass in accordance with glass manufacturer's recommendations.

.4 Maintain a minimum clearance of 12 mm and a maximum clearance of 18 mm between window frames and adjacent rough opening components.

.2 Assembly of Units:

.1 Join members by mechanical methods. Reinforcement or fasteners visible on exposed faces of members when window is closed will not be acceptable.

.3 Incorporate weep holes to drain water which enters into system. Baffle to prevent entry of driven water to conform to specified performance.

.4 Except where shipping makes impossible, fabricate units in shop and ship completely assembled with operating hardware attached.

.3 Fasteners:

.1 Where fasteners are exposed to dampness or moisture, use cadmium plated steel, or stainless steel fasteners.

.2 Where fasteners are not exposed to dampness or moisture at aluminum to aluminum connections, aluminum fasteners may be used.

.4 Dissimilar Materials:

.1 Protect material from electrolytic action when dissimilar metals are in contact with one another.

.2 Protect aluminum in contact with masonry with a heavy coating of bituminous paint.

.5 Anchors:

.1 Incorporate anchorage to structure as required by the reviewed Shop Drawings.

.2 Allow for complete adjustment in anchorage for leveling and positioning of units during installation.

.3 Straps and angles used for anchoring window system to structure to be aluminum

PART 3 - EXECUTION

3.1 Examination

.1 Take critical site dimensions to ensure that adjustments in fabrication or installation are provided for, that allowance is made for possible deflection of structure at heads, and that clearances to other constructions have been maintained.

3.2 Preparation

.1 Ensure continuity of air barrier is maintained around the rough door opening.

3.3 Installation

.1 Install door in accordance with the instructions given in CAN/CSA-A440.4 “Window Installation” and manufacturer’s printed installation instructions. Tolerances for door framing given in the A440.4 Standard will be strictly adhered to.

.2 General:

.1 Install plumb, level and in accordance with reviewed Shop Drawings.

.2 Do not force units into place, nor apply on them loads for which they were not designed.

.3 Provide for thermal movement to take place between units and adjacent construction.

.4 Conceal anchors, clips, blocking, and all other attachments.

.5 Install reinforcing and supporting members as specified or indicated for units specified in this Section.

.6 Seal metal-to-metal joints between components provided by this Section to ensure a weather-tight assembly, and in accordance with sealant manufacturer's specifications.

.7 Pack frame cavities with insulation.

.8 Provide continuity of air/vapour barriers with adjacent and air/vapour barrier system.

.9 Install units with consideration for finish variations. Abrupt variations of appearance or colour in adjacent components will not be acceptable.

.3 Flashings (Where required):

.1 Flashing shall be installed to shed water away from the building and includes a drip edge.

.2 Prior to installation of window framing, install subsill flashing including prefinished extruded support angle per reviewed shop drawings, self adhering membrane underlay at window sill location and 50 mm up jambs. Sill flashing shall be sloped to shed water to the exterior and include end dams as required. Detail must be incorporated into mock-up for review prior to commencement of work.

.4 Sealants:

.1 Apply sealants where indicated on reviewed Shop Drawings and as specified in Section 07900.

3.4 Cleaning

.1 Remove deposits which affect appearance or operation of units.

.2 Clean interior and exterior surfaces by washing with clear water; or with water and soap or detergent; followed by a clear water rinse.

.3 Clean and restore stained unit and hardware surfaces in accordance with manufacturer's recommendations. Replace if cleaning is impossible.

PART 1 - GENERAL

1.1 Related Work

.1 Caulking of joints between frames and other building components: Section 07900 Joints Sealers.

.2 Supply of finish hardware: Section 08710 Door Hardware.

1.2 References

.1 Aluminum Association Designation System for Aluminum Finishes-1980.

.2 ASTM E330-[90] Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

.3 CAN/CSA-G40.21-92 Structural Quality Steels.

.4 CSA G164-M92 Hot Dip Galvanizing of Irregularly Shaped Articles.

.5 CGSB 1-GP-40M-79 Primer, Structural Steel, Oil Alkyd Type.

.6 CAN/CGSB-12.1-M90 Tempered or Laminated Safety Glass.

1.3 Design Criteria

.1 Design frames and doors in exterior walls to:
.1 Accommodate expansion and contraction within service temperature range of -35°C to 35°C.
.2 Limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM E330 under wind load of 1.2 kpa. Submit certificate of tests performed.

1.4 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit one 300 x 300 mm corner sample of each type door and frame.

.3 Submit sample showing glazing detail, reinforcement, finish and location of manufacturer's nameplates.

.4 Frame sample to show glazing stop, door stop, jointing detail, finish, wall trim.

1.5 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate each type of door and frame, extrusion profiles, method of assembly, section and hardware reinforcement, locations of exposed fasteners, finishes and location of manufacturer's nameplates.

.3 Submit catalogue details for each type of door and frame illustrating profiles, dimensions and methods of assembly.

1.6 Maintenance Data

.1 Provide maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual specified in Section 01730 - Operation and Maintenance Manual.

1.7 Protection

.1 Apply temporary protective coating to finished surfaces. Remove coating after erection. Do not use coatings that will become hard to remove or leave residue.

.2 Leave protective covering in place until final cleaning of building.

PART 2 - PRODUCTS

2.1 Materials

.1 Aluminum extrusions: Aluminum Association alloy AA6063-T5 anodizing quality.

.2 Sheet aluminum: Aluminum Association alloy AA1100-H14 or AA5005-H32 or H34 anodizing quality.

.3 Steel reinforcement: to CAN/CSA-G40.21, grade 300W.

.4 Fasteners: aluminum finished to match adjacent material.

.5 Weather-strip: replaceable plastic backed wool pile.

.6 Door bumpers: black neoprene.

.7 Door bottom seal: operable and automatic adjustable door seal of anodized extruded aluminum frame and vinyl weather seal, recessed in door bottom, closed ends, automatic retract mechanism when door is open.

.8 Isolation coating: alkali resistant.

.9 Glass: tempered glass to CAN/CGSB-12.1, Type 1, Class A.

.10 Glazing materials.

.11 Sealants: Type 2, colour selected by Consultant.

2.2 Aluminum Doors

.1 Construct doors of porthole extrusions with minimum wall thickness of 2.4 mm.

.2 Door stiles nominal wide plus or minus 6 mm.

.3 Top rail nominal wide plus or minus 6 mm.

.4 Bottom rail nominal wide plus or minus 6mm.

.5 Reinforce mechanically-joined corners of doors to produce sturdy door unit.

.6 Glazing stops: interlocking snap-in type for dry glazing. Exterior stops: tamperproof type.

.7 Provide thermally broken doors for exterior.

.8 Hardware.

2.3 Aluminum Frames

.1 Construct thermally broken and insulated frames of aluminum extrusions with minimum wall thickness.

.2 Frame members nominal size, for flush glazing applied stops.

2.4 Aluminum Finishes

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
- .1 Clear anodic finish: designation AA.
- .2 Integral colour anodic finish: designation AA colour to match Consultant's sample.
- .3 Impregnated colour anodic finish: designation AA colour to match Consultant's sample.
- .4 Electrolytically deposited colour anodic finish: designation AA colour to match Consultant's sample.

.2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative.

2.5 Steel Finishes

.1 Finish steel clips and reinforcing steel with steel primer to CGSB 1-GP-40M zinc coating to CSA G164.

2.6 Fabrication

.1 Doors and framing to be by same manufacturer.

.2 Fabricate doors and frames to profiles and maximum face sizes as shown. Provide minimum 22 mm bite for insulating glazed units.

.3 Provide structural steel reinforcement as required.

.4 Fit joints tightly and secure mechanically.

.5 Conceal fastenings.

.6 Mortise, reinforce, drill and tap doors, frames and reinforcements to receive hardware using templates provided under Section 08710 - Door Hardware.

.7 Isolate aluminum from direct contact with dissimilar metals, concrete and masonry.

PART 3 - EXECUTION

3.1 Installation

.1 Set frames plumb, square, level at correct elevation in alignment with adjacent work.

.2 Anchor securely.

.3 Install doors and hardware in accordance with hardware templates and manufacturer's instructions.

.4 Adjust operable parts for correct function.

.5 Make allowances for deflection of structure to ensure that structural loads are not transmitted to frames.

3.2 Glazing

.1 Glaze aluminum doors and frames in accordance with Section 08800 - Glazing.

3.3 Caulking

.1 Seal joints to provide weathertight seal at outside and air, vapour seal at inside.

.2 Apply sealant in accordance with Section 07900 - Joint Sealers. Conceal sealant within the aluminum work except where exposed use is permitted by Consultant.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 06200 Finish Carpentry, wood door frames.

.2 Section 06666 Plastic Laminate.

.3 Section 08110 Steel Doors and Frames, steel door frames.

.4 Section 08710 Door Hardware.

.5 Section 08800 Glazing.

1.2 References

.1 Canadian Standards Association (CSA).
- .1 CSA O115-M1982, Hardwood and Decorative Plywood.
- .2 CAN/CSA O132.2 Series-90, Wood Flush Doors.
- .3 CAN/CSA-O132.5-M1992, Stile and Rail Wood Doors.

.2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-71.19-M88, Adhesive, Contact, Sprayable.
- .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.

.3 National Fire Protection Association (NFPA).
- .1 NFPA 80-1989, Fire Doors and Windows.
- .2 NFPA 252-1990, Door Assemblies, Fire Tests of.

.4 Architectural Woodwork Manufacturers Association of Canada (AWMAC).
- .1 Quality Standards for Architectural Woodwork 1990.

.5 Underwriters' Laboratories of Canada (ULC).
- .1 CAN4 S104M-M80, Fire Tests of Door Assemblies.
- .2 CAN4 S105M-M85, Fire Door Frames.

.6 American Society for Testing and Materials.
- .1 ASTM E 152-81a, Methods for Fire Tests of Door Assemblies.

1.3 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate door types and cutouts for lights and louvres, sizes, core con2struction, transom panel construction and cutouts.

1.4 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit one 300 x 300 mm corner sample of each type wood door.

.3 Show door construction, core, glazing detail and faces.

1.5 Regulatory Requirements

.1 Wood fire rated doors: labeled and listed by an organization accredited by Standards Council of Canada.

1.6 Storage and Protection

.1 Protect doors from dampness. Arrange for delivery after work causing abnormal humidity has been completed.

.2 Store doors in well ventilated room, off floor, in accordance with manufacturer's recommendations.

.3 Protect doors from scratches, handling marks and other damage. Wrap doors.

PART 2 - PRODUCTS

2.1 Fire Rated Wood Doors

.1 Wood doors: tested in accordance with CAN4 S104 ASTM E 152 NFPA 252 to achieve rating as scheduled.
- .1 Face panels.

2.2 Wood Flush Doors

.1 Solid core: to CAN/CSA-O132.2.1.
- .1 Construction:
  - .1 Solid particleboard core: stile and rail frame bonded to particleboard core with wood lock blocks and special describe wood blocking, 3-ply construction.
  - .2 Solid wood core:
    - .1 Glued block core with wood edge band.
    - .2 Framed block glued core.
    - .3 Framed block non-glued core.
    - .4 Stile and rail core.
    - .5 5-ply construction.
  - .3 Solid, wood block, lined core: with two core liners:
    - .1 Glued block with wood edge band.
    - .2 Framed block glued core.
    - .3 Framed block non-glued core.
    - .4 Stile and rail core.
    - .5 7-ply construction.

.2 Face Panels:
.1 Hardwood; veneer grades: Grade I (Premium).
.2 Hardboard: composition face moulded face.
.3 Laminated plastic: with hardwood plywood subface.

.3 Adhesive: Type I (waterproof).

.2 Hollow core: to CAN/CSA-O132.2.2.
.1 Construction: ladder core mesh or cellular core with lock blocks, 7-ply construction.
.2 Face Panels:
.1 Hardwood: Grade I (Premium) (Good).
.2 Hardboard face panels: composition face moulded face.
.3 Laminated plastic: with hardwood plywood subface.
.3 Adhesive: Type I (waterproof) for interior doors.

2.3 Stile and Rail Doors

.1 Fabricate doors as indicated to AWMAC CAN/CSA-O132.5.

.2 Construction:
.1 Residential grade: to CAN/CSA-O132.5 AWMAC, exterior interior solid veneered construction.
.2 Architectural grade veneered doors: to AWMAC mortise and tenon doweled joints, vertical edge AWMAC Detail No. 1, stile and rail widths to AWMAC Type I (exterior)] Type II (interior) adhesive.

.3 Type: raised panel French plank combination door.

2.4 Laminated Plastic

.1 Plastic laminate.

.2 Backing: hardwood plywood subface to CSA O115.

.3 Laminated plastic adhesive.

2.5 Glazing

.1 Glass: as indicated.

.2 Accessories.

2.6 Transom and Side Panels

.1 Construction: to match adjacent door.

.2 Meeting edges of doors and transom panels: square.

.3 Veneer of doors and transom panels: end colour matched.

2.7 Wood Louvers

.1 Material: to match face veneer.

.2 Type: flat-edge slat.

.3 Free area: as indicated.

2.8 Fabrication

.1 Vertical edge strips to match face veneer.

.2 Prepare doors for louvres and glazing. Provide species to match face veneer glazing stops with mitered corners.

.3 Bevel vertical edges of single acting doors 3 mm in 50 mm on lock side and 1.5 mm in 50 mm on hinge side.

.4 Radius vertical edges of double acting doors to 60 mm radius.

.5 Finish laminated plastic smooth and flush with stile edges of door and bevel at approximately 20 degrees.

.6 Provide waterproof non-staining membrane at cutouts on exterior doors to exclude moisture from core.

PART 3 - EXECUTION

3.1 Installation

.1 Unwrap and protect doors in accordance with CAN/CSA-O132.2 Series, Appendix A.

.2 Install labeled fire rated doors to NFPA 80.

.3 Install doors and hardware in accordance with manufacturer's printed instructions and CAN/CSA-O132.2 Series, Appendix A.

.4 Adjust hardware for correct function.

.5 Install glazing in accordance with Section 08800 - Glazing.

.6 Install louvres and stops.

.7 Secure transom and side panels by means of stops concealed fasteners or countersunk screws concealed by means of wood plugs matching panel in grain and colour.

3.2 Adjustment

.1 Re-adjust doors and hardware just prior to completion of building to function freely and properly.

PART 1 - GENERAL

1.1 General

.1 All conditions of the contract and Division 1, General Requirements apply to this section.

.2 Execute work to the highest standards of workmanship in the industry by fully trained applicators, in strict accordance with the written application instructions from the manufacturer.

1.2 Scope of Work

.1 Supply all materials, labour, plant and equipment required to complete all window installation work as specified and as shown on the drawings.

1.3 System Description and Performance Requirements

.1 Performance: Installed door units shall meet or exceed the performance requirements including those outlined for air and water leakage, wind load resistance, forced entry resistance and condensation resistance given in the CAN/CGSB-82.1-M89, and the current edition of the Ontario Building Code. Driving Rain Wind Pressure requirements are to be determined using Appendix SB1 of the 2006 Ontario Building Code.

.3 Door Construction: Door units must meet all the prescriptive requirements outlined in the CAN/CGSB-82.1-M89. Acceptable frame materials include: extruded 6063 aluminum. Door frames must be compatible with window wall system.

.4 Tolerances:

.1 Fabricate units to a tolerance of ± 1.5 mm for vertical, horizontal, and diagonal dimensions of units under 1830 mm, and ± 3 mm for dimensions greater than 1830 mm.

.2 Fabricate mullions to ensure under specified wind loads a maximum deflection of L/175 of mullion span or 12 mm, whichever is less.

.4 Allow minimum 12 mm perimeter clearance around door framing, in addition to clearance required for structural deflection.

.5 Glazed doors that extend to less than 1 m from the floor shall be designed in accordance with requirements of the OBC sentence 3.7.2.2 (2).

1.4 General Requirements

.1 Examine thoroughly all Drawings, site conditions, and all other factors influencing design and performance of building envelope and be fully aware of requirements.

.2 Design and engineer window system to comply with all applicable requirements given in CAN/CGSB-82.1-M89, current edition of the Ontario Building Code and all other relevant standards.

.3 Door frames should not be used to support other components, except for the weight of window components. Including but not limited to:

.1 Resistance to pressure differentials.

.2 Adequate provision for thermal movement without thermal fractures.

.3 Adequate provision for live and dead loads without failures, distortion or fracture.

.4 Adequate support and anchorage of components taking into consideration all loading factors.

.5 A water tight installation with gaskets, seals, and sealants to effectively prevent water entry into building.

.6 Continuous air and vapour seals to control transfer of moisture vapour into insulated glass units.

.7 For drained fixed window a heel bead is employed continuous around the entire glass perimeter using a compatible sealant.

.8 When galvanic corrosion represents a possible problem, design shall include preventative measures.

1.5 Submittals

.1 Samples:

.1 250 mm long samples of each type of extrusion and finish.

.2 250 mm x 250 mm samples of insulating glass unit.

.2 Documentation:

.1 Prior to installation work, submit to the Owner's Representative for review test documentation as required to verify that the window assemblies specified meet the requirements of the CAN/CGSB-82.1-M89. Information must be supplied by the manufacturer that all requirements of the standard are satisfied. Additional testing may be required to illustrate that the specifications are satisfied. Test reports submitted without drawings and comprehensive description of the door tested are not acceptable. All testing must be carried out by an SCC accredited laboratory.

.2 Submit to the Owner's Representative, as a matter of record, manufacturer's internal quality control specifications and standards.

.3 Submit to the Owner's Representative the manufacturer's installation instructions.

.4 Submit to the Owner's Representative the manufacturer's maintenance instructions / data.

.3 Shop Drawings:

.1 Submit shop drawings to the Owner's Representative showing all components of the door assemblies in as large a scale as practical, showing construction, methods of joining, bonding, fastening, sealing, anchorage, as well as type of material, thickness, finishes and other pertinent details.

.2 Shop drawings shall be stamped by a Professional Engineer licensed to practice in the Province of Ontario, confirming compliance with applicable Ontario Building Code structural and safety requirements.

.3 Show details of connecting work of this Section with the building. Provide specific details of window head, sill and jamb configurations. Drawings must also indicate without being limited to the following:

.1 Type and properties of metal alloy used for all extrusions.

.2 Vertical and horizontal sections through mullions and frames.

.3 Thicknesses, profiles, etc., of all extrusions and members.

