Public Works and Government Services Canada

Requisition No:_____

SPECIFICATIONS
for
Fisheries & Oceans Canada- Institute of Ocean Sciences
Roofing Remediation – Stage 1, Sidney, BC

Project No.: November 2020

APPROVED BY:

_____ _____
Regional Manager, AES Date

_____ _____
Construction Safety Coordinator Date

TENDER:

_____ _____
Project Manager Date

Real Property Services Branch,
Professional and Technical Services, Pacific Region
Room 219 - 800 Burrard Street, Vancouver, B.C., V6Z 0B9

PART 1 - SPECIFICATIONS

PART 2- DRAWINGS

Architectural Drawings: 5

ARCHITECTURE	STRUCTURAL
 2020-12-15	

END OF SECTION

Part 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises remediation of the roofs identified in the drawings dated August 2020 titled “Fisheries & Oceans Canada Institute of Ocean Sciences Roof Remediation”

1.2 DESCRIPTION OF WORK

.1 Remediation of roofs identified in areas over the Pacific Geoscience Centre in the drawings dated August 2020.

.2 The Work includes, but is not limited to, the following general scope;

- .1 Site Demolition of roof areas to be replaced.
- .2 Making good any collateral damage created by the demolition including damage to the building and or the site.
- .3 Disposal of all materials removed.
- .4 Replacement of all roof assemblies identified in the Remediation Drawings.
- .5 Tarps and hoarding to protect interior areas from water ingress during removal and replacement of roof systems as indicated in the drawings.

.3 Include all temporary means and facilities required to advance the work in a timely manner, and to keep the property protected, safe and secure during the performance of the work. Contractor Staging Area and Access to the Site: refer to Site Plan and Division 1 requirements.

1.3 WORK SEQUENCE

.1 Construct Work in stages to accommodate Owner's continued use of premises during construction.

.2 Co-ordinate Progress Schedule and co-ordinate with Owner site use during construction.

.3 Maintain fire access/control.

.4 Refer to Section 01 52 00 Construction Facilities for road access limitations.

1.4 CONTRACTOR USE OF PREMISES

.1 Unrestricted use of site until Substantial Performance, road access subject to Section 01 52 00 Construction Facilities.

.2 Co-ordinate use of premises under direction of Departmental Representative.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.5 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.5 OWNER OCCUPANCY

.1 Owner will occupy premises outside of construction area during entire construction period for execution of normal operations.

.2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.6 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance normal use of premises. Arrange with the Department Representative to facilitate execution of work.

1.7 EXISTING SERVICES

.1 Notify, the Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 5 working days notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian, vehicular traffic and tenant operations.

.3 Provide alternative routes for personnel, pedestrian and vehicular traffic.

.4 Establish location and extent of service lines in area of work before starting Work. Notify the Departmental Representative of findings.

.5 Submit schedule to and obtain approval from the Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.6 Provide temporary services when directed by the Departmental Representative to maintain critical building and tenant systems.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise the Departmental Representative and confirm findings in writing.

.9 Protect, relocate, or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations of maintained, re-routed, and abandoned service lines.

.11 Construct barriers in accordance with Section 01 52 00 – Construction Facilities.

1.8 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

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

END OF SECTION

Part 1 GENERAL

1.1 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Provide sanitary facilities for the work force in accordance with governing regulations and ordinances. Remove temporary facilities from site when directed by the Departmental Representative.

.5 Use only assigned elevators, stairwells, or paths of travel in existing in building for moving workers and material.

.6 Closures: protect work temporarily until permanent enclosures are completed.

.7 Workers shall refrain from use of loud and vulgar language. Non- compliance to this policy will result in the specific worker(s) involved being required to immediately leave the site and to be permanently removed from any subsequent involvement on this project by the Contractor.

.8 Use of loud radios shall be prohibited.

.9 Pets are not allowed on site.

.10 Vehicles must be parked in designated areas.

.11 The Departmental Representative will designate storage areas for tools and equipment. The Contractor shall assign and coordinate storage facilities for sub-Contractors within these designated areas

1.2 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING SYSTEMS

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

1.3 EXISTING SERVICES

.1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services give Departmental Representative Consultant a minimum of 5 working days of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel and pedestrian and vehicular traffic.

.4 Construct barriers in accordance with WorkSafeBC, safety authority, Authority Having Jurisdiction, and Departmental Representative.

1.4 SPECIAL REQUIREMENTS

.1 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.2 Keep within limits of work and avenues of ingress and egress.

1.5 SECURITY

.1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

END OF SECTION

Part 1 GENERAL

1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting five days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

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

.7 Reproduce and distribute copies of minutes within [three] days after meetings and transmit to meeting participants and Departmental Representative.

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

1.2 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 Establish time and location of meeting and notify parties concerned minimum 10 days before meeting.

.3 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Schedule - Bar (GANTT) Chart.

.3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittals.

.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

.5 Delivery schedule of specified equipment.

.6 Site security in accordance with Section 01 52 00 - Construction Facilities.

.7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.8 Owner provided products.

.9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

.10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.12 Monthly progress claims, administrative procedures, photographs, hold backs.

.13 Appointment of inspection and testing agencies or firms.

1.3 PROGRESS MEETINGS

.1 During course of Work and 2 weeks prior to project completion, schedule progress regular bi-weekly meetings

.2 Notify parties minimum 5 days prior to meetings.

.3 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.

.4 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.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 Submittals

1.2 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally, Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday or Saturday, inclusive, will provide five to six day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element: usually expressed as workdays or work weeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

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

1.4 SUBMITTALS

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

.2 Submit to Departmental Representative within 15 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to the Departmental Representative within 10 working days of receipt of acceptance of Master Plan.

1.5 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule.

.1 Project completed before March 31, 2021.

1.6 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

1.7 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.
.2 Shop Drawings, Samples.
.3 Mobilization.
.4 Project Completion

END OF SECTION

Part 1 GENERAL

1.1 SECTION INCLUDES

.1 Shop drawings and product data.

.2 Samples.

.3 Certificates and transcripts.

1.2 PRECEDENCE

.1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Document.

1.3 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

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

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

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

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

.7 Verify field measurements and affected adjacent Work is co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

1.4 SUBCONTRACTOR LIST

.1 Submit list of all subcontractors including contact information to Departmental Representative within 10 business days of contract award.

1.5 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of BC, Canada.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 2 days for Departmental Representative’s review of each submission.

.5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in shop drawings as Departmental Representative require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions, other than those requested.

.7 Accompany submissions with transmittal letter, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 Details of appropriate portions of Work as applicable:

.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions, and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

.9 After Departmental Representative’s review, distribute copies.

.10 Submit electronic copies of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit electronic copies of product data sheets or brochures for requirements requested in specification sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product, or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system, or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit electronic copies of manufacturer’s instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.17 Delete information not applicable to project.