.4 Door schedule and layout dimensioned to indicate the number and spacing of anchors.

.5 Location of setting blocks and edge blocks should be clearly indicated.

.6 Type of glazing and sealants.

.7 Hardware, including (without being limited to) handles, latches and locking devices, hinge assemblies, tilt-in hardware, rollers spring assemblies and weather-stripping.

1.6 Quality Assurance

.1 Manufacturer Qualifications: Provide fabrications specified in this Section only by a fabricator / erector who has adequate plant, equipment, and skilled tradesmen to perform it expeditiously, and is known to have been responsible for satisfactory installations similar to that specified during a period of at least the immediate past five years.

.2 Welder Qualifications: Perform welding of structural components only by fabricators certified by Canadian Welding Bureau to CSA welding qualification codes; CSA Standard W47.1 for welding of steel, and CSA Standard W47.2 for welding of aluminum.

1.7 Project / Site Environmental Requirements

.1 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.

1.8 Related By-Laws, Codes and Standard Specifications

.1 Code

.1 Conform with the requirements of the Ontario Building Code, (latest edition) and all amendments

.2 By-laws

.1 Conform with all local, municipal and provincial building by-laws and ordinances.

.3 Standard Specifications

.1 Except where exceeded by the requirements of section of the contract documents, the specifications listed below shall govern.

Standard No.	**Title**
CAN/CGSB-82.1-M89	Sliding Doors
CGSB12.20 M89	Structural Design of Glass for Buildings
CSA G164-M1981	Hot-Dip Galvanizing of Irregularly Shaped Articles
CSAW47.1-1994	Certification of Companies for Fusion Welding of Steel Structures.
CGSB1-GP-108M	Paint, Acid and Alkali Resistant, Black.
CGSB1-GP-181M	Coating, Zinc Rich, Organic, Ready Mix
CSA W47.2-1967	Aluminum Welding Qualification Code.
CSA S-157-05	Strength Design In Aluminum

1.9 Inspection and Testing

.1 The Owner Representative will be engaged to perform field testing of representative window installations. Unsuccessful tests will be at the expense of the door manufacturer

.2 The following field tests may be performed:

.1 Air Infiltration: ASTM E783

.2 Water Resistance: ASTM E1105 with a pressure differential as determined using Appendix SB1 of the 2006 Ontario Building Code..

1.10 Delivery, Storage and Handling

.1 Brace frame units to prevent distortion in shipment and handling, and protect finished surfaces with appropriate protective coverings that do not bond when exposed to the sun.

.2 Employ methods for handling, storing and installing material without causing damage.

.3 Damaged doors may be rejected

1.11 Warranty

.1 Submit a written warranty to the Owner Representative for the fabrication and installation of work specified in this Section covering a period of five (5) years from date of the Certificate for Substantial Performance.

.2 Defects in the fabrication and installation of units specified in this Section shall include, but not be limited to: uncontroled water leakage, excessive air leakage, loosening of whole or of parts of units, breakage or deformation of metalwork, glass breakage from excessive stresses developed within the glazed unit or the glass, and fading or discolouration of factory applied finishes.

.3 Warranties shall include the prompt remedy of defect(s) upon written notification from the Owner. Remedy shall include labour, materials, equipment, and services required to make good defective areas of the work, and in the case of the factory-fabricated components, to supply and install new components, at no cost to the Owner. Warranties shall also include, making good other adjoining parts and finishes or other Owner's property damaged as a result of any defects, or disturbed in the process of remedying defects.

.4 The cost of warranty shall be included in the Contract price.

PART 2 - PRODUCTS

2.1 Materials

.1 Materials: to CAN/CGSB-82.1-M89 and supplemented as follows:

.2 All materials shall be compatible.

.3 Aluminum:

.1 Extrusions: AA6063, alloy and temper for framing, and where not exposed to suit specified and fabricator's requirements.

.2 Exposed Sheet and Plate: AA1100-H14, alloy and temper.

.4 Aluminum Finish:

.1 Enamel coating on interior aluminum shall be “Duracron” as manufactured by PPG, or an approved equivalent. The finish shall be certified by the manufacturer of the finished metal in accordance with AAMA2603. Colour to be selected by Owner.

.2 Enamel coating on exterior aluminum shall be at minimum “Acrynar” as manufactured by PPG or an approved equivalent. The finish shall be certified by the manufacturer of the finished metal in accordance with AAMA2604. Colour to be selected by Owner.

.5 Glass: To meet specified requirements of Section 08 80 00.

.6 Glazing Materials: To meet specified requirements of Section 08 80 00.

.7 Sealant: To meet specified requirements of Section 07 92 00.

.8 Bituminous Paint: To meet specified requirements of CGSB Specification 1-GP-108.

.9 Thermal Break: Solid or hollow extruded sections with a durometer hardness between Shore "A" 75 and 85, to be rolled in.

.10 Screens: To meet the specified requirements of CAN/CGSB-79.1-M91. Extruded aluminum frame with finish to match window framing. Plastic coated fibrous glass screening with an 18 x 16 mesh count.

.11 Weatherstripping: Durable, non-absorbing material resistant to deterioration by weathering and aging. Fin Seal High-Fin for inner sash as manufactured by Schlegel Canada Inc. or an approved equivalent.

.12 Hardware: Stainless steel with satin finish, aluminum with satin finish (except for wearing surfaces). Standard hardware for horizontal slider window unit. Samples to be submitted for approval.

.14 Self Adhering Membrane: Composite self adhering membrane comprised of rubberized or modified asphalt and polyethylene such as Exo Air 110 by Tremco, Blueskin SA as manufactured by Bakor Inc. or an approved equivalent. Primer and sealant as supplied or recommended by the membrane manufacturer.

2.2 Fabrication

.1 Members:

.1 Fabricate generally to dimensions and profiles indicated on reviewed shop drawings and to meet specified requirements. Determine window dimensions from site measurements. Maintain sight lines indicated and clearances to other construction components.

.2 Reinforce members for attachment of hardware.

.3 Ensure that glazing rebate is provided with depth and width to accommodate specified glass in accordance with glass manufacturer's recommendations.

.4 Maintain a minimum clearance of 12 mm and a maximum clearance of 18 mm between window frames and adjacent rough opening components.

.2 Assembly of Units:

.1 Join members by mechanical methods. Reinforcement or fasteners visible on exposed faces of members when window is closed will not be acceptable.

.3 Incorporate weep holes to drain water which enters into system. Baffle to prevent entry of driven water to conform to specified performance.

.4 Except where shipping makes impossible, fabricate units in shop and ship completely assembled with operating hardware attached.

.3 Fasteners: Where fasteners are exposed to dampness or moisture, use cadmium plated steel, or stainless steel fasteners.

.4 Dissimilar Materials:

.1 Protect material from electrolytic action when dissimilar metals are in contact with one another.

.2 Protect aluminum in contact with masonry with a heavy coating of bituminous paint.

.5 Anchors:

.1 Incorporate anchorage to structure as required by the reviewed Shop Drawings.

.2 Allow for complete adjustment in anchorage for leveling and positioning of units during installation.

.3 Straps and angles used for anchoring window system to structure to be aluminum

PART 3 - EXECUTION

3.1 Examination

.1 Take critical site dimensions to ensure that adjustments in fabrication or installation are provided for, that allowance is made for possible deflection of structure at heads, and that clearances to other constructions have been maintained.

3.2 Preparation

.1 Ensure continuity of air barrier is maintained around the rough door opening.

3.3 Installation

.1 Install door in accordance with the instructions given in CAN/CSA-A440.4 “Window Installation” and manufacturer’s printed installation instructions. Tolerances for door framing given in the A440.4 Standard will be strictly adhered to.

.2 General:

.1 Install plumb, level and in accordance with reviewed Shop Drawings.

.2 Do not force units into place, nor apply on them loads for which they were not designed.

.3 Provide for thermal movement to take place between units and adjacent construction.

.4 Conceal anchors, clips, blocking, and all other attachments.

.5 Install reinforcing and supporting members as specified or indicated for units specified in this Section.

.6 Seal metal-to-metal joints between components provided by this Section to ensure a weather-tight assembly, and in accordance with sealant manufacturer's specifications.

.7 Pack frame cavities with insulation.

.8 Provide continuity of air/vapour barriers with adjacent and air/vapour barrier system.

.9 Install units with consideration for finish variations. Abrupt variations of appearance or colour in adjacent components will not be acceptable.

.3 Flashings (Where required):

.1 Flashing shall be installed to shed water away from the building and includes a drip edge.

.2 Prior to installation of window framing, install subsill flashing including prefinished extruded support angle per reviewed shop drawings, self adhering membrane underlay at window sill location and 50 mm up jambs. Sill flashing shall be sloped to shed water to the exterior and include end dams as required. Detail must be incorporated into mock-up for review prior to commencement of work.

.4 Sealants:

.1 Apply sealants where indicated on reviewed Shop Drawings and as specified in Section 07900.

3.4 Cleaning

.1 Remove deposits which affect appearance or operation of units.

.2 Clean interior and exterior surfaces by washing with clear water; or with water and soap or detergent; followed by a clear water rinse.

.3 Clean and restore stained unit and hardware surfaces in accordance with manufacturer's recommendations. Replace if cleaning is impossible.

PART 1 - GENERAL

1.1 Related Work

.1 Aluminum frames: Section 08120 Aluminum Doors and Frames.

.2 Supply of master keyed Section 08710 cylinders: Door Hardware.

1.2 References

.1 ASTM A167-90 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 Aluminum Association Designation System for Aluminum Finishes-1980.

.3 CAN/CGSB-12.1-M90 Tempered or Laminated Safety Glass.

1.4 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate each type of door, sizes, hardware locations, rail shapes and materials.

.3 Submit complete list of hardware for safety glass doors, indicating catalogue and reference identification to specified standards. Include certification of conformance to referenced CGSB standards.

1.5 Maintenance Data

.1 Provide operation and maintenance data for door closers, locksets and door holders for incorporation into manual specified in Section 01730 - Operation and Maintenance Manual.

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

.3 Brief maintenance staff regarding proper care of hardware such as lubrication of locksets, adjustments of door closers, cleaning, and general maintenance.

PART 2 - PRODUCTS

2.1 Glass

.1 Clear safety glass: to CAN/CGSB-12.1, type 2, Class B glazing quality, of thickness indicated.

.2 Translucent safety glass: to CAN/CGSB-12.1, Type 2 Style A of thickness indicated.

.3 Glazing gasket: rubber purpose made gasket for dry glazing.

2.3 Aluminum Finishes

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
- .1 As fabricated or mill finish: designation AA-.
- .2 Clear anodic finish: designation AA-.
- .3 Integral colour anodic finish: designation AA- colour to match Consultant's sample.
- .4 Impregnated colour anodic finish: designation AA- colour to match Consultant's sample.
- .5 Electrolytically deposited colour anodic finish: designation AA- colour to match Consultant's sample.

2.4 Fabrication

.1 Cut glass to required size, finish edges as detailed, provide cutouts for hardware and other attachments before heat treatment.

.2 Attach top and bottom rails and hardware before shipping doors to job site.

.3 Provide safety glass sidelights as indicated.

PART 3 - EXECUTION

3.1 Installation

.1 Install doors in accordance with manufacturer's printed instructions.

.2 Adjust operable parts for correct function.

.3 Adjust weatherstripping to form a weathertight seal.

.4 Clean and polish glass and hardware.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 05500 Metal Fabrications: Steel (plate, angle and channel) door frames.

.2 Section 08800 Glazing.

.3 Section 09911 Interior Painting.

.4 Section 16: Electrical power supply.

1.2 References

.1 Canadian Standards Association (CSA)
- .1 CSA G164-M92 Hot Dip Galvanizing of Irregularly Shaped Articles.

.2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-1.105-M91 Quick-Drying Primer.
- .2 CGSB 1-GP-121M-77 Coating, Vinyl, Pretreatment, for Metals (Vinyl Wash Primer).
- .3 CGSB 1-GP-181M-77 Coating, Zinc-Rich, Organic, Ready Mixed.

.3 American Society for Testing and Materials (ASTM)
- .1 ASTM A 366M-85 Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- .2 ASTM A 526M-[90] Specification for Steel Sheet, Zinc-coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
- .3 ASTM D 523-89 Test Method for Specular Gloss.
- .4 ASTM D 822-89 Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.

.4 The Aluminum Association Inc. (AA)
- .1 Aluminum Association Designation System for Aluminum Finishes-1980.

1.3 Design Requirements

.1 Design exterior door assembly to withstand wind load of 1 kPa with a maximum horizontal deflection of 1/240 of opening width.

.2 Design door assembly to withstand minimum 15,000 cycles per annum.

.3 Provide 2 year warranty.

1.4 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate sizes, service rating, types, materials, operating mechanisms, glazing locations and details, hardware and accessories, required clearances and electrical connections.

1.5 Closeout Submittals

.1 Provide operation and maintenance data for overhead door hardware for incorporation into manual specified in Section 01730 - Operation and Maintenance Manual.

.2 Provide operation and maintenance data for overhead door hardware for incorporation into manual specified.

1.6 Extra Materials

.1 Provide spare parts in accordance with Section 01730 - Maintenance Materials, Special Tools and Spare Parts.

.2 Provide spare parts for overhead doors as follows:
2.1 Door panels: 5
.2 Door rollers: 20
.3 Weather stripping: 10 sets.
.4 Springs and cables: 10

.3 Store where directed. Identify each part and reference to appropriate door.

PART 2 - PRODUCTS

2.1 Materials

.1 Galvanized steel sheet: commercial quality to ASTM A 526M with Z275 zinc coating.

.2 Steel sheet: commercial quality to ASTM A 366M unexposed(U).

.3 Aluminum sheet: mill finish plain utility sheet.

.4 Anodized aluminum sheet: plain anodizing quality aluminum sheet.

.5 Aluminum extrusions: Aluminum Association alloy AA6063-T5.

.6 Primer: to CAN/CGSB-1.105 for steel CGSB 1-GP-121M for aluminum CGSB 1-GP-181M, for galvanized steel surfaces.

.7 Glazing: Section 08800

.8 Cable: multi-strand galvanized steel aircraft cable.

2.2 Doors

.1 Fabricate 45 mm thick panel doors of interlocking aluminum sections as indicated.

.2 Fabricate panel frames in a continuous box frame with vertical stiffeners 600 mm centers.

.3 Install glazing for door sections (if shown). Sizes and number of lights as indicated.

.4 Assemble components by means of spot or arc welding or coated rivet system or adhesive and self tapping screws to manufacturer's recommendations.

.5 Apply shop coat of primer after fabrication of door.

2.3 Heavy Duty Industrial Hardware

.1 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.

.2 Top roller carrier: galvanized Steel 3.04 mm thick adjustable.

.3 Rollers: full floating grease packed hardened steel, ball bearing 75 mm diameter solid steel tire.

.4 Roller brackets: adjustable, minimum 2.5 mm galvanized steel.

.5 Hinges: heavy duty, 3.04 mm thick galvanized stainless steel as recommended by manufacturer.

.6 Cable: 6 mm diameter galvanized steel aircraft cable.

2.4 Standard Duty Industrial Hardware

.1 Track: standard hardware with 75 mm size, minimum 2.28 mm core thickness galvanized steel track.

.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: 133 mm diameter die cast aluminum.
.2 Shaft: 25 mm diameter solid steel.

.4 Top roller carrier: galvanized steel minimum 2.28 mm thick adjustable,

.5 Rollers: full floating, grease packed hardened steel, ball bearing minimum 75 mm diameter, stamped tire.

.6 Roller brackets: adjustable, galvanized steel, minimum 2.5 mm thick.

.7 Hinges: standard duty industrial 2.28 mm thick galvanized or as recommended by manufacturer.

.8 Cable: minimum 4 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.

.4 Handles
- .1 Flat bar door latch with night latch and electric interlock switch.
- .2 Handles: key operated from outside.
- .3 Drop ring: outside drop ring handle for high lift doors.

.5 Weather stripping
- .1 Sills: double contact full width extruded neoprene weather-strip.
- .2 Jambs and head: extruded aluminum and arctic grade vinyl weather-strip to manufacturer's standard.

.6 Finish ferrous hardware items with minimum zinc coating of 300 g/mto CSA G164.

2.6 Aluminum Finishes

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
- .1 As fabricated mill finish: designation AA-.

2.7 Prefinished Steel Sheet

.1 Prefinished steel with factory applied polyvinylidene fluoride.
- .1 Class F1S.
- .2 Colour selected by Consultant from manufacturer's standard range.
- .3 Specular gloss: 30 units +/- 5 in accordance with ASTM D 523.
- .4 Coating thickness: not less than 200 micrometers.
- .5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D 822 as follows:
  - .1 Outdoor exposure period 5000 hours.
  - .2 Humidity resistance exposure period 5000 hours.

2.8 Operators

.1 Equip doors for operation by:
- .1 Hand, two handles on inside face of door.

.2 Cable fail safe device.
- .1 Able to stop door immediately if cable breaks on door free fall. Braking capacity 500 kg.

2.9 Electrical Operator

.1 Electrical jack shaft center side mounted trolley type operator.

.2 Electrical motors, controller units, remote push button stations, relays and other electrical components: to CSA approval with CSA enclosure.

.3 Power supply: as indicated.

.4 Controller units with integral motor reversing starter, solenoid operated brake 3 heater elements for overload protection, including push buttons and control relays as applicable.

.5 Operation:
- .1 Remote push button stations: surface mounted, with "OPEN-STOP-CLOSE" designations on push buttons in English and French.
- .2 Cable control: pendant hung control to open and electric eyes to close.

.6 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.

.7 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.

.8 For trolley operators:
- .1 Attach operator to door with quick release device to disconnect door from operator in event of power failure.

.9 Automatic illumination complete with time delay, self extinguishing.

.10 Door speed 300 mm per second.

.11 Control transformer: for 24 V AC control voltage.

.12 Mounting brackets: galvanized steel, size and gauge to suit conditions.

PART 3 - EXECUTION

3.1 Installation

.1 Install doors and hardware in accordance with manufacturer's instructions.

.2 Rigidly support rail and operator and secure to supporting structure.

.3 Touch-up steel doors with primer where galvanized finish damaged during fabrication.

.4 Install operator including electrical motors, controller units, push button stations, relays and other electrical equipment required for door operation.

.5 Lubricate and adjust door operating components to ensure smooth opening and closing of doors.

.6 Adjust weather-stripping to form a weather-tight seal.

PART 1 - GENERAL

1.1 Related Work

.1 Conventional doors: Section.

.2 Architectural hardware: Section 08715 Cabinet and Miscellaneous Hardware.

.3 Electrical wiring for magnetic strikes, electric releases, electric locks: Section 16.

1.2 Reference Standards

.1 Standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufactures' Association.

.2 CAN/CGSB-69.17-M86/ANSI/BHMA A156.2-1983, Bored and Preassembled Locks and Latches.

.3 CAN/CGSB-69.18-M90/ANSI/BHMA A156.1-1981, Butts and Hinges.

.4 CAN/CGSB-69.19-M89/ANSI/BHMA A156.3-1984, Exit Devices.

.5 CAN/CGSB-69.20-M90/ANSI/BHMA A156.4-1986, Door Controls (Closers).

.6 CAN/CGSB-69.21-M90/ANSI/BHMA A156.5-1984, Auxiliary Locks and Associated Products.

.7 CAN/CGSB-69.22-M90/ANSI/BHMA A156.6-1986, Architectural Door Trim.

.8 CAN/CGSB-69.23-M90/ANSI/BHMA A156.7-1981, Template Hinge Dimensions.

.9 CAN/CGSB-69.24-M90/ANSI/BHMA A156.8-1982, Door Controls - Overhead Holders.

.10 CAN/CGSB-69.26-M90/ANSI/BHMA A156.10-1985, Power-operated Pedestrian Doors.

.11 CAN/CGSB-69.28-M90/ANSI/BHMA A156.12-1986, Interconnected Locks and Latches.

.12 CAN/CGSB-69.29-M90/ANSI/BHMA A156.13-1980, Mortise Locks and Latches.

.13 CAN/CGSB-69.30-M90/ANSI/BHMA A156.14-1985, Sliding and Folding Door Hardware.

.14 CAN/CGSB-69.31-M89/ANSI/BHMA A156.15-1981, Closer/Holder Release Device.

.15 CAN/CGSB-69.32-M90/ANSI/BHMA A156.16-1981, Auxiliary Hardware.

.16 CAN/CGSB-69.33-M90/ANSI/BHMA A156.17-1987, Self-closing Hinges and Pivots.

.17 CAN/CGSB-69.34-M90/ANSI/BHMA A156.18-1984, Materials and Finishes.

.18 CAN/CGSB-69.35-M89/ANSI/BHMA A156.19-1984, Power Assist and Low Energy Power Operated Doors.

.19 CAN/CGSB-69.36-M90/ANSI/BHMA A156.20-1984, Strap and Tee Hinges and Hasps.

1.3 Requirements Regulatory Agencies

.1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.

1.4 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.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.

1.5 Hardware List

.1 Submit contract hardware list in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.

1.6 Maintenance Data

.1 Provide operation and maintenance data for door closers, locksets, door holders and fire exit hardware for incorporation into manual specified in Section 01730 - Operation and Maintenance Manual.

.2 Brief maintenance staff regarding proper care, cleaning, and general maintenance.

1.7 Maintenance Materials

.1 Provide maintenance materials in accordance with Section 01730 - Maintenance Materials, Special Tools and Spare Parts.

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

1.8 Delivery and Storage

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

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

PART 2 - PRODUCTS

2.1 Hardware Items

.1 Only door locksets and latch sets listed on CGSB Qualified Products List are acceptable for use on this project.

.2 Use one manufacturer's products only for all similar items.

2.2 Door Hardware

.1 Locks and latches:
- .1 Bored and pre-assembled locks and latches: to CAN/CGSB-69.17, 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.
- .5 Escutcheons: round square.
- .6 Normal strikes: box type, lip projection not beyond jamb.
- .7 Cylinders: key into keying system as noted.
- .8 Finished to.

.2 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.
- .2 Self-closing hinges and pivots: to CAN/CGSB-69.33, designated by letter K and numeral identifiers listed in Hardware Schedule, with suffix letter F indicating listed for used on fire doors.

.3 Strap and tee hinges and hasps: to CAN/CGSB-69.36, designated by letter A and numeral identifiers listed in Hardware Schedule, size listed in Hardware Schedule in accordance with CAN/CGSB 69.36, Table I.

.3 Exit devices: to CAN/CGSB-69.19, type, function, grade 1, conventional design, finished to.

.1 Auxiliary item(s): door coordinator, type 21, for pairs of doors with overlapping astragals.

.4 Door Closers and Accessories:
.1 Door controls (closers): to CAN/CGSB-69.20, designated by letter C and numeral identifiers listed in Hardware Schedule, size in accordance with CAN/CGSB-69.20, table A1, finished to.
.2 Door controls - overhead holders: to CAN/CGSB-69.24, designated by letter C and numeral identifiers listed in Hardware Schedule, finished to.
.3 Closer/holder release devices: to CAN/CGSB-69.31, designated by letter C and numeral identifiers listed in hardware schedule, finished to.
.4 Door coordinator: surface concealed for pairs of doors with overlapping astragal.

.5 Door Operators:
.1 Power-operated pedestrian doors: to CAN/CGSB-69.26.
.2 Power assist and low energy power operated doors: to CAN/CGSB-69.35.

.6 Auxiliary locks and associated products: to CAN/CGSB-69.21, designated by letter E and numeral identifiers listed in Hardware Schedule, finished to.
.1 Dead bolt, type finished to. Key into keying system as noted.
.2 Cylinders: type, finished to, for installation in deadlocks provided with special doors as listed in Hardware Schedule. Key into keying system as noted.

.7 Architectural door trim: to CAN/CGSB-69.22, designated by letter J and numeral identifiers listed in Hardware Schedule finished to.
.1 Door protection plates: kick plate type, 1.27 mm thick brass 1 edges finished to.
.2 Push plates: type, 1.27 mm thick brass1 edges, finished to.
.3 Push/Pull units: type brass, finished to.

.8 Sliding and folding door hardware: to CAN/CGSB-69.30, designated by letter D and numeral identifiers listed in Hardware Schedule.

.9 Door bottom seal: heavy duty, door seal of extruded aluminum frame and solid closed cell neoprene weather seal, recessed in door bottom closed ends, adjustable automatic retract mechanism when door is open, clear anodized finish.

.10 Thresholds:860 mm wide x full width of door opening, mill finish, plain surface, with lip and vinyl door seal insert.

.11 Weather-stripping:
- .1 Head and jamb seal:
  - .1 Extruded aluminum frame and solid closed cell neoprene.
  - .2 Adhesive backed neoprene material.
- .2 Door bottom seal:
  - .1 Extruded aluminum frame and closed cell neoprene nylon brush sweep.

.12 Astragal: adjustable compensating overlapping, extruded aluminum frame with vinyl pile insert, finished to match doors.

2.3 Miscellaneous Hardware

.1 Indexed key control system: to CAN/CGSB-69.21, designated by letter E and numeral identifiers, wall mounted multiple drawer portable system, type colour enamel paint finish.

2.4 Fastenings

.1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.2 Exposed fastening devices to match finish of hardware.

.3 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.

.4 Use fasteners compatible with material through which they pass.

2.5 Keying

.1 Doors, padlocks and cabinet locks to be keyed differently master keyed great as noted in Hardware Schedule. Prepare detailed keying schedule in conjunction with Consultant.

.2 Provide keys in duplicate for every lock in this Contract.

.3 Provide three master keys for each MK or GMK group.

.4 Stamp keying code numbers on keys and cylinders.

.5 Provide construction cores.

.6 Provide all permanent cores and keys to Consultant.

PART 3 - EXECUTION

3.1 Installation Instructions

.1 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

.2 Furnish manufacturers' instructions for proper installation of each hardware component.

.3 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.

.4 Where doorstop contacts door pulls, mount stop to strike bottom of pull.

.5 Install key control cabinet.

.6 Remove construction when directed by Consultant; install permanent cores and check operation of all locks.

3.2 Setup Keying System 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 Consultant.

PART 1 - GENERAL

1.1 Related Work

.1 Cabinetwork and shelves: Section 06200 Finishes Carpentry

.2 Cabinetwork and shelves: Section 06400 Architectural Woodwork

.3 Door hardware: Section 08710 Door Hardware

1.2 Reference Standards

.1 CAN/CGSB-69.25-M90/ANSI/BHMA A156.9-1982 Cabinet Hardware.

.2 CAN/CGSB-69.27-M90/ANSI/BHMA A156.11-1985, Cabinet Locks.

.3 CAN/CGSB-69.32-M90/ANSI/BHMA A156.16-1981, Auxiliary Hardware.

.4 CAN/CGSB-69.34-M90/ANSI/BHMA A156.18-1984, Materials and Finishes.

.5 CAN/CGSB-69.36-M90/ANSI/BHMA A156.20-1984, Strap and Tee Hinges and Hasps.

1.3 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

1.4 Hardware List

.1 Submit cabinet hardware list in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate specified hardware, including make, model, material, function, finish and other pertinent information.

1.5 Maintenance Data

.1 Provide maintenance data, parts list, and manufacturer's instructions for incorporation into maintenance manual specified in Section 01730 - Operation and Maintenance Manual.

.2 Brief maintenance staff regarding proper care, cleaning, and general maintenance.

1.6 Delivery and Storage

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

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

PART 2 - PRODUCTS

2.1 Hardware Items

.1 Use one manufacturer's product for all similar items.

2.2 Cabinet Hardware

.1 Cabinet hardware: to CAN/CGSB-69.25, designated by letter B and numeral identifiers as listed below.
- .1 Hinges: butt hinge.
- .2 Pulls: back mounted with back plate, type B02191.
- .3 Knobs: back mounted knob, with back plate, type B02181.
- .4 Latches: elbow latch.
- .5 Catches: magnetic catch.
- .6 Adjustable shelf standards, type with closed shelf rests.
- .7 Shelf brackets and standards: vertical slotted shelf standard, with shelf brackets.
- .8 Drawer slides: bottom edge mounted drawer slides.
- .9 Rotating shelves: full round rotating shelves, with 180 degree rotatable shelf mechanism.
- .10 Pull up shelf supports: adjustable tension, lock in up position self supports, type B06033.
- .11 Track and guides for sliding panels: surface or recessed mounted.

.2 Cabinet locks: to CAN/CGSB-69.27, designated by letter E and numeral identifiers as listed below.
- .1 Door or drawer locks: surface mounted.
- .2 Sliding door locks.
- .3 Cylinders: key into keying system as directed.
- .4 Finished.

2.3 Miscellaneous Hardware

.1 Auxiliary hardware: to CAN/CGSB-69.32, as listed below:
- .1 Handrail brackets.
- .2 Garment hooks.
- .3 Garment rods & shelf brackets.
- .4 Window bolts or catches.
- .5 Window lifts.
- .6 Roller latch: type.

.2 Strap and tee hinges and hasps: to CAN/CGSB-69.36, designated by letter A and numeral identifiers listed in Hardware Schedule, size in accordance with Table I, finished to approved by Consultant.

.3 Closet shelf supports: heavy duty support with brace for shelf and closet rod, wrought steel, white colour enamel paint finish.

.4 Closet hanger bar and supports:
.1 Metal pole sockets for metal poles.
.2 Extension closet rod with integral end supports and center support, finished to 645 (nickel plated).

.5 Padlock.

2.4 Fastenings

.1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.2 Exposed-fastening devices to match finish of hardware.

.3 Use fasteners compatible with material through which key pass.

2.5 Keying

.1 Padlocks and cabinet lock to be keyed alike as directed. Submit keying schedule for approval.

.2 Provide keys in duplicate for every lock in this Contract.

.3 Provide three master keys for each MK or GMK group.

.4 Stamp keying code numbers on keys and cylinders.

.5 Install key cabinet, location as indicated.

PART 3 - EXECUTION

3.1 Installation Instructions

.1 Furnish manufacturers' instruction for proper installation of each hardware component.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 09250 Gypsum Board: Gypsum board.

1.2 References

.1 CAN/CGSB-1.40-M89, Primer, Structural Steel, Oil Alkyd Type.

.2 CAN/CGSB-19.21-M87, Sealing and Bedding Compound Acoustical.

.3 ASTM C645-88, Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.

PART 2 - PRODUCTS

2.1 Materials

.1 Non-loadbearing channel stud framing: to ASTM C645, 92 mm stud size, roll formed from 0.91 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knockout service holes at 460 mm centres.

.2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.

.3 Non-loadbearing truss stud framing system: to consist of:
- .1 Studs: 92 mm size; truss-type bent rod web with double rod chords 12 x 6 mm x 1.2 mm channel chords; welded together at contact points. Make rod of minimum 4.5 mm diameter cold drawn steel wire having tensile strength of 620 MPa. Design studs for clip attachment of gypsum lath or wire tying of metal lath.
- .2 Floor track: snap-in type formed to hold studs securely in place at 50 mm intervals; fabricated from 0.5 mm thick steel sheet; size to suit studs.
- .3 Ceiling track: channel shaped track for use with stud shoes and 1.2 mm diameter double wire ties; size to suit studs.
- .4 After fabrication apply one shop coat of CAN/CGSB-1.40 primer to steel surfaces. Descale and clean surfaces before painting.

.4 Metal channel stiffener: size as noted, 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.

.5 Acoustical sealant: to CAN/CGSB-19.21.

.6 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

PART 3 - EXECUTION

3.1 Erection

.1 Align partition tracks at floor and ceiling and secure at 600 mm o.c. maximum.

.2 Install dampproof course under stud shoe tracks of partitions on slabs on grade.

.3 Place studs vertically at 600 mm oc and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.4 Erect metal studding to tolerance of 1:1000.

.5 Attach studs to bottom ceiling track using screws.

.6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.

.8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.

.9 Install double studs at jamb openings.

.10 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.

.11 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.12 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.

.13 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.14 Extend partitions to ceiling height except where noted otherwise on drawings.

.15 Maintain clearance under beams and structural slabs to avoid

transmission of structural loads to studs. Use 50 mm leg ceiling tracks.

.16 Install continuous insulating strips to isolate studs from uninsulated surfaces.

.17 Install two continuous beads of acoustical sealant insulating strip under studs and tracks around perimeter of sound control partitions.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 09250 Gypsum Board: Suspension systems for gypsum board ceilings.

.2 Section 09510 Acoustical Ceilings: Acoustical units.

.3 Section 15: Trim for recessed mechanical fixtures.

.4 Section 16: Trim for recessed light fixtures.

1.2 References

.1 ASTM C635-91, Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.

.2 ASTM C636-91, Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

1.3 Design Requirements

.1 Maximum deflection: 1/360th of span to ASTM C635 deflection test.

1.4 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit reflected ceiling plans for special grid patterns as indicated.

.3 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines change in level details, access door dimensions, and locations and acoustical unit support at ceiling fixture.

1.5 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit one representative model of each type ceiling suspension system.

.3 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.6 Regulatory Requirements

.1 Fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

PART 2 - PRODUCTS

2.1 Materials

.1 Intermediate duty system to ASTM C635.

.2 Basic materials for suspension system: commercial quality cold rolled steel.

.3 Suspension system: non fire rated, made up as follows:
- .1 two directional exposed tee bar grid.
- .2 one directional exposed tee bar grid.
- .3 two directional concealed tee spline.
- .4 concealed tee access spline
- .5 concealed T & G runner
- .6 concealed H runner, tee spline and flat steel spline
- .7 concealed zee runner and flat steel spline.
- .8 metal pan special tee system

.4 Fire-resistance rated suspension system: certified for use in 1 hour, Certification Organizations Design floor/ceiling and roof/ceiling assembly.

.5 Exposed tee bar grid components: shop painted satin sheen white. Components die cut. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.

.6 Hanger wire: galvanized soft annealed steel wire.
- .1 3.6 mm diameter for access tile ceilings.
- .2 To ULC design requirements for fire rated assemblies.
- .3 2.6 mm diameter for other ceilings.

.7 Hanger inserts: purpose made.

.8 Carrying channels: 38 x 38 mm channel, of mm thick painted steel.

.9 Accessories: splices, clips, wire ties, retainers and wall moulding reveal, to complement suspension system components, as recommended by system manufacturer.

PART 3 - EXECUTION

3.1 Installation

.1 Installation: in accordance with ASTM C636 except where specified otherwise.

.2 Install suspension system to manufacturer's instructions and Certification Organizations tested design requirements.

.3 Do not erect ceiling suspension system until work above ceiling has been inspected by Consultant.

.4 Secure hangers to overhead structure using attachment methods acceptable to Consultant.

.5 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.

.6 Lay out room perimeter system according to reflected ceiling plan.

.7 Ensure suspension system is co-ordinated with location of related components.

.8 Install wall moulding to provide correct ceiling height.

.9 Completed suspension system to support super-imposed loads, such as lighting fixtures diffusers grilles and speakers.

.10 Support at light fixtures diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.11 Interlock Attach cross member to main runner to provide rigid assembly.

.12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.

.13 Install access splines to provide 25 percent ceiling access.

.14 Finished ceiling system to be square with adjoining walls and level within 1:1000.

.15 Expansion joints.
.1 Erect two main runners parallel 25 mm apart, on building expansion joint line. Lay in strip of acoustic tile/board, painted black, 25% narrower than space between 2 'T' bars.
.2 Supply and install "Z" shaped metal trim pieces at each side of expansion joint. Design to accommodate plus or minus 25 mm movement and maintain visual closure. Finish metal components to match adjacent exposed metal trim. Provide backing plates behind butt joints.

3.2 Cleaning

.1 Touch up scratches, abrasions, voids and other defects in painted surfaces.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 06100 - Rough Carpentry: Wood framing/grounds.

.2 Section 15: Access doors.

1.2 References

.1 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.

.2 Underwriters Laboratories of Canada (ULC)
- .1 CAN/ULC-S102-1988, Building Materials and Assemblies, Standard Method of Test for Surface Burning Characteristics of.