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

.19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.20 The review of shop drawings by Fisheries & Oceans Canada (DFO) is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that DFO approves detail design inherent in shop drawings. Responsibility for which shall remain with Contractor submitting, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.6 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to the Owner.

.3 Notify the Owner in writing, at time of submission of deviations in samples from requirements of Contract Documents.

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

.5 Adjustments made on samples by the Owner are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Owner prior to proceeding with Work.

.6 Make changes in samples, which the Engineer may require, consistent with Contract Documents.

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

1.7 PROGRESS PHOTOGRAPHS

.1 Submit progress photographs in accordance as requested by the Departmental Representative

1.8 CERTIFICATES AND TRANSCRIPTS

.1 Compliance certificates, material and product certificates shall be maintained in the document of compliance records.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

.1 Canada Labour Code, Canada Occupational Safety and Health Regulations.

.2 American National Standards Institute (ANSI):

.1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.

.3 Canadian Standards Association (CSA):

.1 CSA S269.1-1975 (R1998), Falsework for Construction Purposes.

.2 CSA S269.2-M87 (R1998), Access Scaffolding for Construction Purposes.

.3 CSA S350-M1980 (R1998), Code of Practice for Safety in Demolition of Structures.

.4 Fire Commissioner of Canada (FCC):

.1 FCC No. 301-1982, Standard for Construction Operations.

.2 FCC No. 302-1982, Standard for Welding and Cutting.

.5 National Building Code of Canada (NBC):

.1 Part 8, Safety Measures at Construction and Demolition Sites.

.6 Province of British Columbia:

.1 Workers Compensation Act (Occupational Health & Safety), Amendment Act, BC Reg. 185/99, herein referred to as the Workers Compensation Act (WCA).

1.2 RELATED SECTIONS

.1 Refer to the following sections as required:

.1 Section 01 33 00 – Submittals.

1.3 WORKERS COMPENSATION BOARD COVERAGE

.1 Comply fully with the Work Safe BC regulations and orders made pursuant thereto, and any amendments up to the completion of the work.

.2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.4 COMPLIANCE WITH REGULATIONS

.1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.

.2 It is the Contractor's responsibility to ensure that all workers are qualified, competent, and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

1.5 SUBMITTALS

.1 Perform submittals, if required in accordance with Section 01 33 00

.2 The following shall be in the Records Document:

.1 Health and Safety Plan.

.2 Copies of reports or directions issued by federal and provincial health and safety inspectors.

.3 Copies of incident and accident reports.

.4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.

.5 Emergency Procedures.

.3 Records of Health and Safety Plan, and any revised version, to the Owner is to be a part of the Records Document and It shall not:

.1 Be construed to imply approval by the Owner.

.2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.

.3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.6 RESPONSIBILITY

.1 Be responsible for:

.1 The safety of persons and property on site; and

.2 The protection of persons off site, and the environment to the extent that they may be affected by the conduct of the work.

1.7 GENERAL PROTECTION

.1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.

.2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.

.3 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.

.4 Secure site at nighttime or provide security guard as deemed necessary to protect site against entry.

1.8 REGULATORY REQUIREMENTS

.1 Comply with specified codes, acts, bylaws, standards, and regulations to ensure safe operations at site.

.2 In event of conflict between any provisions of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Engineer will advise on the course of action to be followed.

1.9 WORK PERMITS

.1 Obtain all necessary permits related to the project before start of work.

1.10 HEALTH AND SAFETY PLAN

.1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.

.2 Prepare and comply with a job-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:

.1 Primary requirements:

.1 Contractor’s safety policy.

.2 Identification of applicable compliance obligations

.3 Definition of responsibilities for project safety/organization chart for project.

.4 General safety rules for project.

.5 Job-specific safe work procedures.

.6 Inspection policy and procedures

.7 Incident reporting and investigation policy and procedures

.8 Occupational Health and Safety Committee/Representative procedures.

.9 Occupational Health and Safety meetings

.10 Occupational Health and Safety communications and record keeping procedures.

.2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.

.3 List hazardous materials to be brought on site as required by work.

.4 Indicate engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.

.5 Identify personal protective equipment (PPE) to be used by workers.

.6 Identify personnel and alternates responsible for site safety and health.

.7 Identify personnel training requirements and training plan, including site orientation for new workers.

.3 Develop the plan in collaboration with all sub-contractors. Ensure that work/activities of sub-contractors are included in the hazard assessment and are reflected in the plan.

.4 Revise and update Health and Safety Plan as required and re-submit to the Engineer.

1.11 EMERGENCY PROCEDURES

.1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:

- .1 Designated personnel from own company.
- .2 Regulatory agencies applicable to work and as per legislated regulations.
- .3 Local emergency resources.
- .4 Engineer and site staff.

.2 Include the following provisions in the emergency procedures:

- .1 Notify workers and the first aid attendant, of the nature and location of the emergency.
- .2 Evacuate all workers safely
- .3 Check and confirm the safe evacuation of all workers.
- .4 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
- .5 Notify Engineer and staff.

.3 Provide written rescue/evacuation procedures as required for, but not limited to:

- .1 Work at high angles.
- .2 Work in confined spaces or where there is a risk of entrapment.
- .3 Work with hazardous substances.
- .4 Underground work.
- .5 Work on, over, under and adjacent to water.
- .6 Workplaces where there are persons who require physical assistance to be moved.

.4 Design and mark emergency exit routes to provide quick and unimpeded exit.

.5 At least once each year, emergency drills must be held to ensure awareness and effectiveness of emergency exit routes and procedures, and a record of the drills must be kept.

.6 Revise and update emergency procedures as required, and re-submit to the Engineer.

1.12 MEETINGS

.1 Contractor to hold health and safety meetings related to execution of the work.

1.13 HEALTH AND SAFETY OFFICER

.1 The Health and Safety Officer must:

.1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.

.2 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.

.3 Be on site during execution of work.

1.14 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Engineer and in accordance with the Canada Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:

.1 Obtain appropriate permission beforehand of the product(s) intended for use.

.2 Submit applicable MSDS and WHMIS documents as per Section 01 33 00.

.3 Provide adequate means of ventilation in accordance with WCB of British Columbia.

1.15 REMOVAL OF LEAD-CONTAINING PAINTS

.1 All paints containing TCLP lead concentrations above 5 ppm are classified as hazardous.

1.16 ELECTRICAL SAFETY REQUIREMENTS

.1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.

.2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

1.17 ELECTRICAL LOCK-OUT

.1 Develop, implement and enforce use of established procedures to provide electrical lock-out and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

.2 Prepare the lock-out procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have the procedures available for review upon request by the Owner.

.3 Keep the documents and lock-out tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Owner or by any authorized safety representative.

1.18 OVERLOADING

.1 Ensure no part of work is subjected to a load, which will endanger its safety or will cause permanent deformation.

1.19 FALSEWORK

.1 Design and construct falsework in accordance with CSA S269.1.

1.20 SCAFFOLDING

.1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CAN/CSA-S269.2.