.3 American Society for Testing and Materials (ASTM)
- .1 ASTM A 653M-94, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM C 36-95, Specification for Gypsum Wallboard.
- .3 ASTM C 79-94, Specification for Gypsum Sheathing Board.
- .4 ASTM C 442-92, Specification for Gypsum Backing Board and Coreboard.
- .5 ASTM C 475-94, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
- .6 ASTM C 514-94, Specification for Nails for the Application of Gypsum Board.
- .7 ASTM C 630-93, Specification for Water-Resistant Gypsum Backing Board.
- .8 ASTM C 840-95, Specification and Finishing of Gypsum Board.
- .9 ASTM C 931/931M-95, Specification for Exterior Gypsum Soffit Board.
- 10 ASTM C 954-93, Specification for Steel Drill Screws for the Application of Gypsum Board.
- .11 ASTM C 960-91, Specification for Predecorated Gypsum Board.
- .12 ASTM C 1047-94, Accessories for Gypsum Wallboard and Gypsum Veneer.
- .13 ASTM C 1280-94, Specification for Application of Gypsum Sheathing Board.
- .14 ASTM C 1177-91, Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- .15 ASTM C 1178-93, Specification for Glass Mat Water-Resistant Gypsum Backing Board.

1.3 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

1.4 Environmental Requirements

.1 Maintain temperature minimum 10°C, maximum 21°C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.

.2 Apply board and joint treatment to dry, frost free surfaces.

PART 2 - PRODUCTS

2.1 Materials

.1 Standard board: to ASTM C 36, as indicated on drawings, 1200 mm wide x maximum practical length, ends square cut, edges squared minimum 25% recycled content.

.2 Gypsum sheathing board: to ASTM C 79, as indicated on drawings, 1200 mm wide x maximum practical length, EcoLogo certified minimum 25% recycled content.

.3 Backing board and coreboard: to ASTM C 442 regular, 15.9 mm thick and Type X, 15.9 mm thick, squared edges.

.4 Water resistant board: to ASTM C 630 regular, 15.9 or 12.7 mm thick and Type X, 15.9 mm thick, 1200 mm wide x maximum practical length.

.5 Exterior gypsum soffit board: to ASTM C 931/C931M 15.9 mm thick, 1200 mm wide x maximum practical length.

.6 Glass mat water-resistant gypsum backing board: to ASTM C 1178, 1200 mm wide x maximum practical length.

.7 Glass mat gypsum substrate sheathing: to ASTM C 1177, 1200 mm wide x maximum practical length.

.8 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30, galvanized.

.9 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.

.10 Resilient clips: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.

.11 Nails: to ASTM C 514.

.12 Steel drill screws: to ASTM C 1002.

.13 Stud adhesive: to CAN/CGSB-71.25 ASTM C 557.

.14 Laminating compound: as recommended by manufacturer, asbestos-free.

.15 Casing beads, corner beads, control joints and edge trim: to ASTM C 1047, metal, 0.5 mm base thickness, perforated flanges, one piece length per location.

.16 Cornice cap: 12.7 mm deep x partition width, of 1.6 mm base thickness galvanized sheet steel, prime painted extruded aluminum, minimum 2.5 mm thick, clear anodized to Aluminum Association designation AA. Include splice plates for joints.

.17 Shadow mould: 35 mm high, snap-on trim, of 0.6 mm base steel thickness galvanized sheet prefinished in satin enamel white colour.

.18 Wood mouldings: mouldings for joint treatment of vinyl-faced gypsum board, as supplied by gypsum board manufacturer.

.19 Sealants: 5

.20 Acoustic sealant: 4.

.21 Polyethylene: to CAN/CGSB-51.34, Type 2.

.22 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.

.23 Joint compound: to ASTM C 475, asbestos-free.

2.2 Finishes

.1 Texture finish: asbestos-free standard white texture coating and primer-sealer, recommended by gypsum board manufacturer.

PART 3 - EXECUTION

3.1 Erection

.1 Do application and finishing of gypsum board in accordance with ASTM C 840 except where specified otherwise.

.2 Do application of gypsum sheathing in accordance with ASTM C 1280.

.3 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C 840 except where specified otherwise.

.4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

.5 Install work level to tolerance of 1:1200.

.6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.

.7 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

.8 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.

.9 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

.10 Install wall furring for gypsum board wall finishes in accordance with ASTM C 840, except where specified otherwise.

.11 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.12 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

.13 Erect drywall resilient furring transversely across studs joists between the layers of gypsum board, spaced maximum 600 mm oc and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screw.

.14 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions where resilient furring installed.

3.2 Application

.1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.

.2 Apply single layer gypsum board to metal furring or framing using screw fasteners for first layer, screw fasteners for second layer. Maximum spacing of screws as per applicable codes and standards.

.3 Apply single layer gypsum board to concrete block surfaces, where indicated, using laminating adhesive.

.4 Apply water resistant gypsum board where wall tiles to be applied and adjacent to slop sinks janitor's closets. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

.5 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, in partitions where perimeter sealed with acoustic sealant.

.6 Arrange vinyl faced gypsum board symmetrical about openings and wall areas, with butt joints.

.7 Apply board using stud adhesive on furring or framing.

.8 Studless Solid Gypsum Wallboard Partitions.

3.3 Installation

.1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm oc.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.

.4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.

.5 Install shadow mould at gypsum board/ceiling juncture as indicated. Minimize joints; use corner pieces and splicers.

.6 Construct control joints of preformed units two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.

.7 Provide continuous polyethylene dust barrier behind and across control joints.

.8 Locate control joints where indicated at changes in substrate construction at approximate 10 m spacing on long corridor runs at approximate 15 m spacing on ceilings.

.9 Install control joints straight and true.

.10 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.

.11 Install expansion joint straight and true.

.12 Install cornice cap where gypsum board partitions do not extend to ceiling.

.13 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm oc.

.14 Splice corners and intersections together and secure to each member with 3 screws.

.15 Install access doors to electrical and mechanical fixtures specified in respective Sections.
.1 Rigidly secure frames to furring or framing systems.

.16 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.17 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.18 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.19 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.20 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

.21 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.

.22 Mix joint compound slightly thinner than for joint taping.

.23 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.

.24 Allow skim coat to dry completely.

.25 Remove ridges by light sanding or wiping with damp cloth.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 06100 Rough Carpentry: Wood strapping.

.2 Section 09130 - Acoustical Suspension: Suspension system.

1.2 References

.1 Canadian Standards Association (CSA)
.1 CSA B111-1974, Wire Nails, Spikes and Staples.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
.2 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.

.3 Underwriters Laboratories of Canada (ULC)
.1 CAN/ULC-S102-M88, Surface Burning Characteristics of Building Materials.

1.3 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit duplicate full size samples of each type acoustical units.

1.4 Regulatory Requirements

.1 Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

1.5 Mock-up

.1 Construct mock-ups in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Construct mock-up 10 m″ minimum of each type acoustical panel tile ceiling including one inside corner and one outside corner.

.3 Construct mock-up where directed.

.4 Allow 24 hours for inspection of mock-up by Consultant before proceeding with ceiling work.

.5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

1.6 Environmental Requirements

.1 Permit wet work to dry before commencement of installation.

.2 Maintain uniform minimum temperature of 15°C and humidity of 20 - 40% before and during installation.

.3 Store materials in work area 48 hours prior to installation.

1.7 Maintenance Materials

.1 Provide extra materials of acoustic units in accordance with Section 01731 - Maintenance Materials, Special Tools and Spare Parts.

.2 Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type required for project.

.3 Extra materials to be from same production run as installed materials.

.4 Clearly identify each type of acoustic unit, including colour and texture.

.5 Deliver to Consultant, upon completion of the work of this section.

.6 Store where directed by Consultant.

PART 2 - PRODUCTS

2.1 Materials

.1 Acceptable material.

.2 Acoustic units for suspended ceiling system: to CAN/CGSB-92.1.
- .1 Type.
- .2 Cellulose fibre with minimum 75% recycled content.
- .3 Pattern.
- .4 Flame spread rating of 25 or less.
- .5 Smoke developed 300 or less.
- .6 Noise reduction coefficient (NRC) designation of
- .7 Light reflectance range of
- .8 Ceiling plenum sound transmission range of
- .9 Edge type bevelled.
- .10 Colour
- .11 Size
- .12 Shape flat.
- .13 Perforated to permit air flow of m≥/s per m″ of tile.
- .14 Alloy designation for stainless steel pans 302.
- .15 Surface finish of aluminum panels anodized.
- .16 Fire-resistance rated, certified for use in 1 hour floor/ceiling and roof/ceiling assembly, Certification Organizations Design.
- .17 Surface coverings: EcoLogo certified paint low VOC paint.

.3 Adhesive: low VOC type recommended by acoustic unit manufacturer.

.4 Staples, nails and screws: to CSA B111 non-corrosive finish as recommended by acoustic unit manufacturer.

.5 Fibrous acoustical media.

.6 Spacers: galvanized wire acoustical media supports, crimped and welded, to allow space between back of unit and acoustical media.

.7 Polyethylene: to CAN/CGSB-51.34, 0.15 mm thick.

.8 Hold down clips: purpose made clips to secure tile to suspension system, approved for use in fire-rated systems.

PART 3 - EXECUTION

3.1 Examination

.1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Consultant.

3.2 Installation

.1 Install acoustical panels and tiles in ceiling suspension system.

.2 Install fibrous acoustical media and spacers over entire area above suspended metal panels.

.3 In fire rated ceiling systems, secure lay-in panels with hold-down clips and protect over light fixtures, diffusers, air return grilles and other appurtenances according to Certification Organizations design requirements.

3.3 Application

.1 Install adhesive bonded acoustic units to clean, dry and firm substrate.

.2 Install acoustical units. Refer to reflected ceiling plan.

.3 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

3.4 Interface With Other Work

.1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 06200 Finish Carpentry.

.2 Section 09962 Elastomeric Coatings.

1.2 References

.1 Canadian Painting Contractors' Architectural (CPCA).
- .1 Painting Specifications Manual 1993.

.2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-1.36-M90, General Purpose Interior Varnish.
- .2 CAN/CGSB-1.38-M91, Interior Enamel Undercoater.
- .3 CGSB 1-GP-48M-78, Primer, Marine, for Steel.
- .4 CAN/CGSB-1.57-M90, Alkyd, Interior, Semigloss, Enamel.
- .5 CAN/CGSB-1.60-M89, Interior Alkyd Gloss Enamel.
- .6 CAN/CGSB-1.68-M91, Solvent Type Primer-Sealer for Interior Walls.
- .7 CAN/CGSB-1.73-M91, Exterior and Interior Enamel for Floors.
- .8 CAN/CGSB-1.100-M89, Interior Latex Type, Flat Paint.
- .9 CAN/CGSB-1.102-M89. Clear Alkyd Type Sealer.
- .10 CAN/CGSB-1.118-M89, Interior Alkyd, Flat Finish.
- .11 CAN/CGSB-1.119-M89, Primer-Sealer, Wall, Interior Latex Type.
- .12 CAN/CGSB-1.121-93, Vinyl Pretreatment Coating for Metals (Vinyl Wash Primer).
- .13 CAN/CGSB-1.126-M91, Vinyl Sealer for Wood.
- .14 CAN/CGSB-1.143-M90, Heat Resistant Aluminum Enamel, Silicone Alkyd.
- .15 CAN/CGSB-1.145-M90, Solvent-Based Pigmented Stain.
- .16 CAN/CGSB-1.146-92, Cold Curing, Gloss Epoxy Coating.
- .17 CAN/CGSB-1.150-M91, Clear Lacquer for Wood Furniture.
- .18 CAN/CGSB-1.153-M90, High Build, Gloss, Epoxy Coating.
- .19 CAN/CGSB-1.165-M89, Cold Curing Epoxy Primer.
- .20 CAN/CGSB-1.175-M89, Polyurethane Interior Coating, Oil Modified, Clear, Gloss and Satin.
- .21 CGSB 1-GP-180Ma-82, Coating, Polyurethane, Two-Package, General Purpose.
- .22 CAN/CGSB-1.188-M90, Emulsion Type Filler Masonry Block.
- .23 CGSB 1-GP-193Ma-83, Coating, High-Build Epoxy, Marine.
- .24 CAN/CGSB-1.195-M90 Interior Semigloss Latex Paint.
- .25 CAN/CGSB-1.198-92, Cementitious Primer (for Galvanized Surfaces).
- .26 CAN/CGSB-1.202-92, Interior Low Gloss Alkyd Enamel.
- .27 CAN/CGSB-1.209-93, Low Sheen Latex Interior Paint.
- .28 CGSB 85-GP-1M-78, Painting (New) Exterior Wooden Surfaces.
- .29 CGSB 85-GP-2M-78, Painting (Maintenance) of Exterior Painted Wooden Surfaces.
- .30 CGSB 85-GP-10M-79, Shop Painting Structural Steel.
- .31 CGSB 85-GP-11M-80, Painting Steel for Protection Against Continuous Wetting.

.32 CGSB 85-GP-13M-80, Painting Structural Steel for Protection Against Heavy Industrial Atmospheres.
.33 CGSB 85-GP-14M-78, Painting Steel Surfaces Exposed to Normally Dry Weather.
.34 CGSB 85-GP-15M-78, Painting, Maintenance, Exterior Steel Exposed to Normally Dry Weather.
.35 CGSB 85-GP-16M-79, Painting Galvanized Steel.
.36 CGSB 85-GP-18M-80, Painting, Maintenance, Exterior, Steel, for Protection Against Continuous Wetting.
.37 CGSB 85-GP-20M-79, Painting copper and Copper Alloys.
.38 CGSB 85-GP-31M-79, Painting Stucco, Masonry and Brick Surfaces.
.39 CGSB 85-GP-32M-79, Painting Concrete Floors.
.40 CGSB 85-GP-33M-79, Painting Interior Plaster and Wallboard.
.41 CAN/CGSB-85.100-93, Painting.

.3 National Fire Code of Canada Latest edition.

.4 Steel Structures Painting Council (SSPC).
.1 Systems and Specifications Manual.

1.3 Product Data

.1 Submit product data in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-Ups.

.2 Submit full records of all products used. List each product in relation to finish formula and include the following:
.1 Finish formula designation.
.2 Product type and use.
.3 CGSB number.
.4 Manufacturer's product number.
.5 Colour number.
.6 Manufacturer's Material Safety Data Sheets (MSDS).
.7 Maximum VOC classification.
.8 Ecologo certification.

.3 Submit manufacturer's application instructions for each product specified.

1.4 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit sample panels of each paint stain clear coating specified.

.3 Submit full range of available colours where colour availability is restricted.

.4 Use 3 mm plate steel for finishes over metal surfaces. Use 12.5 mm birch plywood for finishes over wood surfaces. Use 50 mm concrete block for finishes over concrete or concrete masonry surfaces. Use 12.5 mm gypsum board for finishes over gypsum board and other smooth surfaces.

1.5 Quality Assurance

.1 Retain purchase orders, invoices and other documents to prove that all materials utilized in this contract meet requirements of the specifications. Produce documents when requested by Engineer.

.2 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.

1.6 Delivery
Storage and Handling

.1 Deliver and store materials in original containers, sealed, with labels intact.

.2 Indicate on containers or wrappings:
.1 Manufacturer's name and address.
.2 Type of paint.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Provide and maintain dry, temperature controlled, secure storage.

.5 Observe manufacturer's recommendations for storage and handling.

.6 Store materials and supplies away from heat generating devices.

.7 Store materials and equipment in a well ventilated area with temperature range 7° to 30° C.

.8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Engineer. After completion of operations, return areas to clean condition to approval of Engineer.

.10 Provide minimum one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.11 Remove only in quantities required for same day use.

.12 Fire Safety Requirements
.1 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.
.2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.7 Environmental Requirements

.1 Environment Choice Program
.1 Provide paint products certified to meet the requirements of the Environmental Choice Program, Department of the Environment.
.2 Submit CSA Certification Reports that products proposed for use are certified under the Environmental Choice Program. Water based paints to be certified to ECP-07-89. Solvent based paints to be certified to ECP-12-89.

.2 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.3 Ventilation:
.1 Engineer, Consultant will arrange for ventilation system to be operated during application of paint. Ventilate area of work as directed by Engineer Consultant by use of approved portable supply and exhaust fans.
.2 Ventilate enclosed spaces in accordance with Section.
.3 Provide continuous ventilation during and after application of paint. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of application of paint.

.4 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturers recommendations.

.5 Substrate and ambient temperature must be within limits prescribed in paint standard and by manufacturer to approval of Engineer.

.6 Maintain minimum substrate and ambient air temperature of 5°C for Alkyd and 7°C for latex paints. Maximum relative humidity 85%. Maintain supplemental heating until paint has cured sufficiently.

.7 Provide temporary heating where permanent facilities are not available to maintain minimum recommended temperatures.

.8 Apply paint finish only in areas where dust is no longer being generated by related construction operations such that airborne particles will not affect the quality of the finished surface.

.9 Apply paint only when surface to be painted is dry, properly cured and adequately prepared.

.10 Painting in occupied facilities to be carried out during silent hours only. Schedule operations to approval of Engineer Consultant such that painted surfaces will have dried and cured sufficiently before occupants are affected.

.11 Provide minimum 270 lx on surfaces to be painted.

.12 VOC emissions from paints must not exceed the VOC and chemical component limits of Green Seal's Standard GS-11, January 1997 requirements.

AND

The VOC content of anti-corrosive coatings used must be less than the current VOC content limits of Green Seal Standard GS-03, May 1993 requirements.

AND

For interior paints and coatings not already covered by GS-11 and GS-03, the VOC content of all primers, under-coatings, sealers and clear wood finishes used must be less than the current VOC content limits of South Coast Air Quality Management District (SCAQMD) Rule #1113, November 1996 requirements.

Table 3: Extract from State of Californian South Coast Air Quality

Management District's Rule 1113-Architectural Coatings(Nov.8, 1996)

Table of Standards: VOC Limits

Grams of VOC per Liter of Coating, Less Water and Less Exempt Compounds

Coating	Limit*	Effective 1/1/98	Effective 1/1/99	Effective 7/1/01	Effective 1/1/05	Effective 7/1/08
Bond Breakers	350					
Clear wood Finishes:						
varnish	350					
sanding sealers	350					
lacquer	350	550			275	
Concrete-curing Compounds	350					
Dry-Fog Coatings	400					
Fire-proofing Exterior Coatings	350		350			
Fire-retardant Coatings						
clear	650					
pigmented	350					
Flats	100			100		50
Graphis Arts (sign) Coatings	500					

Table 3 (Cont'd)

Coating	Limit*	Effective 1/1/98	Effective 1/1/99	Effective 7/1/01	Effective 1/1/05	Effective 7/1/08
Industrial Maintenance Primers and TopCoats						
Alkyds	420					
Catalyzed Epoxy	420					
Bituminous Coatings Materials	420					
Inorganic Polymers	420					
Vinyl Chloride Polymers	420					
Chlorinated Rubber	420					
Acrylic Polymers	420					
Urethane Polymers	420					
Silicones	420					
Unique Vehicles	420					
Japans/Faux Finishing Coatings	350		350			
Magnesite Cement Coatings	450		450			
Mastic Coatings	300					
Multi-Color Coatings	250	250				
Pigmented Lacquer	550	550				275
Pre-Treatment Wash Primers	780					
Primers, Sealers, and Undercoats	350					
Quick-Dry Enamels	400					
Roof Coatings	300					
Shellac						
Clear	730					
Pigmented	550					
Stains	350					
Swimming Pool Coatings						
Repair	650					
Other	340					
Traffic Coatings	150	150				
Waterproofing Sealers	400					
Wood preservatives						
Below-Ground	350					
Other	350					
Low-solids Coating	120					

.12 (Cont'd)

.2 Product-Specific environmental Requirements

2.1 Chemical Component Limitations

2.1.1 *VOCs.* The VOC concentrations of the product shall not exceed those Listed below as determined by U.S. Environmental Protection Agency(EPA) Reference Test Method 24 (Determination of Volatile Matt Content, Water Content, Density Volume Solids, and Weight Solids Of Surface Coatings), Code of Federal Regulations Title 40, Part 60, Appendix A

The calculation of VOC shall exclude water and tinting color added at the Point of sale.

Interior Coatings:

Coating Type	VOC weight in grams/litre of product minus water
Non-flat3	150
Flat	50

Exterior Coatings:

Coating Type	VOC weight in grams/litre of product minus water
Non-flat4	200
Flat	100

2.1.2 *Aromatic Compounds*. The product must contain no more than1.0% by weight of the sum total of aromatic compounds. Testing for the concentration of these compounds will be performed if they are determined to be present in the product during a materials audit.

2.2 Chemical Component Restrictions. The manufacturer shall demonstrate that the following chemical compounds are not used as ingredients in the Manufacture of the product.

2.2.1 Halomethane
methylene chloride
2.2.2 Chlorinated ethanes
1,1,1-trichloroethne
2.2.3 Aromatic solvents
benzene
toluene (methylbenzene)
ethylbenzene
2.2.4 Chlorinated ethylenes
vinyl chloride
2.2.5 Polynuclear aromatics
naphthalene
2.2.6 Chlorobenzenes
1,2-dichlorobenzene
2.2.7 Phthalate esters
di (2-ethylhexyl) phthalate
butyl benzyl phthalate
di-n-butyl phthalate
di-n-octyl phthalate
diethyl phthalate
dimethyl phthalate

2.2 (Cont'd)

2.2.8 Miscellaneous semi-volatile organics
isophorone
2.2.9 Metals and their compounds
antimony
cadmium
hexavalent chromium
lead
mercury
2.2.10 Preservatives (antifouling agents)
formaldehyde
2.2.11 Ketones
methyl ethyl ketone
methyl isobutyl ketone
2.2.12 Miscellaneous volatile organics
acrolein
acrylonitrile

.3 Extract from Green Seal Environmental Standard Anti-Corrosive Paints (GC-03), first Edition January 7, 1997

3.1 Product-Specific Environmental Requirements

a.Chemical Component Limitations – VOC: the manufacture shall demonstrate that the pain is not formulated to exceed the VOC concentrations (in grams per liter of product, minus water) listed below:

Coating Type: Gloss – 250
Semi-gloss – 250
Flat – 250

The calculation of VOCs shall exclude water and tinting color added at the Point of sale.

b.Chemical Component Limitations – Aromatic Compounds: the product must contain no more that 1.0% by weight of the sum total of aromatic compounds. Testing for the concentration of these compounds will be performed if they are determined to be present in the product during a materials audit.

c.Chemical Component Limitations – Other: the manufacturer shall demonstrate that the following chemical compounds are not used as ingredients in the product beyond incidental contamination:

1. Halomethanes: methylene chloride
2. Chlorinated ethanes: 1, 1, 1-trichloroethane
3. Aromatic solvents: benzene, toluene (methylbenzene),
4. ethylbenzene
5. Chlorinated ethylenes: vinyl chloride
6. Polynuclear aromatics: naphthalene
7. Chlorobenzenes: 1,2-dichlorobenzene
8. Phthalate esters: di (2-ethylhexyl) phthalate, butyl
9. benzyl phthalate, di-n-butyl phthalate, di-n-octyl
10. phthalate, diethyl phthalate, dimethyl phthalate
11. Miscellaneous semi-volatile organics: isophorone

3.1 (Cont'd)

12. Metals and their compounds: antimony, cadmium, hexavalent
13. chromium, lead, mercury
14. Preservatives (antifouling agents): formaldehyge
15. Ketones: methyl ethyl ketone, methyl isobutyl ketone
16. Miscellaneous volatile organics: acrolein, acrylonitrile

1.8 Scheduling

.1 Submit work schedule for various stages of painting to Engineer Consultant for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization from Engineer Consultant for any changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.9 Extra Materials

.1 Submit maintenance materials in accordance with Section 01730 - Maintenance Materials, Special Tools and Spare Parts.

.2 Submit one - one four litre can of each type and colour of primer finish coating. Identify colour and paint type in relation to established colour schedule and finish formula.

.3 Deliver to Engineer Consultant and store where directed.

PART 2 - PRODUCTS

2.1 Materials

.1 Qualified products: only paint materials listed on the CGSB Qualified Products List are acceptable for use on this project.

.2 Qualified products: only paint materials listed on the CPCA Approved Product Lists are acceptable for use on this project.

.3 Qualified products: only paint materials listed as ECOLOGO Approved Products are acceptable for use on this project.

.4 Paint materials for each coating formula to be products of a single manufacturer.

.5 Low odour products. Whenever possible, select products exhibiting low odour characteristics. If two products are otherwise equivalent, select the product with the lowest odour.

2.2 Colours

.1 Engineer Consultant will provide Colour Schedule after contract award. Submit proposed Colour Schedule to Engineer Consultant for approval.

.2 Colour schedule will be based upon the selection of five base colours and three accent colours. No more than eight colours will be selected for the entire project and no more than three colours will be selected in each area.

.3 Selection of colours will be from manufacturers full range of colours.

.4 Where specific products are available in a restricted range of colours, selection will be based on the limited range.

.5 Perform all colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials allowed only with Engineer's Consultant's written permission.

.6 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Paint Finishes

.1 Formula 1 (Alkyd): for concrete, brick masonry and stucco walls and ceilings apply:
- .1 One coat latex primer-sealer CAN/CGSB-1.119.
- .2 Two coats flat finish CAN/CGSB-1.118. Two coats low gloss enamel CAN/CGSB-1.202. Two coats semigloss enamel CAN/CGSB-1.57. Two coats gloss enamel CAN/CGSB-1.60.
- .3 CPCA System INT-7-B, premium custom. Finish coat: flat low gloss semigloss gloss.

.2 Formula 2 (Alkyd): for concrete block and concrete brick walls apply:
- .1 One coat latex block filler CAN/CGSB-1.188.
- .2 Two coats flat finish CAN/CGSB-1.118. Two coats low gloss enamel CAN/CGSB-1.202. Two coats semigloss enamel CAN/CGSB-1.57. Two coats gloss enamel CAN/CGSB-1.60.
- .3 CPCA System INT-8-B, premium. Finish coat: flat low gloss semigloss gloss.

.3 Formula 3 (Alkyd): for gypsum board, plaster hardboard, composition board walls apply:
- .1 One coat latex primer-sealer CAN/CGSB-1.119.
- .2 Two coats flat finish CAN/CGSB-1.118. Two coats low gloss enamel CAN/CGSB-1.202. Two coats semigloss enamel CAN/CGSB-1.57. Two coats gloss enamel CAN/CGSB-1.60.
- .3 PCA System INT-4-A, premium custom. Finish coat: flat low gloss semigloss gloss.

.4 Formula 4 (Alkyd): for gypsum board, plaster hardboard, composition board ceilings apply:
- .1 One coat latex primer-sealer CAN/CGSB-1.119.
- .2 Two coats flat finish CAN/CGSB-1.118. Two coats low gloss enamel CAN/CGSB-1.202.
- .3 CPCA System INT-4-A, premium custom. Finish coat: flat low gloss.

.5 Formula 5 (Latex): for concrete, masonry and stucco walls and ceilings apply:
.1 One coat latex primer-sealer CAN/CGSB-1.119.
.2 Two coats flat finish CAN/CGSB-1.100. Two coats low gloss enamel CAN/CGSB-1.209. Two coats semigloss enamel CAN/CGSB-1.195. Two coats high gloss acrylic.
.3 CPCA System INT-7-A, premium custom. Finish coat: flat low gloss semigloss gloss.

.6 Formula 6 (Latex): for concrete block and concrete brick walls apply:
.1 One coat latex block filler CAN/CGSB-1.188.
.2 Two coats flat finish CAN/CGSB-1.100. Two coats low gloss enamel CAN/CGSB-1.209. Two coats semigloss enamel CAN/CGSB-1.195. Two coats high gloss acrylic.

.3 CPCA System INT-8-A, premium custom. Finish coat: flat low gloss semigloss gloss.

.7 Formula 7 (Latex): for gypsum board, plaster hardboard composition board walls apply:
.1 One coat latex primer-sealer CAN/CGSB-1.119.
.2 Two coats flat finish CAN/CGSB-1.100. Two coats low gloss enamel CAN/CGSB-1.209. Two coats semigloss enamel CAN/CGSB-1.195. Two coats high gloss acrylic.
.3 CPCA System INT-4-B, premium custom. Finish coat: flat low gloss semigloss gloss.

.8 Formula 8 (Latex): for gypsum board, plaster hardboard composition board ceilings:
.1 One coat latex primer-sealer CAN/CGSB-1.119.
.2 Two coats flat finish CAN/CGSB-1.100. Two coats low gloss enamel CAN/CGSB-1.209.
.3 CPCA System INT-4-B, premium custom. Finish coat: flat low gloss semigloss gloss.

.9 Formula 9 (Latex): for acoustic tile and textured ceilings apply:
.1 Two coats latex flat CAN/CGSB-1.100 CPCA System INT-6-A, custom.
.2 Two coats alkyd flat finish CAN/CGSB-1.118. CPCA System INT-6-B, custom.
.3 One coat solvent primer-sealer CAN/CGSB-1.68. One coat semigloss enamel CAN/CGSB-1.195 One coat high gloss acrylic. CPCA System INT-6.C, custom semigloss gloss.

.10 Formula 10 (Alkyd): for wood baseboards trim doors frames window frames window sash paneling plywood cabinetry to receive paint finish apply:
.1 Spot prime knots and resinous areas CAN/CGSB-1.126.
.2 One coat enamel undercoat CAN/CGSB-1.38.
.3 Two coats flat finish CAN/CGSB-1.118. Two coats low gloss enamel CAN/CGSB-1.202. Two coats semigloss enamel CAN/CGSB-1.57. Two coats gloss enamel CAN/CGSB-1.60.
.4 CPCA System INT-1-A, premium custom. Finish coat: flat low gloss semigloss gloss.

.11 Formula 11 (Latex): for wood baseboards trim interior doors interior frames paneling cabinetry plywood to receive paint finish apply:
.1 Spot prime knots and resinous areas CAN/CGSB-1.126.
.2 One coat enamel undercoat CAN/CGSB-1.38.
.3 Two coats flat paint CAN/CGSB-1.100. Two coats low gloss enamel CAN/CGSB-1.209. Two coats semigloss enamel CAN/CGSB-1.195. Two coats high gloss acrylic.
.4 CPCA System INT-1-B, premium custom. Finish coat: flat low gloss semigloss gloss.

.12 Formula 12 (alkyd): for concrete floors apply:
.1 One coat floor enamel CAN/CGSB-1.73. Reduced.
.2 Two coats floor enamel CAN/CGSB-1.73.
.3 CPCA System INT-9-B, premium.

.13 Formula 13 (Epoxy): for concrete floors apply:
.1 One coat cold cured gloss epoxy CAN/CGSB-1.146. Reduced.

.2 Two coats cold cured gloss epoxy CAN/CGSB-1.146.
.3 CPCA System INT-9-A, premium custom.

.14 Formula 14 (Polyurethane): for concrete floors apply.
.1 One coat two-component polyurethane CGSB 1-GP-180Ma (Type 2). Reduced.
.2 Two coats two-component polyurethane CGSB 1-GP-180Ma (Type 2). Reduced.
.3 CPCA System INT-9-C, premium.

.15 Formula 15 (Alkyd): for shop primed ferrous metal surfaces apply:
.1 Touch up with shop primer with primer as provided by fabricator.
.2 One coat marine alkyd metal primer CGSB 1-GP-48M.
.3 Two coats flat finish CAN/CGSB-1.118. Two coats low gloss enamel CAN/CGSB-1.202. Two coats semigloss enamel CAN/CGSB-1.57. Two coats gloss enamel CAN/CGSB-1.60.
.4 CPCA System INT-12-A, premium custom. Finish coat: flat low gloss semigloss gloss.

.16 Formula 16 (Epoxy): for shop primed ferrous metal surfaces apply:
.1 Touch up with shop primer with primer as provided by fabricator.
.2 One coat cold cured epoxy primer CAN/CGSB-1.165 (Type 1).
.3 Two coats cold cured gloss epoxy CAN/CGSB-1.146. Two coats high build gloss epoxy CAN/CGSB-1.153. Two coats high build marine epoxy CGSB 1-GP-193Ma.
.4 CPCA System INT-12-D, premium custom.

.17 Formula 17 (Alkyd): for galvanized and zinc coated metal apply:
.1 One coat cementitious primer CAN/CGSB-1.198.
.2 Two coats flat finish CAN/CGSB-1.118. Two coats low gloss enamel CAN/CGSB-1.202. Two coats semigloss enamel CAN/CGSB-1.57. Two coats gloss enamel CAN/CGSB-1.60.
.3 CPCA System INT-13-A, premium custom. Finish coat: flat low gloss semigloss gloss.

.18 Formula 18 (Alkyd): for galvanized metal deck (ceilings) apply:
.1 One coat cementitious primer CAN/CGSB-1.198.
.2 Two coats flat finish CAN/CGSB-1.118. Two coats low gloss enamel CAN/CGSB-1.202.
.3 CPCA System INT-13-A, premium custom. Finish coat: flat low gloss.

.19 Formula 19 (Latex): for galvanized and zinc coated metal apply:
.1 One coat cementitious primer CAN/CGSB-1.198.
.2 Two coats flat paint CAN/CGSB-1.100. Two coats low gloss enamel CAN/CGSB-1.209. Two coats semigloss enamel CAN/CGSB-1.195. Two coats high gloss acrylic.
.3 CPCA System INT-13-D, premium custom. Finish coat: flat low gloss semigloss gloss.

.20 Formula 20 (Latex): for galvanized metal deck (ceilings) apply:
.1 One coat cementitious primer CAN/CGSB-1.198.
.2 Two coats flat paint CAN/CGSB-1.100. Two coats low gloss enamel CAN/CGSB-1.209.
.3 CPCA System INT-13-D, premium custom. Finish coat: flat low gloss.

.21 Formula 21 (Alkyd): for copper piping and fittings apply:
.1 One coat vinyl wash primer CAN/CGSB-1.121.

.2 Two coats flat finish CAN/CGSB-1.118. Two coats low gloss enamel CAN/CGSB-1.202. Two coats semigloss enamel CAN/CGSB-1.57. Two coats gloss enamel CAN/CGSB-1.60.
.3 CPCA System INT-16-A, premium custom. Finish coat: flat low gloss semigloss gloss.

.22 Formula 22 (Alkyd): for cotton or canvas insulation coverings apply:
.1 One coat latex primer-sealer CAN/CGSB-1.119.
.2 Two coats flat finish CAN/CGSB-1.118. Two coats low gloss enamel CAN/CGSB-1.202. Two coats semigloss enamel CAN/CGSB-1.57. Two coats gloss enamel CAN/CGSB-1.60.
.3 CPCA System INT-5-A, premium custom. Finish coat: flat low gloss semigloss gloss.

2.4 Stain Finishes

.1 Formula 23: for woodwork to receive stained finish apply:
.1 One coat wood filler.
.2 Two coats solvent based stain CAN/CGSB-1.145. Type 2 (interior) Class A Solid Class B Semi transparent.
.3 CPCA System INT-1-O, custom. semi-transparent solid colour.

.2 Formula 24: for woodwork to receive oil resin sealer finish apply:
.1 One coat wood filler.
.2 One coat Danish Oil, wiped.
.3 One coat Danish Oil, buffed.
.4 Wax and buff.
.5 CPCA System INT-1-N, premium.

2.5 Clear Finishes

.1 Formula 25 (Varnish): for woodwork to receive stained clear finish apply:
- .1 One coat wood filler.
- .2 One coat solvent based stain CAN/CGSB-1.145. Type 2 (interior) Class A solid Class B semi transparent.
- .3 One coat alkyd sanding sealer CAN/CGSB-1.102.
- .4 Two coats varnish CAN/CGSB-1.36. Type 2 semigloss. Type 1 – gloss.
- .5 CPCA System INT-1-C, [premium] [custom]. [semigloss] [gloss].

.2 Formula 26 (Polyurethane): for woodwork to receive stained clear finish apply:
- .1 One coat wood filler.
- .2 One coat solvent based stain CAN/CGSB-1.145. Type 2 (interior) Class A solid Class B semi transparent.
- .3 One coat oil modified clear polyurethane CAN/CGSB-1.175 Type 2 satin Type 1 gloss. thinned.
- .4 Two coats oil modified clear polyurethane CAN/CGSB-1.175 Type 2 satin Type 1 gloss.
- .5 CPCA System INT-1-D, premium custom. Satin gloss.

.3 Formula 27 (Polyurethane): for wood floors to receive stained clear finish apply:
- .1 One coat wood filler.
- .2 One coat solvent based stain CAN/CGSB-1.145. Type 2 (interior) Class A solid Class B semi transparent.
- .3 Three coats, two-component polyurethane CGSB 1-GP-180Ma, Type 1 clear gloss.