1.21 CONFINED SPACES

.1 Carry out work in confined spaces in compliance with provincial regulations.

1.22 BLASTING

.1 Not Required.

1.23 POWDER-ACTUATED DEVICES

.1 Use powder-actuated devices in accordance with ANSI A10.3 only after receipt of written permission from the Engineer.

1.24 FIRE SAFETY REQUIREMENTS

.1 Store oily/paint-soaked 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.

1.25 FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut off.

.3 Left Inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes, and hose systems for purposes other than firefighting.

.3 Be responsible/liable for costs incurred from the fire department and the building owner and tenants, resulting from false alarms.

1.26 POSTED DOCUMENTS

.1 Post legible versions of the following documents on site:

.1 Health and Safety Plan.

.2 Sequence of work.

.3 Emergency procedures.

.4 Drawing showing project layout, locations of the first aid station, evacuation route and marshalling station, and the emergency transportation provisions.

.5 Floor plans

.6 Notice as to where a copy of the workers' Compensations Act and Regulations are available on the work site for review by employees and workers.

.7 Workplace Hazardous Materials Information System (WHMIS) documents.

.8 Material Safety Data Sheets (MSDS).

.9 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

.2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.

1.27 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues as directed by the appropriate regulators.

.2 Record action taken to correct non-compliance with health and safety issues identified by the appropriate regulators.

END OF SECTION

Part 1 GENERAL

1.1 INSPECTION

.1 Allow Departmental Representative or Consultant Engineer access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative or Consultant Engineer instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.2 ACCESS TO WORK

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

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

1.3 PROCEDURES

.1 Notify Departmental Representative or Consultant Engineer 5 days in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

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

1.4 REJECTED WORK

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

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

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

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 N/A

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.3 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121-M1978(R2003), Douglas Fir Plywood.

.3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.

.4 CAN/CSA-Z321-[96(R2001)], Signs and Symbols for the Occupational Environment.

.4 Public Works Government Services Canada (PSPC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

.5 U.S. Environmental Protection Agency (EPA) / Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Provide construction facilities in order to execute work expeditiously.

.5 Remove from site all such work after use.

1.3 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

1.4 HOISTING

.1 Provide, operate and maintain hoists [cranes]required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.

.2 Hoists [cranes]to be operated by qualified operator.

1.5 SITE STORAGE/LOADING

.1 N/A

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

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

1.6 CONSTRUCTION PARKING

.1 Parking will not be permitted on site. Arrangements as follows:

.1 Parking available for the Contractor; sub contractors will require a visitor pass.

.2 Parking area near loading bay and large generator.

.2 Provide and maintain adequate access to project site.

.3 Clean runways and taxi areas where used by Contractor's equipment.

1.7 OFFICES

.1 Contractor to provide temporary office facilities on premises, location as directed by the Departmental Representative.

.2 Subcontractors to provide their own offices as necessary, location as per Departmental Representative.

.3 Provide marked and fully stocked first-aid case in a readily available location.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.9 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.10 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by the Departmental Representative.

.4 Protect travelling public from damage to person and property.

.5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.7 Construct access and haul roads necessary.

.8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.10 Dust control: adequate to ensure safe operation at all times.

.11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

.12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

.13 Provide snow removal during period of Work.

.14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.11 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

Part 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

Part 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards. List of standards reference writing organizations is contained in each section.

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

.3 If there is question as to whether products or systems are in conformance with applicable standards, the Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be born by the Departmental Representative in event of conformance with Contract Documents or by the Contractor in event of non-conformance.

1.2 WARRANTY

.1 Where the contractor supplies equipment purchased from a contractor manufacturer, the Contractor shall obtain from the Manufacturer the normal warranty period and such warranty shall be made out to Her Majesty the Queen in right of Canada.

1.3 QUALITY

.1 Products, materials, equipment, and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.4 Should disputes arise as to quality or fitness of products, decision rests strictly with [Departmental Representative] based upon requirements of Contract Documents.

.5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 AVAILABILITY

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

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

1.5 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration, and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

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

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of the Departmental Representative.

.9 Touch-up damaged factory finished surfaces to the Departmental Representative's. Use touch-up materials to match original. Do not paint over name plates.

1.6 TRANSPORTATION

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

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

1.7 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 the Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that the Departmental Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.8 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. The Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.9 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

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

1.10 CONCEALMENT

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

.2 Before installation inform the Departmental Representative if there is interference. Install as directed by the Departmental Representative.

1.11 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.12 LOCATION OF FIXTURES

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

.2 Inform the Departmental Representative of conflicting installation. Install as directed.

1.13 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.14 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.15 PROTECTION OF WORK IN PROGRESS

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

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 minimum of disturbance to the Work.

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

END OF SECTION

Part 1 GENERAL

1.1 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify the Departmental Representative of findings.

.2 Perform Ground Penetrating Radar scans of all areas to be excavated and/or where equipment is to be installed outdoors prior to commencing Work.

1.2 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures, and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform the Departmental Representative of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by the Departmental Representative.

1.3 RECORDS

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

.2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles, and elevations of Work.

.3 Record locations of maintained, re-routed, and abandoned service lines.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit name and address of Contractor performing Ground Penetrating Radar scans to the Departmental Representative.

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

1.5 SUBSURFACE CONDITIONS

.1 Promptly notify Departmental Representative and Consultants in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

END OF SECTION

Part 1 GENERAL

1.1 PROJECT CLEANLINESS

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

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Departmental Representative. Do not burn waste materials on site, unless approved by the Departmental Representative.

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

.4 Dispose of waste materials and debris off site.

.5 Store volatile waste in covered metal containers and remove from premises at end of each working day.

.6 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.7 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris including that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

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

.7 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors.

.8 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

END OF SECTION

Part 1 GENERAL

1.1 WASTE MANAGEMENT GOALS

.1 Prior to start of Work conduct meeting with the Departmental Representative to review and discuss waste management goals and Contractor's Waste Reduction Workplan.

.2 Waste Management Goal is to divert all materials considered recyclable from landfill sites.

.3 Target percentage goals are achievable for waste diversion. Contractor to review and confirm the Departmental Representative's Waste Audit acceptable values.

.4 Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse, and recycling of solid waste.

.5 Protect environment and prevent environmental pollution damage.

1.2 DISPOSAL OF WASTES

.1 Debris and waste will be managed and disposed of in a proper manner as approved by the Departmental Representative. Permits for waste handling and disposal will be obtained by the Contractor. Do not bury rubbish or waste materials.

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

.3 Keep records of construction waste including:

.1 Number and size of bins.

.2 Waste type of each bin.

.3 Total tonnage generated.

.4 Reused or recycled waste destination.

.4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in the waste audit.

1.3 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 EXECUTION

2.1 APPLICATION

.1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

2.2 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

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

END OF SECTION

Part 1 GENERAL

1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify the Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request the Departmental Representative Inspection.

.2 Departmental Representative Inspection: the Departmental Representative, Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested, adjusted and are fully operational.

.4 Operation of systems have been demonstrated to Owner's personnel.

.5 Work is complete and ready for final inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by the Departmental Representative and Engineer Consultant. If Work is deemed incomplete by the Departmental Representative and Engineer Consultant, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Owner and the Departmental Representative and Engineer consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be dated for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment: when the Owner and the Departmental Representative consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by the Owner, the Departmental Representative, and the Consultant, complete outstanding items and request re-inspection.

.8 Payment of Holdback: after issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount

1.2 CLEANING

.1 In accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 77 00 Closeout Procedures

1.2 REFERENCES

.1 Canadian Environmental Protection Act (CEPA)

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting one week prior to contract completion with the Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify Project requirements.

.2 Review warranty requirements.

.2 The Departmental Representative to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative 2 final copies of operating and maintenance manuals.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

1.5 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.

.1 Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by Section numbers and sequence of Table of Contents.

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

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab.

.1 Bind in with text; fold larger drawings to size of text pages.

.9 Provide scaled CAD files in dwg format.

1.6 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

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

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data.

.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.7 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, [in addition to requirements in General Conditions, at site for the Departmental Representative one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Maintain record documents in clean, dry and legible condition.

.1 Do not use record documents for construction purposes.

.3 Keep record documents and samples available for inspection by the Departmental Representative.

1.8 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of drawings.

.2 Use felt tip marking pens.

.3 Record information concurrently with construction progress.

.1 Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

.7 Provide digital photos, if requested, for site records.

1.9 EQUIPMENT AND SYSTEMS

.1 For each item of equipment and each system include description of unit or system, and component parts.

.1 Give function, normal operation characteristics and limiting conditions.

.2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.

.1 Include regulation, control, stopping, shut-down, and emergency instructions.

.2 Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Include manufacturer's printed operation and maintenance instructions.

.7 Include sequence of operation by controls manufacturer.

.8 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.9 Provide installed control diagrams by controls manufacturer.

.10 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.

.11 Additional requirements: as specified in individual specification sections.

1.10 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.2 Additional requirements: as specified in individual specifications sections.

1.11 MAINTENANCE MATERIALS

.1 Spare Parts:

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Departmental Representative.

.2 Include approved listings in Maintenance Manual.

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

.2 Extra Stock Materials:

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to the Departmental Representative.

.2 Include approved listings in Maintenance Manual.

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

.3 Special Tools:

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Departmental Representative.

.2 Include approved listings in Maintenance Manual.

1.12 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

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

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by the Departmental Representative.

1.13 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Warranty management plan to include required actions and documents to assure that the Departmental Representative receives warranties to which it is entitled.

.3 Submit, warranty information made available during construction phase, to the Departmental Representative.

.4 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, commissioned systems, fire protection, alarm systems, sprinkler systems, lightning protection systems.

.3 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.4 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.5 Respond in timely manner to oral or written notification of required construction warranty repair work.

.6 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the Departmental Representative to proceed with action against the Contractor.

END OF SECTION

PART 1 GENERAL

1.1 RELATED WORK

.1	Section 01 74 19	Construction Waste Management and Disposal
.2	Section 06 10 00	Rough Carpentry

1.2 PROTECTION

.1 Take precautions during demolition to support parts of building elements not being demolished, and if safety of same appears to be endangered, cease operations, and notify Consultant.

.2 Prevent debris from blocking drainage which must remain in operation.

.3 Take precaution during demolition to protect all adjacent finished surfaces. Make good any damage to adjacent surfaces.

.4 Make good any damages due to demolition. Where exterior envelope elements are removed, provide temporary secure and weathertight closures.

.5 Fire burning and selling of waste of materials is not permitted on site.

.6 Do not bury waste or materials on site.

.7 Do not dispose of waste or volatile materials such as: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.

1.3 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 33 – Health and Safety Requirements and the Workers' Compensation Board of BC latest regulations.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste management materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal and the Waste Reduction Workplan, and the Waste Management Plan to the maximum extent economically possible.

PART 2 LOCATIONS

2.1

.1 Site demolition: existing roof areas as shown on drawings.

.2 Elements for removal and re-use are noted on the drawings.

PART 3 EXECUTION

3.1 WORK

.1 Dispose of demolished materials off site except where noted otherwise. Refer to Section 01 74 19.

.2 Carefully remove all noted material in areas of roof remediation. Qualified tradesmen shall be used for the removal of all material scheduled for re-use. Contractor shall be responsible for making good, to the satisfaction of the Consultant, all damage to materials and equipment to be reinstalled.

.3 Site-examine and record locations, conditions, etc., of all elements which must be removed then re-installed and made good after re-installation work.

.4 Where existing piping, conduits, wall assemblies, wiring, applied items and other elements are removed, patch and make good affected surfaces which are to remain. Patching and remedial materials shall match adjacent existing unless otherwise noted.

.5 Protect all existing elements and finishes not scheduled for replacement and store where directed as required. Make good where damaged.

.6 Layout and execute all cutting and demolition such as to cause the least amount of disruption to remaining existing finishes, materials, elements and equipment.

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

.1 Exterior Condensing Unit (Unistrut).

1.2 REFERENCES

.1 ASTM International

.1 ASTM A 53/A 53M-20, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A 269 08, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc- Coated Welded and Seamless. REPLACE WITH BELOW:

ASTM A269 / A269M Standard Specification for seamless and welded austentic stainless steel tubing for general service.

.3 ASTM A 307-14e1, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.

.4 ASTM B 209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.5 ASTM B 221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.

.2 CSA International

.1 CSA G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CAN/CSA G164-18, Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA S16:19, Design of Steel Structures.

.4 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).

.5 CSA W59-18, Welded Steel Construction (Metal Arc Welding) [Metric].

.1 GS-11-2008, 2nd Edition], Paints and Coatings.

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

.5 Green Seal Environmental Standard GS 03 (anti-corrosive primer).

1.3 SUBMITTALS

.1 Submit in accordance with Division 1.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, tubing, bolts and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS in accordance with Division 1.

.1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia. Submit Letter of Assurance Schedule B1, B2 and C-B.

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

1.4 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE & HANDLING

.1 Deliver, store and handle materials in accordance with Division 1 and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Division 1.

.5 Packaging Waste Management: remove for reuse of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Division 1.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Steel sections and plates: to CSA G40.20-13/G40.21-13, Grade 350W.

.2 Welding materials: to CSA W59-18.

.3 Welding electrodes: to CSA W48-18 Series.

.4 Bolts and anchor bolts: to ASTM A 307-14e1.

.5 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

.6 Aluminum: to ASTM B209, clear anodized finish.

.7 Grout: non-shrink, non-metallic flowable, 15MPC at 24 hours.

.8 Security fasteners: screws and bolts with spanner type heads to prevent removal except with special tools; non-corrosive type.