.4 Formula 28 (Lacquer): for woodwork to receive natural finish apply:
- .1 One coat wood filler.
- .2 One coat solvent based stain CAN/CGSB-1.145. Type 2 (interior) Class A solid Class B semi transparent.
- .3 One coat lacquer sanding seal.
- .4 Two coats three coats lacquer CAN/CGSB-1.150 Type I Class B satin Class A gloss.
- .5 CPCA System INT-1-E, premium custom (with stain) INT-1-F, premium custom (clear). Finish coat: satin gloss.

2.6 Special Finishes

.1 Formula 29: for metal surfaces exposed to heat medium temperature range to 425°C apply:
- .1 Two coats aluminum enamel to CAN/CGSB-1.143.
- .2 CPCA System: EXT-14-A, premium custom.

.2 Formula 30 (Chlorinated Rubber): for surfaces exposed to Moderate or Heavy Duty corrosive environments apply:
- .1 One coat chlorinated rubber primer.
- .2 Two coats chlorinated rubber enamel.

PART 3 - EXECUTION

3.1 General

.1 Perform all painting operations in accordance with CAN/CGSB-85.100 except where specified otherwise.

.2 Perform all painting operations in accordance with CPCA Painting Specifications Manual except where specified otherwise.

.3 Apply all paint materials in accordance with paint manufacturers written application instructions.

3.2 Preparation

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, door stops, bath accessories and all other surface mounted fittings and fastenings prior to undertaking any painting operations. Store for re-installation 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 As painting operations progress, place "WET PAINT" signs in occupied areas to approval of Engineer.

3.3 Protection

.1 Protect existing building surfaces not to be painted from paint spatters, markings and other damage. If damaged, clean and restore such surfaces as directed by Engineer.

.2 Cover or mask floors, windows and other ornamental hardware adjacent to areas being painted to prevent damage and to protect from paint drops and splatters. Use non-staining coverings.

.3 Protect items that are permanently attached such as Fire Labels on doors and frames.

.4 Protect factory finished products and equipment.

.5 Protect passing pedestrians, building occupants and the general public in and about the building.

3.4 Existing Conditions

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Engineer all damage, defects, unsatisfactory or unfavorable conditions before proceeding with work.

.2 Investigate moisture content of surfaces to be painted and report findings to Engineer. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:
.1 Plaster and wallboard: 12%.
.2 Masonry/Concrete: 12%.
.3 Concrete Block/Brick: 12%.
.4 Wood: 15%.

3.5 Cleaning

.1 Clean all surfaces to be painted as follows:
.1 Remove all dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
.2 Wash surfaces with solution of T.S.P. bleach 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.

.2 Clean the following surfaces with high pressure water washing.

.3 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.

.4 Sand existing surfaces with intact, smooth, high gloss coatings to provide adequate adhesion for new finishes.

3.6 Surface Preparation

.1 Prepare new wood surfaces to CGSB 85-GP-1M.

.2 Where possible, prime all surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.

.3 Prepare previously painted wood surfaces to CGSB 85-GP-2M.
.1 Apply vinyl sealer to CAN/CGSB-1.126 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.

.4 Prepare stucco, brick, concrete masonry and concrete surfaces to CGSB 85-GP-31M.

.5 Prepare concrete floors to CGSB 85-GP-32M. Prepare new concrete floor by acid etching. Rinse with clean water and thoroughly dry.

.6 Prepare plaster and wallboard surfaces to CGSB 85-GP-33M.

3.7 Surface Preparation - Metal

.1 Clean new metal surfaces to be painted by: removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with the following:
- .1 Solvent cleaning: SSPC-SP-1.
- .2 Hand tool cleaning: SSPC-SP-2.
- .3 Power tool cleaning: SSPC-SP-3.
- .4 Commercial blast cleaning: SSPC-SP-6.
- .5 Brush-off blast cleaning: SSPC-SP-7.

.2 Clean existing metal surfaces to be repainted by: removing loose, cracked, brittle or non-adherent paint, rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with following:
- .1 Scrape edges of old paint back to sound material where remaining paint is thick and sound, feather exposed edges.
- .2 Commercial blast clean rusted and bare metal surfaces where existing paint system has failed.
- .3 Solvent cleaning: SSPC-SP-1.
- .4 Hand tool cleaning: SSPC-SP-2.
- .5 Power tool cleaning: SSPC-SP-3.
- .6 Commercial blast cleaning: SSPC-SP-6.
- .7 Brush-off blast cleaning: SSPC-SP-7.

.3 Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air, or vacuum cleaning.

.4 Touch up shop primer to CGSB 85-GP-10M with primer as specified in applicable section. Touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.

.5 Prepare galvanized steel and zinc coated steel surfaces to CGSB 85-GP-16M.

.6 Prepare copper and copper alloys surfaces to CGSB 85-GP-20M.

.7 Prepare new steel surfaces exposed normally to dry conditions to CGSB 85-GP-14M.

.8 Prepare previously painted steel surfaces exposed normally to dry conditions to CGSB 85-GP-15M.

.9 Prepare steel surfaces exposed to industrial environments to CGSB 85-GP-13M.

.10 Prepare steel surfaces exposed to water or high humidity levels to CGSB-85-GP-11M CGSB 85-GP-18M.

.11 Do not apply paint until prepared surfaces have been accepted by Engineer Consultant.

3.8 Mixing Paint

.1 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.

.2 Thin paint for spraying according to manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Engineer.

3.9 Application

.1 Method of application to be as approved by Engineer. Apply paint by brush roller air sprayer airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.

.2 Brush application.
.1 Work paint into cracks, crevices and corners. Paint surfaces not accessible to brushes by spray, daubers or sheepskins.
.2 Brush out runs and sags.
.3 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 properly 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 a uniform layer, with overlapping at edges of spray pattern.
.4 Brush out immediately all runs and sags.
.5 Use branches 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 and only when specifically authorized by Engineer.

.5 Apply each coat of paint as a 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 each coat to remove visible defects.

.8 Finish tops of cupboards, cabinets and projecting ledges, both above and below sight lines as specified for surrounding surfaces.

.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.

3.10 Mechanical Electrical Equipment

.1 In finished areas: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment. Colour and texture to match adjacent surfaces, except as noted otherwise.

.2 In boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 In 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 disconnect switches for fire alarm system and exit light systems in red enamel.

.9 Paint all fire protection piping Red.

.10 Paint all 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.

3.11 Field Quality Control

.1 Field inspection of painting operations to be carried out be independent inspection firm as designated by Engineer.

.2 Advise Engineer when each applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Co-operate with inspection firm and provide access to all areas of the work.

3.12 Restoration

.1 Clean and re-install all hardware items that were 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 Engineer. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Engineer.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 02761 Painted Traffic Lines and Markings.

.2 Section 09971 Painting Heavy Civil Metal Surfaces.

1.2 References

.1 Canadian Painting Contractors' Architectural (CPCA).
- .1 Painting Specifications Manual 1993.

.2 Canadian General Standards Board (CGSB).
- .1 CAN/CGSB-1.28-M89, Alkyd, Exterior House Paint.
- .2 CAN/CGSB-1.40-M89, Primer, Structural Steel, Oil Alkyd Type.
- .3 CGSB 1-GP-48M-78, Primer, Marine, for Steel.
- .4 CAN/CGSB-1.59-M89, Alkyd, Exterior Gloss Enamel.
- .5 CGSB 1-GP-61Ma-85, Enamel, Alkyd, Marine, Exterior and Interior.
- .6 CAN/CGSB-1.69-M89, Aluminum Paint.
- .7 CAN/CGSB-1.99-92, Exterior and Marine Phenolic Resin Varnish.
- .8 CAN/CGSB-1.121-93, Vinyl Pretreatment Coating for Metals (Vinyl Wash Primer).
- .9 CAN/CGSB-1.126-M91, Vinyl Sealer for Wood.
- .10 CAN/CGSB-1.132-M90, Zinc Chromate Primer, Low Moisture Sensitivity.
- .11 CAN/CGSB-1.135-M91, Flat Alkyd Enamel for Equipment.
- .12 CAN/CGSB-1.138-93, Exterior Latex Type, Flat Paint.
- .13 CAN/CGSB-1.143-M90, Heat Resistant Aluminum Enamel, Silicone Alkyd.
- .14 CAN/CGSB-1.145-M90, Solvent-Based Pigmented Stain.
- .15 CAN/CGSB-1.146-92, Cold Curing, Glass Epoxy Coating.
- .16 CAN/CGSB-1.153-M90, High Build, Gloss, Epoxy Coating.
- .17 CAN/CGSB-1.162-M90, Stucco and Masonry Coating, Emulsion Type.
- .18 CAN/CGSB-1.165-M89, Cold Curing Epoxy Primer.
- .19 CGSB 1-GP-180Ma-82, Coating, Polyurethane, Two-Package, General Purpose.
- .20 CAN/CGSB-1.188-M90, Emulsion Type Filler Masonry Block.
- .21 CGSB 1-GP-189M-78, Primer, Alkyd, Wood, Exterior.
- .22 CAN/CGSB-1.198-92, Cementitious Primer (for Galvanized Surfaces.
- .23 CGSB 85-GP-1M-78, Painting (New) Exterior Wooden Surfaces.
- .24 CGSB 85-GP-2M-78, Painting (Maintenance) of Exterior Painted Wooden Surfaces.
- .25 CGSB 85-GP-10M-79, Shop Painting Structural Steel.
- .26 CGSB 85-GP-11M-80, Painting Steel for Protection Against Continuous Wetting.
- .27 CGSB 85-GP-13M-80, Painting Structural Steel for Protection Against Heavy Industrial Atmospheres.
- .28 CGSB 85-GP-14M-78, Painting Steel Surfaces Exposed to Normally Dry Weather.
- .29 CGSB 85-GP-15M-78, Painting, Maintenance, Exterior Steel Exposed to Normally Dry Weather.

.30 CGSB 85-GP-16M-79, Painting Galvanized Steel.
.31 CGSB 85-GP-18M-80, Painting, Maintenance, Exterior, Steel, for Protection Against Continuous Wetting.
.32 CGSB 85-GP-31M-79, Painting Stucco, Masonry and Brick Surfaces.
.33 CAN/CGSB-85.100-93, Painting.

.3 National Fire Code of Canada Latest edition.

.4 Steel Structures Painting Council (SSPC).
.1 Systems and Specifications Manual.

1.3 Product Data

.1 Submit product data in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-Ups.

.2 Submit product data in accordance with Section.

.3 Submit full records of all products used. List each product in relation to finish formula and include the following:
.1 Finish formula designation.
.2 Product type and use.
.3 CGSB number.
.4 Manufacturer's product number.
.5 Colour number numbers.
.6 Manufacturer's Material Safety Data Sheets (MSDS).
.7 Maximum VOC classification.
.8 Ecologo certification.

.4 Submit manufacturer's installation application instructions for each product specified.

1.4 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit samples in accordance with Section.

.3 Submit duplicate 300 x 200 mm sample panels of each paint stain clear coating special finish formula type colour texture specified.

.4 Submit full range of available colours where colour availability is restricted.

.5 Use 3 mm plate steel for finishes over metal surfaces. Use 10 mm cedar hardboard siding plywood for finishes over wood surfaces. Use 50 mm concrete block for finishes over concrete or concrete masonry surfaces. Use 12.5 mm gypsum board for finishes over smooth surfaces.

1.5 Quality Assurance

.1 Retain purchase orders, invoices and other documents to prove that all materials utilized in this contract meet requirements of the specifications. Produce documents when requested by Engineer.

.2 Walls. No defects visible from a distance of 1000 mm at 90 degrees to surface.

.3 Ceilings. No defects visible from floor at 45 degrees to surface when viewed using final lighting source.

.4 Final coat to exhibit uniformity of colour and texture as well as uniformity of sheen across full surface area.

1.6 Delivery, Storage and Handling

.1 Deliver and store materials in original containers, sealed, with labels intact.

.2 Indicate on containers or wrappings:
.1 Manufacturer's name and address.
.2 Type of paint.
.3 Compliance with applicable standard.
.4 Colour number in accordance with established colour schedule.

.3 Remove damaged, opened and rejected materials from site.

.4 Provide and maintain dry, temperature controlled, weatherproof, secure storage.

.5 Observe manufacturer's recommendations for storage and handling.

.6 Store materials and supplies away from heat generating devices.

.7 Store materials and equipment in a well ventilated area with temperature range 7 to 30°C.

.8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.

.9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Engineer Consultant. After completion of operations, return areas to clean condition to approval if Engineer Consultant.

.10 Provide minimum one 9 kg Type ABC dry chemical fire extinguisher adjacent to storage area.

.11 Remove only in quantities required for same day use.

.12 Fire Safety Requirements
.1 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.
.2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.7 Environmental Requirements

.1 Environment Choice Program
- .1 Provide paint products certified to meet the requirements of the Environmental Choice Program, Department of the Environment.
- .2 Submit CSA Certification Reports that products proposed for use are certified under the Environmental Choice Program. Water based paints to be certified to ECP-07-89. Solvent based paints to be certified to ECP-12-89.

.2 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

.3 Ventilation:
- .1 Engineer Consultant will arrange for ventilation system to be operated during application of paint. Ventilate area of work as directed by Engineer Consultant by use of approved portable supply and exhaust fans.
- .2 Ventilate enclosed spaces in accordance with Section.
- .3 Provide continuous ventilation during and after application of paint. Run ventilation system 24 hours per day during application; provide continuous ventilation for 7 days after completion of application of paint.

.4 Apply paint finishes only when conditions forecast for entire period of application fall within manufacturer's recommendations.

.5 Where surface to be painted is not under cover, do not apply paint when:
- .1 Substrate and ambient air temperature is below 5°C for alkyd and 7°C for latex paints or when temperature is expected to drop to 0°C before paint has thoroughly cured.
- .2 Substrate and ambient air temperature are expected to fall outside limits prescribed in paint standard and by manufacturer.
- .3 Temperature of surface is over 50°C unless paint is specifically formulated for application at high temperatures.
- .4 Rain or snow are forecast to occur before paint has thoroughly cured; it is foggy, misty, raining or snowing at site; relative humidity is above 85%.
- .5 Surface to be painted is wet, damp or frosted.
- .6 Previous coat is not dry.

.6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.

.7 Apply paint finish only when dust is no longer being generated by related construction operations or when wind conditions are such that airborne particles will not affect the quality of the finished surface.

.8 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.

.9 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

.10 Painting of occupied facilities to be carried out in accordance with approved schedule only. Schedule operations to approval of Engineer such that painted surfaces will have dried and cured sufficiently before occupants are affected.

.11 VOC emissions from paints must not exceed the VOC and chemical component limits of Green Seal's Standard GS-11, January 1997 requirements.

AND

The VOC content of anti-corrosive coatings used must be less than the current VOC content limits of Green Seal Standard GS-03, May 1993 requirements.

.2 Product-Specific environmental Requirements

2.1 Chemical Component Limitations

2.1.1 *VOCs.* The VOC concentrations of the product shall not exceed those Listed below as determined by U.S. Environmental Protection Agency(EPA) Reference Test Method 24 (Determination of Volatile Matt Content, Water Content, Density Volume Solids, and Weight Solids Of Surface Coatings), Code of Federal Regulations Title 40, Part 60, Appendix A

The calculation of VOC shall exclude water and tinting color added at the Point of sale.

Interior Coatings:

Coating Type	VOC weight in grams/litre of product minus water
Non-flat3	150
Flat	50

Exterior Coatings:

Coating Type	VOC weight in grams/litre of product minus water
Non-flat4	200
Flat	100

2.1.2 *Aromatic Compounds*. The product must contain no more than1.0% by weight of the sum total of aromatic compounds. Testing for the concentration of these compounds will be performed if they are determined to be present in the product during a materials audit.

2.2 Chemical Component Restrictions. The manufacturer shall demonstrate that the following chemical compounds are not used as ingredients in the Manufacture of the product.

2.2 (Cont'd)

2.2.1 Halomethanes
methylene chloride
2.2.2 Chlorinated ethanes
1,1,1-trichloroethne
2.2.3 Aromatic solvents
benzene
toluene (methylbenzene)
ethylbenzene
2.2.4 Chlorinated ethylenes
vinyl chloride
2.2.5 Polynuclear aromatics
naphthalene
2.2.6 Chlorobenzenes
1,2-dichlorobenzene
2.2.7 Phthalate esters
di (2-ethylhexyl) phthalate
butyl benzyl phthalate
di-n-butyl phthalate
di-n-octyl phthalate
diethyl phthalate
dimethyl phthalate
2.2.8 Miscellaneous semi-volatile organics
isophorone
2.2.9 Metals and their compounds
antimony
cadmium
hexavalent chromium
lead
mercury
2.2.10 Preservatives (antifouling agents)
ormaldehyde
2.2.11 Ketones
methyl ethyl ketone
methyl isobutyl ketone
2.2.12 Miscellaneous volatile organics
acrolein
acrylonitrile

.3 Extract from Green Seal Environmental Standard Anti-Corrosive Paints (GC-03), first Edition January 7, 1997

3.1 Product-Specific Environmental Requirements

a.Chemical Component Limitations – VOC: the manufacture shall demonstrate that the pain is not formulated to exceed the VOC concentrations (in grams per liter of product, minus water) listed below:

Coating Type: Gloss – 250
Semi-gloss – 250
Flat – 250

3.1 (Cont'd)

The calculation of VOCs shall exclude water and tinting color added at the Point of sale.

b.Chemical Component Limitations – Aromatic Compounds: the product must contain no more that 1.0% by weight of the sum total of aromatic compounds. Testing for the concentration of these compounds will be performed if they are determined to be present in the product during a materials audit.

c.Chemical Component Limitations – Other: the manufacturer shall demonstrate that the following chemical compounds are not used as ingredients in the product beyond incidental contamination:

1. Halomethanes: methylene chloride
2. Chlorinated ethanes: 1, 1, 1-trichloroethane
3. Aromatic solvents: benzene, toluene (methylbenzene),
4. ethylbenzene
5. Chlorinated ethylenes: vinyl chloride
6. Polynuclear aromatics: naphthalene
7. Chlorobenzenes: 1,2-dichlorobenzene
8. Phthalate esters: di (2-ethylhexyl) phthalate, butyl
9. benzyl phthalate, di-n-butyl phthalate, di-n-octyl
10. phthalate, diethyl phthalate, dimethyl phthalate
11. Miscellaneous semi-volatile organics: isophorone

3.1 (Cont'd)

12. Metals and their compounds: antimony, cadmium, hexavalent
13. chromium, lead, mercury
14. Preservatives (antifouling agents): formaldehyge
15. Ketones: methyl ethyl ketone, methyl isobutyl ketone
16. Miscellaneous volatile organics: acrolein, acrylonitrile

1.8 Scheduling of Work

.1 Submit work schedule for various stages of painting to Engineer for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

.2 Obtain written authorization form Engineer for any changes in work schedule.

.3 Schedule painting operations to prevent disruption of occupants in and about the building.

1.9 Extra Materials

.1 Submit maintenance materials in accordance with Section 01731 - Maintenance Materials, Special Tools and Spare Parts.

.2 Submit 1 - 4 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 formula.

.3 Deliver to Engineer and store where directed.

PART 2 - PRODUCTS

2.1 Materials

.1 Qualified products: only paint materials listed on the CGSB Qualified Products List are acceptable for use on this project.

.2 Qualified products: only paint materials listed on the CPCA Approved Product Lists are acceptable for use on this project.

.3 Qualified products: only paint materials listed as Ecologo Approved Products are acceptable for use on this project.

.4 Paint materials for each coating formula to be products of a single manufacturer.

2.2 Colours

.1 Engineer will provide Colour Schedule after contract award. Submit proposed Colour Schedule to Engineer for approval.

.2 Colour schedule will be based upon Base colour on the selection of five base colours and three accent colours.

.3 Perform all colour tinting operations prior to delivery of paint to site. Unless approved in writing by Engineer.

.4 Ensure each second coat in a three coat system is tinted lighter colour than top coat.

2.3 Paint Finishes

.1 Formula 1 (Alkyd): for wood fences siding [glue laminated beams and columns plywood wall shingles to receive paint apply:

- .1 One coat wood filler.
- .2 Spot prime knots and resinous areas CAN/CGSB-1.126.
- .3 One coat alkyd primer CAN/CGSB-1.189.
- .4 Two coats flat alkyd enamel CAN/CGSB-1.135. Two coats alkyd gloss enamel CAN/CGSB-1.59. Two coats alkyd house paint CAN/CGSB-1.28.
- .5 CPCA System: EXT-1-A, premium custom. Gloss: flat gloss.

.2 Formula 2 (Latex): for wood fences siding glue laminated beams and columns plywood wall shingles to receive paint apply:
.1 One coat wood filler.
.2 Spot prime knots and resinous areas CAN/CGSB-1.126.
.3 One coat alkyd primer CAN/CGSB-1.189.
.4 Two coats latex flat CAN/CGSB-1.138. Two coats latex semigloss two coats latex gloss acrylic.
.5 CPCA System: EXT-1-B, premium custom. Gloss: flat semigloss gloss.

.3 Formula 3 (Oil): for wood fences siding glue laminated beams and columns plywood wall shingles to receive semi-transparent solid colour stain apply:
.1 One coat wood filler.
.2 Two coats semi-transparent solid colour oil stain CAN/CGSB-1.145 (Type I).
.3 CPCA System: EXT-1-C, premium semi-transparent solid colour.

.4 Formula 4 (Alkyd): for wood doors door frames window sash and frames fascial trim to receive paint apply:
.1 One coat wood filler.
.2 Spot prime knots and resinous areas CAN/CGSB-1.126.
.3 One coat alkyd primer CAN/CGSB-1.189.
.4 Two coats alkyd gloss enamel CAN/CGSB-1.59.
.5 CPCA System: EXT-2-A, premium.

.5 Formula 5 (Oil): for wood doors door frames window sash and frames fascial trim to receive semi-transparent solid colour stain apply:
.1 One coat wood filler.
.2 Two coats semi-transparent solid colour oil stain CAN/CGSB-1.145 (Type I).
.3 CPCA System: EXT-2-B, premium (semi-transparent) EXT-2-C, premium custom (solid colour).

.6 Formula 6 (Varnish): for wood doors door frames window sash and frames fascial trim to receive stain and varnish apply:
.1 One coat wood filler.
.2 One coat semi-transparent oil stain CAN/CGSB-1.145 (Type I).
.3 Two coats exterior marine gloss varnish CAN/CGSB-1.99. Two coats exterior semigloss varnish.
.4 CPCA System: EXT-2-D, premium.

.7 Formula 7 (Varnish): for wood doors door frames window sash and frames fascial trim to receive clear varnish apply:
.1 One coat wood filler.
.2 One coat exterior marine gloss varnish CAN/CGSB-1.99. Reduced one coat exterior semigloss varnish reduced.
.3 Three coats exterior marine gloss varnish CAN/CGSB-1.99. Three coats exterior semigloss varnish.
.4 CPCA System: EXT-2-E, premium. Gloss: gloss semigloss.

.8 Formula 8 (Polyurethane): for wood doors door frames window sash and frames fascial trim to receive clear polyurethane apply:
- .1 One coat wood filler.
- .2 One coat two-component polyurethane CGSB 1-GP-180Ma (Type 1). Reduced.
- .3 Two coats two-component polyurethane CGSB 1-GP-180Ma (Type 1).
- .4 CPCA System: EXT-2-H, premium.

.9 Formula 9 (Latex): for cast concrete walls, concrete masonry, surfaces to receive paint apply:
- .1 One coat block filler CAN/CGSB-1.188.
- .2 Two coats latex flat CAN/CGSB-1.138. Two coats latex semigloss two coats latex gloss acrylic.
- .3 CPCA System: EXT-6-B, premium custom. Gloss: flat semigloss gloss.

.10 Formula 10 (Latex): for brick masonry, stucco, cement board and parged surfaces to receive paint apply:
- .1 Three coats latex flat CAN/CGSB-1.138. Three coats latex semigloss three coats latex gloss acrylic.
- .2 CPCA System: Ext-6-A, premium custom. Gloss: flat semigloss gloss.

.11 Formula 11 (Aggregate latex): for cast concrete walls, concrete masonry, brick masonry, stucco, and parged surfaces to receive painted aggregate finish apply:
- .1 Two coats stucco and masonry coating CAN/CGSB-1.162. Type 1 – coarse Type 2 - medium.
- .2 One coat latex flat CAN/CGSB-1.138. One coat latex semigloss one coat latex glass acrylic.
- .3 CPCA System: EXT-6-C, premium custom. Gloss: flat semigloss gloss.

.12 Formula 12 (Epoxy): for cast concrete, concrete masonry, surfaces to receive epoxy finish apply:
- .1 One coat block filler CAN/CGSB-1.188. One coat epoxy block filler.
- .2 Two coats two component cold curing gloss epoxy CAN/CGSB-1.146.
- .3 CPCA System: EXT-6-G, premium custom.

.13 Formula 13 (Oil) for open dimensional wood decks to receive stain apply:

- .1 One coat wood preservative.
- .2 Two coats semi-transparent oil stain CAN/CGSB-1.145. Type 1.
- .3 CPCA System: EXT-9-D, premium.

.14 Formula 14 (Alkyd): for primed ferrous metal to receive paint apply:
- .1 Spot priming with shop primer.]
- .2 One coat oil alkyd primer CAN/CGSB-1.40 one coat zinc chromate primer CAN/CGSB-1.132.
- .3 Two coats alkyd flat enamel CAN/CGSB-1.135 two coats alkyd gloss enamel CAN/CGSB-1.59.
- .4 CPCA System: EXT-11-A, premium] custom. Gloss: flat gloss.

.15 Formula 15 (Epoxy): for primed ferrous metal to receive epoxy paint apply:
.1 Spot priming with shop primer.
.2 One coat cold cured epoxy primer CAN/CGSB-1.165. Type 1.
.3 Two coats high-build gloss epoxy CAN/CGSB-1.153. Two coats cold cured gloss epoxy CAN/CGSB-1.146.
.4 CPCA System: EXT-11-D, premium custom.

.16 Formula 16 (Alkyd): for primed ferrous metal exposed to marine environment to receive paint apply:
.1 One coat marine primer CGSB 1-GP-48M.
.2 Two three coats alkyd marine enamel CGSB 1-GP-61Ma.

.17 Formula 17 (Alkyd): for galvanized and zinc coated metal to receive paint apply:
.1 One coat cementitious primer CAN/CGSB-1.198.
.2 Two coats flat alkyd enamel] CAN/CGSB-1.135. Two coats alkyd gloss enamel CAN/CGSB-1.59.
.3 CPCA System: EXT-12-A, premium custom. Gloss: flat gloss.

.18 Formula 18 (Alkyd): for aluminum to receive paint apply:
.1 One coat vinyl wash primer CAN/CGSB-1.121.
.2 Two coats flat alkyd enamel CAN/CGSB-1.135. Two coats alkyd gloss enamel CAN/CGSB-1.59.
.3 CPCA System: EXT-13-A, premium custom. Gloss: flat gloss.

.19 Formula 19 (Aluminum): for aluminum to receive aluminum paint apply:
.1 One coat vinyl wash primer CAN/CGSB-1.121.
.2 Two coats aluminum paint CAN/CGSB-1.69.
.3 CPCA System: EXT-13-B, premium custom.

2.4 Special Finishes

.1 Formula 20: for metal surfaces exposed to heat medium temperature range to 425°C apply:
.1 Two coats aluminum enamel to CAN/CGSB-1.143.
.2 CPCA System: EXT-15-D. premium custom.

.2 Formula 21 (Chlorinated Rubber): for surfaces exposed to Moderate or Heavy Duty corrosive environments apply:
.1 One coat chlorinated rubber primer.
.2 Two coats chlorinated rubber enamel.

PART 3 - EXECUTION

3.1 General

.1 Perform all painting operations in accordance with CAN/CGSB-85.100.

.2 Perform all painting operations in accordance with CPCA Painting Specifications Manual except where specified otherwise.

.3 Apply all paint materials in accordance with paint manufacturers written application instructions.

3.2 Preparation

.1 Remove electrical cover plates, light fixtures, surface hardware on doors, and all other surface mounted fittings, equipment and fastenings prior to undertaking any painting operations. Store for re-installation after painting is completed.

.2 Cover or move portable equipment around building as necessary to carry out painting operations. Replace as painting operations progress.

.3 As painting operations progress, place "WET PAINT" signs in areas of work to approval of Engineer.

3.3 Protection

.1 Protect exterior existing building surfaces not to be painted from paint spatters, markings and other damage. If damaged, clean and restore such surfaces as directed by Engineer.

.2 Cover or mask windows and other ornamental hardware adjacent to areas being painted to prevent damage and to protect from paint drops and splatters. Use non-staining coverings.

.3 Protect items that are permanently attached such as Fire Labels on doors and frames.

.4 Protect factory finished products and equipment.

.5 Protect passing pedestrians, building occupants and the general public in and about the building.

3.4 Existing Conditions

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Engineer all damage, defects, unsatisfactory or unfavourable conditions before proceeding with work.

.2 Investigate moisture content of surfaces to be painted and report findings to Engineer. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

.3 Maximum moisture content as follows:
.1 Masonry/Concrete: 12%.
.2 Concrete Block/Brick: 12%.
.3 Wood: 15%.

3.5 Cleaning

.1 Clean all surfaces to be painted as follows:
.1 Remove all dust, dirt, and other surface debris by wiping with dry, clean cloths [or compressed air].
.2 Wash surfaces with solution of T.S.P. [bleach] 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.

.2 Clean the following surfaces with high pressure water washing.

.3 Prevent contamination of cleaned surfaces 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.

3.6 Surface Preparation

.1 Prepare new wood surfaces to CGSB 85-GP-1M.

.2 Prime surfaces of new wood before installation.

.3 Prepare previously painted wood surfaces to CGSB 85-GP-2M.
.1 Apply vinyl sealer to CAN/CGSB-1.126 over knots, pitch, sap and resinous areas.
.2 Apply exterior wood filler to nail holes and cracks.
.3 Tint filler to match stains for stained woodwork.

.4 Prepare stucco, brick, concrete masonry and concrete surfaces to CGSB 85-GP-31M.

.5 Sand existing surfaces.

3.7 Surface Preparation - Metal

.1 Clean new metal surfaces to be painted in accordance with the following:
.1 Solvent cleaning: SSPC-SP-1.
.2 Hand tool cleaning: SSPC-SP-2.
.3 Power tool cleaning: SSPC-SP-3.
.4 Commercial blast cleaning: SSPC-SP-6.
.5 Brush-off blast cleaning: SSPC-SP-7.

.2 Clean existing metal surfaces to be repainted in accordance with following:
.1 Scrape edges of old paint back to sound material where remaining paint is thick and sound, feather exposed edges.

.2 Clean rusted and bare metal surfaces where existing paint system has failed.
.3 Solvent cleaning: SSPC-SP-1.
.4 Hand tool cleaning: SSPC-SP-2.
.5 Power tool cleaning: SSPC-SP-3.
.6 Commercial blast cleaning: SSPC-SP-6.
.7 Brush-off blast cleaning: SSPC-SP-7.

.3 Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes or blowing with clean dry compressed air.

.4 Touch up damaged or defective paint or rusted areas shop primer to CGSB 85-GP-10M with primer as specified in applicable section.

.5 Prepare galvanized steel and zinc coated steel surfaces to CGSB 85-GP-16M.

.6 Prepare new steel surfaces exposed normally to dry conditions to CGSB 85-GP-14M.

.7 Prepare previously painted steel surfaces exposed normally to dry conditions to CGSB 85-GP-15M.

.8 Prepare steel surfaces exposed to industrial environments to CGSB 85-GP-13M.

.9 Prepare steel surfaces exposed to water or high humidity levels to CGSB-85-GP-11M CGSB 85-GP-18M.

.10 Apply paint only after prepared surfaces have been accepted by Engineer Consultant.

3.8 Mixing Paint

.1 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.

.2 Thin paint for spraying according to manufacturer's written instructions and provide copy to Engineer.

3.9 Application

.1 Apply paint by brush roller air sprayer airless sprayer as approved by Engineer. Conform to manufacturer's application instructions unless specified otherwise.

.2 Brush application.
.1 Work paint into cracks, crevices and corners. Paint surfaces not accessible to brushes by daubers or sheepskins.
.2 Brush out runs and sags.
.3 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 properly 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 a uniform layer, with overlapping at edges of spray pattern.
.4 Brush out immediately all runs and sags.
.5 Use brushes 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 and only when specifically authorized by Engineer.

.5 Apply each coat of paint as a 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 each coat to remove visible defects.

.8 Finish tops of projecting ledges, both above and below sight lines as specified for surrounding surfaces.

.9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.10 Mechanical and Electrical Equipment

.1 Paint exposed conduits, piping, hangers ductwork and other mechanical and electrical equipment unless specified otherwise. Colour to match adjacent surfaces except as specified otherwise.

.2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.3 Paint exterior steel electrical light standards. Do not paint outdoor transformers and substation equipment.

.4 Paint all fire protection piping Red.

.5 Paint all natural gas piping Yellow.

3.11 Field Quality Control

.1 Field inspection of painting operations to be carried out be independent inspection firm as designated by Engineer.

.2 Advise Engineer when each applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

.3 Co-operate with inspection firm and provide access to all areas of the work.

3.12 Restoration

.1 Clean and re-install all items that were removed before undertaking 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 surfaces from paint droppings and dust to approval of Engineer. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Engineer.

PART 1 - GENERAL

1.1 Related Section

.1 Section 07900 Joint Sealers.

.2 Section 15: Louvres connected to ductwork.

.3 Section 16: Electrical power supply.

1.2 References

.1 Aluminum Association Designation System for Aluminum Finishes - 1980.

.2 ASTM A167-91, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.3 ASTM A366M-91, Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.

.4 ASTM A526M-90, Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

.5 ASTM B32-89, Specification for Solder Metal.

.6 ASTM B370-88, Specification for Copper Sheet and Strip for Building Construction.

.7 ASTM D523-89, Test Method for Specular Gloss.

.8 ASTM D822-89, Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.

.9 CGSB 1-GP-121M-77, Coating, Vinyl, Pretreatment, for Metals (Vinyl Wash Primer).

.10 CAN/CGSB-93.1-M85, Sheet, Aluminum Alloy, Prefinished, Residential.

1.3 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit shop drawings in accordance with Section.

.3 Indicate fabrication and erection details, including anchorage, accessories, and finishes.

1.4 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit samples in accordance with Section.

.3 Submit duplicate samples of each type of louvre and vent showing colour and finish.

.4 Show frame detail, screening and finish.

1.5 Closeout Submittals

.1 Provide operation and maintenance data for manual or motorized operated louvres for incorporation into manual specified in Section 01730 - Operation and Maintenance Manual.

.2 Provide operation and maintenance data for manual or motorized operated louvres for incorporation into manual specified in Section.

PART 2 - PRODUCTS

2.1 Materials

.1 Galvanized steel sheet: commercial quality to ASTM A526M with Z275 zinc coating.

.2 Steel sheet: commercial quality to ASTM A366 with Class I matte finish.

.3 Aluminum sheet: mill finish plain embossed pattern utility sheet.

.4 Aluminum extrusions: Aluminum Association alloy AA6063-T5.

.5 Copper sheet: to ASTM B370 cold rolled weighing g/m″.

.6 Stainless steel sheet: to ASTM A167, type 302 304 316 with finish.

.7 Fibreglass.

.8 Solder: to ASTM B32, 50% tin and 50% lead.

.9 Flux: suitable for materials to be soldered.

.10 Nails and fasteners: same material as fabricated items.

.11 Gaskets: vinyl.

.12 Primer: to CGSB 1-GP-121M for copper aluminum surfaces.

.13 Prefinished steel sheet.

.1 Prefinished steel with factory applied polyvinylidene fluoride.

.1 Class F1S F2S.

.2 Colour selected by Engineer Consultant from manufacturer's standard range.

.3 Specular gloss: 30 units +/- in accordance with ASTM D523.

.4 Coating thickness: not less than 22 micrometres.

.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:

.1 Outdoor exposure period 2500 hours.

.2 Humidity resistance exposure period 5000 hours.

.2 Prefinished steel with factory applied polyvinyl chloride.

.1 Class F1S F2S.

.2 Colour selected by Engineer Consultant from manufacturer's standard range.

.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.

.4 Coating thickness: not less than 200 micrometres.

.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D822 as follows.

.1 Outdoor exposure period 5000 hours.

.2 Humidity resistance exposure period 5000 hours.

.3 Prefinished steel with factory applied silicone modified polyester.

.1 Class F1S F2S.

.2 Colour selected by Engineer Consultant from manufacturer's standard range.

.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.

.4 Coating thickness: not less than 25 micrometres.