.9 Shop coat primer: to CAN/CGSB-1.40M.

.10 Galvanize touch-up primer: zinc rich, read mix to CGSB-1-GP-181M.

.11 Pedestal roof Anchors: Stainless steel rotatable head weld-in place roof anchors, to suit BC Work Safe regulations. An example of an acceptable product is Type C from Atlas Anchor Systems.

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 610 g/m² to CAN/CSA-G164-18.

.2 Shop coat primer: CGSB 1GP 40M in accordance with chemical component limits and restrictions requirements and VOC limits of GC-03. Prepare surface to an abrasive blast specification SSPC-SP10.

.3 Zinc primer: To CGSB-1.212-2004, CISC/CPMA 1-73A, CISC/CPMA 2-75 in accordance with chemical component limits and restrictions requirements and VOC limits of GC-03. Prepare surface to an abrasive blast SSPC-SP10.

2.4 ISOLATION COATING

.1 Isolate 2 different metals 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 Primer: VOC limit 250 g/L maximum to GC-03.

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

.3 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 degrees C.

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

PART 3 EXECUTION

3.1 EXAMINATION

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

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

.4 Contractor shall verify field measurements are as shown on shop drawings prior to fabrication.

3.2 ERECTION

.1 Do welding work in accordance with CSA W59-18 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 Departmental Representative 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 Supply components for work by other trades in accordance with shop drawings and schedule.

.6 Weld field connection.

.7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.

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

.9 Primer: maximum VOC limit 250 g/L to GC-03.

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

.11 Primer: maximum VOC limit 250 g/L to GC-03.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Division 1.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Division 1.

.3 Waste Management: separate waste materials for recycling in accordance with Division 1.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCE STANDARDS

.1 American National Standards Institute/National Particleboard Association (ANSI/NPA) (latest edition)

- .1 ANSI/NPA A208.1 Particleboard.

.2 ASTM International, (latest edition)

- .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .3 ASTM A307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.
- .4 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .5 ASTM D 5055, Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
- .6 ASTM D 5456, Standard Specification for Evaluation of Structural Composite Lumber Products.
- .7 ASTM F1667 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.

.3 Canadian General Standards Board (CGSB), (latest edition)

- .1 CAN/CGSB-11.3-M87, Hardboard.
- .2 CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.

.4 Canadian Wood Council, (latest edition)

- .1 Wood Design Manual
- .2 Engineering Guide for Wood Frame Construction

.5 CSA International, (latest edition)

- .1 CAN/CSA-A123.2, Asphalt Coated Roofing Sheets.
- .2 CSA B111, Wire Nails, Spikes and Staples.
- .3 CSA O86 Engineered Design in Wood
- .4 CSA O112.9, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
- .5 CSA O121, Douglas Fir Plywood.
- .6 CSA O141-05(R2014), Softwood Lumber.
- .7 CSA O151, Canadian Softwood Plywood.
- .8 CSA O153, Poplar Plywood.
- .9 CSA O325, Construction Sheathing.
- .10 CAN/CSA-S406, Construction of Preserved Wood Foundations.

.11 CAN/CSA-Z809, Sustainable Forest Management.

.6 Forest Stewardship Council (FSC), (latest edition)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.7 National Lumber Grades Authority (NLGA), (latest edition)

.1 Standard Grading Rules for Canadian Lumber.

.8 National Research Council Canada (NRC)

.1 National Building Code of Canada 2015 (NBC).

.9 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)

.1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.10 Underwriters' Laboratories of Canada (ULC), (latest edition)

.1 CAN/ULC-S706, Standard for Wood Fibre Insulating Boards for Buildings.

1.2 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store materials off ground with moisture barrier at both ground level and as a cover forming a well-ventilated enclosure, with drainage to prevent standing water.

.3 Stack, lift, brace, cut and notch engineered lumber products in strict accordance with manufacturer’s instructions and recommendations.

.4 Store and protect architecturally exposed lumber from nicks, scratches, and blemishes.

.5 Replace defective or damaged materials with new.

.6 Store separated reusable wood waste convenient to cutting station and work areas.

Part 2 PRODUCTS

2.1 SUSTAINABILITY CHARACTERISTICS

.1 Provide wood framing products as specified and with the following sustainability characteristics.

.2 Lumber, Finger Jointed Lumber , I-Joists , structural composite lumber (SCL) , : to be CAN/CSA-Z809 or FSC or SFI certified.

.3 Plywood: urea-formaldehyde free and certified to, CAN/CSA-Z809 or FSC or SFI.

.4 Adhesives: limit 120 g/L maximum to GS-36.

.5 Provide engineered wood products certified as meeting requirements of respective ANSI standard for formaldehyde emissions and low VOC emissions when tested in accordance with ASTM D6330.

2.2 FURRING AND BLOCKING

.1 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 Where indicated, provide pressure treated materials for furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers in accordance with Section 06 05 73.

2.3 PANEL MATERIALS AND APPLICATION

.1 Roof sheathing:

.1 Plywood, as shown in drawings.

.2 Exterior wall sheathing:

.1 Plywood, as shown in drawings

.3 Where indicated, provide pressure treated panel materials.

2.4 TREATED WOOD

.1 Lumber and panel materials as shown on drawing S002 to: CAN/CSA-S406.

.1 Preservative treatment in accordance with Section 06 05 00- Wood Treatment.

.2 Unless noted otherwise on drawings, fasteners and connectors, moisture barrier, sealant and field applied preservative: to CAN/CSA-S406 and in accordance with Section 06 05 00- Wood Treatment.

2.5 ACCESSORIES

.1 Subflooring adhesive: to CAN/CGSB-71.26, cartridge loaded.

.2 General purpose adhesive: to CSA O112.9.

.3 Nails, spikes and staples: to ASTM F1667.

.4 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.5 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.

.6 Joist hangers, connectors and fasteners: in accordance with accepted shop drawings, minimum 1 mm thick sheet steel, galvanized to minimum ZF001 coating designation.

.7 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, fibre, formed to prevent dishing. Bell or cup shapes not acceptable.

.8 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, extruded 6063-T6 aluminum alloy type approved by Departmental Representative.

.9 Fastener Finishes:

.1 Galvanizing: to ASTM A653 G60, use galvanized fasteners for exterior and basement location and where in contacted with preservative treated lumber.

.10 Sill Plate Gasket: Closed cell polyethylene foam gasket in width to match sill plate width, 6 mm thick.

Part 3 EXECUTION

3.1 EXAMINATION

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

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 SYSTEMS INTEGRATION

.1 Install air barrier and vapour retarder sheeting around framing members to ensure continuity of protection and to lap and seal to main sheets.

.2 Install insulation in exterior wall framing cavities that will not be accessible after completion of framing.

.3 Install sill plate gasket in continuous lengths between concrete surfaces and wood framing.

3.3 FURRING AND BLOCKING

.1 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.

.2 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.