.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20% to ASTM D822 as follows:

.1 Outdoor exposure period 1000 hours.

.2 Humidity resistance exposure period 1000 hours.

.14 Prefinished aluminum sheet.

.1 Finish aluminum sheet metal with factory applied coating to CAN/CGSB-93.1 amended as follows:

.1 Type 1 2.

.2 Class F1S F2S.

.3 Colour selected by Engineer Consultant from manufacturer's standard range.

.4 Specular gloss: units.

.5 Coating thickness: not less than micrometres.

.6 Outdoor exposure period.

.7 Exposure period for humidity resistance.

.8 Exposure period for salt spray resistance.

.15 Screens

.1 Insect screens: 0.3 mm diameter aluminum wire fibreglass 18 x 14 mesh with 60% free area, secured to aluminum frame.

.2 Birdscreens: crimped intercrimped aluminum wire cloth secured to 2 2.2 mm thick extruded aluminum frame mitered at corners and secured with corner locks, size mesh, diameter wire with % free area.

.16 Formed sheet metal louvres.
- .1 Fabricate sheet metal louvres from minimum thick stock.
- .2 Form blades, mullions and frames to sizes and shapes indicated.
- .3 Provide concealed vertical stiffeners spaced to meet required loads.
- .4 Complete louvre assembly to have % free area.
- .5 Apply one coat of shop primer.
- .6 Attach bird insect screen to inside face of louvre.

.17 Extruded aluminum louvres.
- .1 Construct louvres from aluminum extrusions of minimum 3 mm thickness to sizes and shapes indicated.
- .2 Arrange blades, mullions and frame extrusions as indicated.
- .3 Install concealed vertical stiffeners spaced to meet required loads.
- .4 Complete louvre assembly to have % free area.

.18 Adjustable louvres.
- .1 Construct manually adjustable louvres from aluminum extrusions of minimum 3 mm thickness.
- .2 Arrange blades, mullions and frame extrusions as indicated.
- .3 Center pivot stormproof type blades with two reinforcing bosses with pinions operating in self-lubricating nylon bearings.
- .4 Arrange blades to be operated by concealed drive arms at each jamb. Connect drive arms by torsion bars operating in nylon bearings.
- .5 Equip louvre blades and sills with vinyl gasket weatherseals. Mechanically fasten Adhere vinyl gaskets to ends of louvre blades to provide jamb weatherseal.
- .6 Complete louvre assembly to have % free area when in open position.
- .7 Provide louvres with manual hand crank operator with removable crank located at.

.19 Door louvres.
- .1 Construct door louvres from fibreglass steel aluminum extrusions minimum thick. Minimum free area of 35%. Provide fasteners to suit louvre material.
- .2 Use standard sightproof lightproof operating blades.
- .3 Provide separate adjustable trim member for clamping louvre in opening.
- .4 Miter frame and trim members at corners and secure rigidly with corner brackets.
- .5 Secure interior frame with countersunk [tamperproof] screws.

.20 Brick vents.
- .1 Construct brick vents from fibreglass steel aluminum extrusions minimum 3 mm thick with 6 mm structural ribs. Sizes of brick vents as indicated.
- .2 Attach insect screen to interior face of vent.
- .3 Provide weepholes at 125 mm oc.
- .4 Apply protective masking cover on exposed surfaces before shipping.

.21 Louvred penthouses.
- .1 Construct penthouse louvres from extruded aluminum stormproof blades of minimum 3 mm thickness.
- .2 Continuously heliarc weld at corners sills, blades and head members. Support by structural aluminum angles on interior as indicated.

.3 Provide one piece weatherproof roof of 2 mm thick aluminum sheet reinforced with 50 x 50 x 6 mm aluminum angles at 1200 mm oc. Insulate underside of roof with minimum 6 mm thick sound deadening and anti-condensation coating.
.4 Attach bird insect screen to inside face of penthouse louvres.

2.2 Finishes

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
.1 As fabricated or mill finish: designation AA-.
.2 Clear anodic finish: designation AA-.
.3 Integral colour anodic finish: designation AA-, colour to match Engineer's Consultant's sample.
.4 Impregnated colour anodic finish: designation AA-, colour to match Engineer's Consultant's sample.
.5 Electrolytically deposited colour anodic finish: designation AA, colour to match Engineer's Consultant's sample.

.2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative.

PART 3 - EXECUTION

3.1 Installation

.1 Install louvres and vents where indicated.

.2 Set adjustable louvre blades for uniform alignment in open and closed positions.

.3 Adjust louvres so moving parts operate smoothly.

.4 Attach bird insect screen to inside face of louvre or vent.

.5 Repair damage to louvres and vents to match original finish.

PART 1 - GENERAL

1.1 References

.1 ASTM A526M-90 Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

.2 CSA A82.30-M1980(R1992), Interior Furring, Lathing and Gypsum Plastering.

.3 CSA G30.5-[M1983(R1991), Welded Steel Wire Fabric for Concrete Reinforcement.

.4 CAN/CSA-G40.21-M92, Structural Quality Steels.

.5 CAN/CSA-G164-M92, Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 CSA W59-M1984, Welded Steel Construction (Metal Arc Welding).

.7 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.

.8 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.

.9 CAN/CGSB-1.104-M91, Semigloss Alkyd, Air Drying and Baking Enamel.

1.2 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit shop drawings in accordance with Section.

.3 Indicate partition panel modules and types, materials, gauges, finishes, door and other openings, hardware, fastening methods to adjacent structure, ceiling details, and assembly methods.

1.3 Samples

.1 Submit samples in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Submit samples in accordance with Section.

.3 Submit duplicate 300 x 300 mm samples of each type partition and colour and finish on actual base metal.

.4 Sample to show basic construction, door construction, hardware, and finishes.

.5 Erect trial assembly of at least two modules of each type partition, on site where directed by Engineer Consultant.

1.4 Mock-ups

.1 Construct mock-ups in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Construct mock-ups in accordance with Section.

.3 Erect one of each type door and two of each type partition panel.

.4 Allow 24 hours for inspection of mock-up by Engineer Consultant before proceeding with work.

.5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may not remain as part of finished work.

PART 2 - PRODUCTS

2.1 Materials

.1 Partition mesh: galvanized painted PVC coated.
- .1 Welded steel wire fabric: to CSA G30.5, longitudinal wire size MW, transverse wire size MW, opening size x mm, provide in flat sheets.
- .2 Wire cloth: steel monel galvanized painted PVC coated, x mesh, mm wire, weave plain twilled dutch.
- .3 Woven wire screen: light medium standard heavy extra heavy, double crimp inter-crimp smooth top crimp lock crimp slot smooth slot long slot, steel monel, galvanized painted PVC coated, x mm clear opening space between wires, mm wire, flattened edge.
- .4 Welded mesh: galvanized painted PVC coated, opening size x mm, mm wire, welded edge.
- .5 Perforated sheets:
  - .1 Material: stainless steel monel nickel aluminum brass copper steel.
  - .2 Size: standard stock sheets sized to suit application, thickness mm.
  - .3 Margins: minimum no margins end margin mm, side margin mm.
  - .4 Perforations:
    - .1 Size: mm.
    - .2 Shape: round square slot diamond.
    - .3 Arrangement: staggered straight line.
    - .4 Spacing: mm centre to centre.
    - .5 Slots: long dimension parallel to long short dimension of sheet.
  - .5 Bolt holes: mm diameter, location.
- .6 Metal lath: to CAN A82.30, diamond mesh, 1.35 1.63 1.84 kg/m 3.2 9.5 mm rib lath, 1.36 1.63 1.89 2.17 kg/m.
- .7 Galvanized steel sheet: commercial quality, to ASTM A526M with Z275 zinc coating.

.2 Steel sections and plates: to CAN/CSA-G40.21, type 44W.
.1 Posts: hollow steel tubing, round mm diameter square x mm, galvanized painted PVC coated, welded bolted knock down construction, designed to fasten to floors and walls and ceiling, minimum wall thickness 2 mm.
.2 Extension posts: 44 x 44 mm hollow steel tubing, minimum wall thickness 1.6 mm.
.3 Angle frame: 32 x 32 x 3 mm.
.4 Post caps: manufacturer's standard formed cap; finish to match other components.

.3 Welding materials: to CSA W59.

.4 Bolts, fasteners and fastening hardware: manufacturer's standard to suit design and application.

2.2 Fabrication

.1 Panels: fabricate panels 2400 x 1200 mm and special sizes or shapes as required consisting of wire mesh and sheet metal as indicated, welded at 100 mm oc to angle frame. Mitre and weld frame corners. Provide 20 x 6 mm flat bars across panels at third points on 2400 mm dimension.

.2 Posts: 2400 mm ceiling high with floor and ceiling plates for fixing and post cap. Include corner, wall, door and other special posts to manufacturer's standard.

.3 Post extensions: length required to telescope 300 mm into post and extend posts to ceiling. Weld ceiling plate on upper end for fixing. Supply extension posts for every second third fourth post where indicated.

.4 Swing doors:
.1 Standard doors: 900 x 2100 1200 x 2100 mm sizes as indicated. Construct doors and transom above of angle frame and wire mesh and sheet metal as indicated, same as panels. Reinforce door with 40 x 5 mm or equivalent flat bar centre rail and 20 x 6 mm or equivalent flat bar bracing from centre rail to opposite corners on hinge side.
.2 Dutch doors: 900 x 2100 1200 x 2100 mm sizes as indicated. Construct doors and transom above of angle frame and wire mesh and sheet metal as indicated, same as panels. Reinforce each leaf with 20 x 6 mm or equivalent flat bar bracing from opposite corners. Provide shelf on lower leaf, 200 mm x width of door, constructed of sheet metal laminated to edges and both sides of 20 mm plywood core. Provide overlapping lugs to hold lower leaf shut when upper leaf closed.
.3 Swing door hardware:
.1 Equip all doors with stops, keeper, hasp for padlock lock guard provision for lockset deadlock.
.2 Equip standard doors with 1-1/2 pair of butts.
.3 Equip dutch doors with 2 pair of butts.

.5 Sliding doors: 1200 x 2400 1800 x 2400 2400 x 2400 3000 x 2400 mm sizes as indicated. Construct of angle frame and mesh and sheet metal as indicated to match enclosure, same as panels. Reinforce corners and at intermediate points horizontally and vertically with flat bar or angle, to manufacturer's standard design for door sizes specified as detailed.

.1 Equip sliding doors with:

.1 Box type sliding door track, 135 kg capacity, fabricated from 1.6 mm thick galvanized steel.

.2 Hanger/trolleys, minimum 70 kg capacity each, consisting of four 54 mm dia, formed, galvanized, steel rollers, on hardened ball bearings, set in cadmium plated forged steel frame, with 16 mm diameter pendant bolt for adjustable attachment to door. Supply 2 3 hanger/trolleys per door.

.3 Door guides, door stops, keeper, hasp for padlock lock guard provision for deadlock.

.6 Service wicket:

.1 Provide in panel door where indicated, hinged shelf service wicket [to manufacturer's standard detail] [as detailed]. Shelf height 965 mm from floor.

.2 Fabricate shelf 535 mm x width of panel door, of sheet metal laminated to edges and both sides of 19 mm plywood core.

.3 Include hinges, commercial quality folding shelf brackets, keeper, and hasp for padlock provision for deadlock.

2.3 Finishes

.1 After fabrication, clean and paint all components with manufacturer's standard prim and 2 coat enamel finish. Standard Special colour selected by Engineer Consultant indicated on finish schedule. Paint materials: in accordance with Section 09911 - Interior Painting.

.2 After fabrication, apply 400 g/m″ zinc coating by hot dip galvanizing process to CAN/CSA-G164. Apply one coat CAN/CGSB-1.81 primer and one two coats CAN/CGSB-1.88 type 2, gloss CAN/CGSB-1.104, type 2, semi-gloss enamel. Standard Special colour selected by Engineer Consultant indicated on finish schedule.

PART 3 - EXECUTION

3.1 Erection

.1 Install mesh enclosures and doors in accordance with manufacturer's printed instructions.

.2 Erect enclosures plumb, level, straight, rigidly supported, and securely fastened to abutting surfaces, free from superimposed loads.

.3 Fix to masonry and concrete using lag bolts and shields; to hollow walls using bolts and toggle type anchors; to steel supports with bolts in threaded holes or spot welds. Locate fasteners on interior side where possible for maximum security.

.4 Install doors and wickets and adjust for proper closing, locking and smooth operation. Mount sliding doors on exterior interior side of enclosed area.

PART 1 - GENERAL

1.1 Related Sections

.1 Section 07620 Metal Flashing and Trim

.2 Section 03300 Cast-in-Place Concrete

.3 Section 05500 Metal Fabrications.

1.2 References

.1 Ontario Building Code (OBC, as amended), Part 4

.2 CAN/CSA-Z91-M, Safety Code for Window Cleaning Operations.

.3 CAN/CSA-G164-M81, Hot Dip Galvanizing or Irregularly Shaped Articles.

.4 Occupational Health and Safety Act.

1.3 Shop Drawings

.1 Submit shop drawings and product data in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

PART 2 - PRODUCTS

2.1 Materials

.1 Anchor system drawings to be made from stainless steel, aluminum, or other corrosion resistant base material, or from steel that is hot dipped galvanized, in accordance with CAN/CSA-G164-M81, Hot Dip Galvanizing or Irregularly Shaped Articles.

PART 3 - EXECUTION

3.1 Preparation

.1 Co-ordinate the work of this Section with the applicable roofing Sections.

.2 Co-ordinate the work of this section with the material fabrications Section with respect to guards.

3.2 Installation

.1 Supply cast-in-type-anchors to Section 03300, along with shop drawings for installation and location.

.2 Supply anchors to be bolted or welded to structural elements to the Section providing the structural elements for installation.

.3 Install bolt-through desk anchors in accordance with approved shop drawings.

PART 1 - GENERAL

1.1 Related Sections

.1 Sections 03300 and 04220 Concrete and masonry work and installation of anchor bolts and inserts

.2 Section 09911 Interior Painting: Field painting.

.3 Section 16: Power connection to equipment and supplementary wiring.

1.2 References

.1 NSWMA August 1971 National Solid Wastes Management Association Rating Criteria.

.2 ASTM A48-92 Specification for Gray Iron Castings.

.3 ASTM A307-92a Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.

.4 ASTM A526M-90 Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.

.5 ASTM B32-93 Specification for Solder Metal.

.6 CAN/CSA-G40.21-M92 Welded Structural Quality Steel/Structural Quality Steel.

.7 CSA W59-1989 Welded Steel Construction (Metal Arc Welding).

.8 CAN/CGSB-1.40-M89 Primer, Structural Steel, Oil Alkyd Type.

.9 CAN/CGSB-1.140-M89 Oil-Alkyd Type Red Lead, Iron Oxide Primer.

1.3 Systems Description

.1 Provide waste compactor: fully automatic and allow for manual dumping.

.2 Responsibility includes design, fabrication, transportation, erection and demonstration of equipment.

1.4 Design Requirements

.1 General
.1 Operation of waste compactor: fully automatic.
.2 Cycling: governed by electric photocell connected to signal light to indicate that container is full.
.3 Equip compactor with deodorizer spray system.
.4 Main control panel to include as minimum an on-off switch, emergency stop button, cycle selector switch (for single or continuous operation) and light indicator to indicate that container is full.

.2 Waste compactor to manufactures standards.

.3 Container to supplier's standard.

1.5 Performance Requirements

.1 Conform to National Solid Wastes Management Association (NSWMA) Rating Criteria.

1.6 Shop Drawings

.1 Submit shop drawings in accordance with Section 01340 - Shop Drawings, Product Data, Samples and Mock-ups.

.2 Indicate construction details, point loads, anchor bolt locations, clearances required, including clearances for access and service and electrical requirements.

1.7 Closeout Submittals

.1 Provide maintenance data for waste compactors for incorporation into manual specified in Section 01730 - Operation and Maintenance Manual].

.2 Include following information: description of operation, servicing, adjusting/testing, inspection/checking, list of lubricates and hydraulic fluid.

PART 2 – PRODUCTS

2.1 Materials

.1 Cast iron: to ASTM A48.

.2 Steel plate: to CAN/CSA-G40.21.

.3 Steel angles: to CAN/CSA-G40.21.

.4 Bolts, nuts and washers: to ASTM A307.

.5 Welding materials: to CSA W59.1.

.6 Shop paint primer: to CAN/CGSB-1.40.

.7 Finish painting: to manufacturer's standard.

.8 Isolation coating: alkali-resistant bituminous paint or epoxy resin solution.

.9 Galvanized steel sheet hopper: commercial quality to ASTM A526M, with Z275 designation zinc coating.

.10 Solder: to ASTM B32, 50% tin and 50% lead.

.11 Flux: resin, cut muriatic acid, or commercial preparation suitable for materials to be soldered.

.12 Cleats: 0.45 mm base metal thickness galvanized steel sheet, minimum 50 mm wide.

.13 Plastic bags: to compactor manufacturer's standard.

2.2 Fabrication

.1 Build work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Fabricate items from steel unless otherwise noted.

.3 Use self-tapping "shake-proof" countersunk flat headed screws on items required to be assembled by screws.

.4 Where possible, shop assemble and fit work ready for erection.

.5 Make exposed welds continuous for length of each joint. File or grind exposed welds smooth and flush.

.6 Power supply as per manufactures requirements.

2.3 Finishes

.1 Apply one shop coat of primer to metal items, with exception of those to be galvanized.

.2 Use primer in accordance with manufacturer’s instructions. Paint on dry surfaces, free from rust, scale, grease and other deleterious material.

.3 Clean surfaces to be field welded; do not prime.

.4 Apply two coats of finish paint to entire compactor, to manufacturer’s standard.

PART 3 - EXECUTION

3.1 Protection

.1 Cover surfaces of metals in contact with concrete with isolation paint coating.

3.2 Installation

.1 Install waste compactor and hopper in accordance with manufacturer's instructions.

.2 Bolt compactor securely in place using galvanized fasteners.

.3 Touch up damaged surfaces after installation as directed.

3.3 Demonstration

.1 Before acceptance of waste compactor system, arrange for demonstration of equipment to authorized representatives. Demonstration to be performed by competent representative of equipment manufacturer to assure proper function, operation and explanation. Give representative minimum of 48 hours advance notice in writing of demonstration.

.2 Instruct maintenance personnel in use of equipment.