.3 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.4 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using steel fasteners.

.5 Install sleepers as indicated.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Div 1- Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Div 1- Cleaning.

3.5 WASTE MANAGEMENT

.1 Separate waste materials for recycling in accordance with Div 1-Waste Management and Disposal.

.2 Re-use scrap lumber to the greatest extent possible. Separate scrap lumber for use on site as accessory components, including shims, bracing, and blocking.

.3 Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill. Prevent saw dust and wood shavings from entering the storm drainage system.

.4 Do not burn scrap lumber that has been pressure treated.

.5 Do not send lumber treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

3.6 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by rough carpentry installation.

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

.1 Rigid thermal insulation.

1.2 RELATED WORK

.1	Section 07 21 29	Sprayed Thermal Insulation
.2	Section 07 27 13	Self Adhered Membrane

1.3 SUBMITTALS

.1 All submittals shall be in accordance with Division 1.

.2 Samples: Submit representative samples of each specified insulation material, insulation clips, adhesives, fasteners, tapes and other material for review.

.3 Manufacturer's Product Data:

.1 Submit manufacturer's product data sheets for products proposed for use in the work of this section.

.2 Submit data and installation instructions for materials and prefabricated devices, providing descriptions sufficient for identification at the site.

.3 Submit data from manufacturer's or independent laboratory indicating compatibility and adhesive results of proposed materials.

1.4 REFERENCE STANDARDS

.1 Model National Energy Code for Buildings (NECB).

.1 Wall and grade slab assemblies to NECB 2015.

PART 2 PRODUCTS

2.1 THERMAL BATT INSULATION FOR WOOD STUDS AND FRAMING

.1 Friction-fit mineral wool fibre blankets, made from basalt rock and slag, thickness as noted on drawings, width-sized to fit wood studs and framing at 400mm O.C. (or as otherwise indicated) and possessing the following characteristics:

.1	CAN/ULC-S702-14	Thermal Insulation Mineral Fibre for Buildings	Type 1, Complies
.2	CAN4-S114:2018	Determination of Non-Combustibility	Non-Combustible
.3	CAN/ULC S102:2018	Surface Burning Characteristics	Flame Spread = 0 Smoke Developed = 0
.4	CCM Evaluation Listing	MasterFormat 07210: Mineral Fibre Batt Insulation	12018-L

.5 Density (32 kg/m^3) meets NBC/ULC Standards of CAN/ULC-S702-97
4.8 kg/m^2 @ 150mm
2.8 kg/m^2 @ 89mm
2.0 kg/m^2 @ 65mm

.2 Thermal resistance rating: as indicated on drawings.

2.2 RIGID THERMAL INSULATION

.1 Extruded polystyrene insulation panels, purpose made for scheduled use including below floor panels and roof panel insulation, conforming to CAN/ULC-S701 Type 4, ship lapped edges, and meeting the values of the following table of properties:

Property and Test Method	Value
Thermal Resistance per 25 mm ASTM C518 @ 24°C mean Temp., m^2•°C/W min., R-value (RSI)	5.0 (.87)
Compressive Strength(1), ASTM D1621, kPa, min.	210
Water Absorption, ASTM D2842, % by volume, max.	<0.7
Water Vapour Permeance, ASTM E96, perm (ng/Pa•s•m^2)	0.9 (50)
Maximum Use Temperature °C	74
Coefficient of Linear Thermal Expansion, ASTM D696, mm/m•°C	6.3 x 10^{-2}

PART 3 EXECUTION

3.1 RIGID INSULATION

.1 Shop-install rigid insulation

.2 Coordinate rigid roof insulation

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 All materials, labour, equipment and services required for the manufacture and installation of spray-applied polyurethane combination thermal insulation/air barrier system to building envelope elements where indicated, detailed and required.

1.2 RELATED SECTIONS

.1	Section 07 21 00	Building Insulation
.2	Section 07 27 13	Self-Adhered Membranes

1.3 REFERENCES

.1 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC) (latest editions)

.1 CAN-ULC-S705.1-98: Standard regarding rigid polyurethane foam spray thermal insulation, intermediate density – materials specifications.

.2 CAN-ULC-S705.2-98: Standard regarding rigid polyurethane foam spray thermal insulation, intermediate density – installer responsibilities.

.3 Publications of the Canadian Urethane Foam Contractor Association (CUFCA).

.4 National Building Code of Canada (NBCC), 2015.

.5 Model National Energy Code for Buildings (NECB)

.1 Wall and grade slab assemblies to NECB 2015.

1.4 SUBMITTALS

.1 Submit in compliance with Division 1, the results of all tests conducted in order to verify if the quality of the insulation material is equal or superior to the requirements outlined in this section.

.2 Submit the results of all CCMC air barrier systems tests approved according to the CCMC's Technical Manual #07272 conducted in order to prove that the air barrier system meets National Building Code (2015) requirements.

.3 Product Data Sheets:

.1 Submit manufacturer's Product data sheets for Products proposed for use in the work of this section.

1.5 MOCK-UPS

.1 Create samples that are in compliance with Division 1.

.2 Create a sample of 5 m^2 minimum, showing both inner and outer corners. This sample may be part of the completed structure.

.3 Using the polyurethane foam insulation sample that was sprayed in place, the following trials must be conducted on site, as required by the Canadian Urethane Foam Contractor Association (CUFCA):

.1 Verify core density.

.2 Verify adhesion between any transition membranes and the substrate.

.3 Verify cohesion/adhesion between the insulation material and the substrate.

.4 Ensure results are in compliance and enter them in the CUFCA daily report.

1.6 PROTECTIVE MEASURES

.1 Ensure the work area is adequately ventilated, in compliance with requirements set out in Division 1 as well as WCB and WHMIS regulations.

.2 Ensure continuous ventilation of the work area, through a fresh air intake and the extraction of foul air, during the course of the application process and for 24 hours thereafter.

.3 Install temporary partitions in order to prevent any effect on the ambient air – outside of the work area – from the sprayed on insulation material.

.4 Ensure all structures are well protected, in accordance with the manufacturer's recommendations.

.5 Protect all adjacent surfaces and equipment against any damage that may be caused by dispersion and overspray of insulation material beyond prescribed limits.

.6 All remaining foam particles must be flushed out of the spray gun on a daily basis. This procedure must be performed in areas designated for this purpose, and the contents of the empty containers neutralized accordingly to the procedure established by the CUFCA and other authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Ensure that application equipment and packaged material can be accommodated by helicopter if site applied.

.2 All materials shall be delivered and stored in their original packaging bearing the manufacturer's name, quantity, CCMC numbers, and other appropriate technical indicators or references. The expiry date must also appear on the containers.

.3 Store materials above ground, in a dry location, protected from weather, moisture and areas of high humidity. Damaged packages found unsuitable for use will be rejected and removed from the project.

1.8 QUALITY ASSURANCE

.1 The insulating material shall be applied by company and personnel who are certified by the material manufacturer and CUFCA or the National Energy Conservation Association (NECA). These certified individuals must have their certification cards in their possession and available for presentation upon request.

.2 Copies of the material manufacturer's and CUFCA installation manuals for the application of sprayed on polyurethane foam shall be kept on site.

.3 Tests shall be conducted daily on both core density and cohesion/adhesion to the substrate, following procedures established by CIFCA/NECA. The results of these tests shall be entered in the daily report forms provided by CUFCA/NECA.

.4 Adhesion tests shall be conducted on all corners, as well as the wall/slab intersections. Do one test on every wall that is less than 30 meters in length.

.5 Verify the adhesion of any transition self-adhesive membranes at the perimeters of all openings.

.6 Access to the jobsite by any material manufacturer's or CUFCA/NECA representative shall be permitted for the purposes of technical assistance or verifying operator certification or the quality of the polyurethane foam application.

1.9 ENVIRONMENTAL CONDITIONS

.1 Only spray the insulating material if the surface and ambient air temperatures are within the manufacturer's prescribed limits. i.e., -10°C to +40°C.

.2 Surfaces to be covered with polyurethane foam must be clean and dry, as required by CAN/ULC-S705.2:2020. Since adhesion of the polyurethane foam is of the utmost importance, the substrate must be free of all frost, dust, oil, grease, oxidization, or any other element that may affect this property, nor should it present a high moisture content.

.3 Metallic surfaces shall be checked to ensure no oxidization has occurred. Use of a primer is strongly recommended. Refer to the CUFCA manual.

1.10 PERFORMANCE REQUIREMENTS

.1 Long Term Thermal Resistance LTTR: Tested by an independent laboratory in accordance with CAN/ULC S770-15 and achieving the following minimum values at a minimum core density of 28.34 kg/m^3 (1.77 lb/ft^3):

.1 RSI 0.91 per 25 mm @ 50 mm.

.2 RSI 0.95 per 25 mm @ 75 mm.

.3 RSI 0.98 per 25 mm @ 100 mm.

.2 Aged R-values based on test methods other than LTTR or at densities lower than specified will not be accepted.

.3 LTTR-values shall be based on density not less than minimum insitu density.

.4 Core density shall be confirmed by field testing.

1.11 COORDINATION

.1 Coordinate the work of this section with all interfacing sections, especially Section 07 27 13.

.2 Coordinate with related work to allow for installation of required materials prior to spray insulation. Perform sprayed foam installation to ensure an un-interrupted and complete thermal and air barrier installation.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Insulation: a spray polyurethane foam listed under CAN.ULC-S705.1:2015, with CCMC #12840-R for insulation and CCMC #1232-R for the air barrier system, according to CCMC technical manual #07272, with the following physical properties:

- .1 Density (ASTM D-1622) = 30.4 kg/m³, minimum Thermal resistance approved by the standard.
- .2 Dimensional stability (ASTM D-2126), % volume change after 28 days: -0.047% at -20°C, 8.45% at +100°C, 7.64% at +70°C with relative humidity >90±3%.
- .3 Flame spread classification (CAN.ULC-S102, including S127) = 375.
- .4 Compressive strength (ASTM D-1621), 10% parallel to rise = 222 kPa.
- .5 Tensile strength (ASTM D-1623) = 337 kPa.
- .6 Open cell content = <1%.
- .7 Water absorption (ASTM D-2842) by volume = 2.5%.
- .8 Water vapour permeance (ASTM E-96) = 125 ng/Pa.s.m².
- .9 VOC during curing: Below detectable limit after 24 hours or during curing.

.2 Primers: as recommended in the CIFCA/NECA Technical Manual, considering the type and condition of work surfaces.

2.2 COMPATIBILITY

.1 Ensure that materials used are compatible with all interfacing materials. Obtain confirmation from sprayed foam insulation manufacturer.

.2 Provide written proof of compatibility.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Follow the manufacturer's written instructions when spraying the polyurethane foam. Refer to manufacturer's technical product documentation, application guide section.

.2 The manufacturer's recommendations shall be followed with regard to outside air temperature and substrate conditions (refer to manufacturer's data).

.3 Spraying shall be done using a positive displacement pump with preset ratios specially designed for use with rigid polyurethane foam. Follow the directions for use and the cleaning and maintenance procedures set out in the equipment manufacturer's manual.

3.2 EXAMINATION

.1 Verify existing conditions before commencing work.

.2 Verify that substrate is free of any foreign material that will impede application.

.3 Verify that other work on and within spaces to be insulated is complete prior to application.

.4 Notify Departmental Representative of conditions that would adversely affect the application.

.5 Commencement of installation implies applicator accepts existing conditions.

3.3 PREPARATION

.1 Comply with manufacturer's written installation instructions for preparing substrates indicated to receive sprayed insulation.

.2 Mask and protect adjacent surfaces from overspray or damage.

.3 Remove foreign materials, dirt, grease, oil, paint, laitance, efflorescence, and other substances that will affect application.

3.4 APPLICATION

.1 Shop-apply insulation to building envelope elements where indicated on drawings and reasonably required.

.2 Spray the foam in consecutive layers of no less than 12.5 mm and no more than 50 mm thick each, for a total thickness as indicated on drawings.

.3 Cover all excessively wide joints prior to application of polyurethane foam insulation.

.4 Spray apply polyurethane foam with a tolerance of +6/-0 mm in relation to the specified thickness.

.5 When spraying polyurethane foam, avoid the formation of sub-layer air pockets.

.6 Avoid spraying the foam on any surfaces other than those indicated. Use drop sheets or masking tape to protect other surfaces.

.7 Once the foam has hardened, remove all overspray from non-prescribed surfaces while at the same time taking care not to damage them.

.8 Do not allow polyurethane foam, once applied, to be damaged during work by other trades, unless prior agreement has been reached.

.9 Ensure the subsequent coverage of the applied insulating foam will be completed within the manufacturer's prescribed time frame. Refer to manufacturer's technical product documentation.

.10 Spray apply the polyurethane foam in overlapping layers, so as to obtain a smooth, uniform surfaces.

.11 In cold weather when applying on a flat surface of more than 15 lineal meters in either direction, apply the first layer in 3-meter strips at 1 meter intervals. After the curing period (±4 hours) has elapsed, spray the polyurethane foam on the unfilled spaces.

.12 Do not spray polyurethane foam any closer than 75 mm from chimneys, heating vents, steam pipes, recessed lighting fixtures, and other heat sources. Do not spray the insides of any exit openings or electrical junction boxes (refer to the CUFCA/NECA manual).

.13 Cover all mechanical fixtures and electrical boxes with polyurethane foam in order to reduce thermal bridging.

.14 Completely fill voids between metal stud flanges and exterior concrete walls with sprayed thermal insulation.

.15 Leave sprayed thermal insulation ready for covering with drywall at walls and sprayed fire resistive crust at soffits.

3.5 FIELD QUALITY CONTROL

.1 Inspect application for insulation thickness and density. Rectify deficiencies.

3.6 PROTECTION AND CLEANING

.1 Do not permit subsequent work to disturb applied insulation.

.2 As work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from this work.

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

.1 Proprietary plastic moisture barrier system below concrete slab on grade.

.2 Bentonite sub-grade geotextile waterproofing system.

1.2 RELATED WORK

.1	Section 07 21 00	Building Insulation
.2	Section 07 27 13	Self-Adhered Membranes

1.3 SUBMITTALS

.1 All submittals shall be in accordance with Division 1;

.2 Product Data Sheets:

.1 Submit manufacturer's product data sheets for products proposed for use in the work of this section.

.3 Samples:

.1 Submit sample of proposed products for review by Departmental Representative.

PART 2 PRODUCTS

2.1 MOISTURE BARRIER MEMBRANE - ROOF

.1 Membrane Material:

.1 Permeance, as tested after conditioning: 0.6 ng (Pa*s *m^2)(0.01 perms (gm/ft^2/in-Hg)) to ASTM E1745-09 paragraphs 7.1.2 through 7.1.5.

.2 Strength: Class A to ASTM E1745-09.

.3 Thickness of plastic:

1. For Roof, 0.152 mm (6 mils) minimum,

.4 Moisture barrier membrane joint tape:

.1 Description: High density polyethylene tape, pressure sensitive, 100 mm wide, product as per vapour barrier membrane manufacturer's installation instructions.

.5 Penetration flashing:

.1 Vapour barrier membrane material and vapour barrier joint tape in accordance with manufacturer's instructions.

.6 Acceptable Products:

.1 "SOPRAVAP'R", by Soprema.

.2 Or approved equal.

PART 3 EXECUTION

3.1 ROOF VAPOUR BARRIER INSTALLATION

.1 Install polyethylene on warm side of insulation as indicated and tight to insulation.

.2 Side laps must be a minimum of 75 mm (3 in) and end laps must be a minimum of 150 mm (6 in).

.3 Tape seal at points of penetration.

.4 Extend vapour barrier tight to perimeter

.5 All end laps on steel deck shall be supported by a metal plate 15 cm x 106 cm (6 in x 42 in)

.6 Once installed, pressure must be applied over the whole surface using a roller to ensure a perfect adhesion

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

.1 Sheet-applied self-adhesive combination air/vapour barrier sheathing and flashing/transition membrane.

.2 Sheet-applied self-adhesive foil-faced membrane flashing required to provide continuity detailing at interruptions in wall envelope such as fenestration.

.3 Liquid-applied flashing membrane as a wall penetration and detailing sealant.

1.2 RELATED WORK

.1	Section 07 52 00	Modified Bituminous Membrane Roofing
.2	Section 07 55 52	Modified Bituminous Protected Membrane Roofing
.3	Section 07 62 00	Sheet Metal Flashing and Trim

1.3 QUALITY ASSURANCE

.1 Qualifications: Work of this section shall be executed by competent installers with experience in the application of products, systems, and assemblies specified.

.2 Conduct quality control in accordance with Division - 1.

.3 All sealants, primers, mastics, and adhesives associated with the sheathing membrane shall be products of said sheathing membrane manufacturer.

1.4 SUBMITTALS

.1 All submittals shall be in accordance with Division 1 – Submittal Procedures.

.2 Product data sheets:

.1 Submit manufacturer’s product data sheets for products proposed for use in the work of this section.

.3 Mock-up:

.1 Construct minimum 10 m^2 area of wall assembly if requested.

.2 Locate at the place of work as part of final installation. Space installation to include exterior wall panel incorporating window, glazing system and installation.

.3 Do not proceed until mock-up has been reviewed by the Consultant.

.4 Samples:

.1 At the Consultant’s request, samples of materials shall be submitted for approval, prior to commencing work concerned.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store all materials in their original packaging in undamaged condition, sealed with labels intact, having manufacturer's name, brand, weight, CSA and other references to accepted standards clearly shown.

.2 Make all necessary arrangements with regard to delivery and storage on the site with the Departmental Representative and schedule deliveries accordingly. In general, deliver material as required for installation and keep site storage to a minimum.

.3 Provide all plant and equipment necessary for off-loading of materials to complete the work of this section.

.4 Protect materials from damage and weather, and store in a dry place.

.5 Handle materials and equipment in strict accordance with manufacturer's recommendations. Damaged or deteriorated materials shall be removed from premises.

1.6 JOB CONDITIONS

.1 Conform to membrane manufacturer's requirements for minimum application temperatures and humidity. Check surfaces and areas specified and shown to receive membrane.

.2 Report any unsatisfactory conditions and/or surfaces to the Departmental Representative in writing. Starting work shall imply acceptance of surfaces and conditions.

.3 Take all necessary measurements and levels at the building. The work shall be laid out to accurately fit the conditions at the building and with adjacent work.

.4 Notify the Departmental Representative of any variations beyond the accepted tolerances in the substrate or in the adjacent work, including membrane roofing (Section 07 52 00).

.5 Low temperature application:

.1 Perform adhesion test for membrane when ambient temperature is below -5°C. Sheathing membrane manufacturer must produce both “summer” and “winter” (low temp.) grades.

.2 Proceed with work when temperature is (or predicted) to fall below -5°C ambient temperature only with the mutual documented agreement of inspection and testing company, manufacturer and applicator.

.6 Do not perform installation during rainy or inclement weather or on wet or frost covered surfaces.

.7 Provide temporary protection of the applied membrane to prevent mechanical damage or damage from spillage of oil or solvents.

1.7 PERFORMANCE REQUIREMENTS

.1 Sheathing membrane system shall perform as a continuous air barrier and liquid water drainage plane flashed to discharge incidental condensation or water penetration to the exterior of the building envelope.

.2 The membrane flashing/universal transition membrane shall perform as flashing by providing continuity at interruptions in sheathing systems caused by openings in building structure and interfacing with other elements and systems. The membrane system is also employed as a transition membrane between envelope components and other membranes and waterproofing systems. Ensure compatibility between systems.

.3 All self-adhesive membrane systems shall accommodate substrate movement, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding the specified limits and requirements, or interruption of the drainage plane.

.4 Air barrier systems shall be joined in an airtight and flexible manner to air barrier material of adjacent building envelope systems, employing transition membrane, allowing for relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between the following unless otherwise applicable:

.1 Foundation and walls.

.2 Walls and openings (windows, doors, louvers, and other wall penetrations).

.3 Wall and roof.

.4 Wall and roof over non-climate controlled space.

.5 Walls, floor and roof across construction, control, and expansion joints.

.6 Walls, floors and roof to utility, pipe and duct penetrations.

.5 Provide temporary protection of the applied membrane to prevent mechanical damage or damage from spillage of oil or solvents.

PART 2 PRODUCTS

2.1 VAPOUR-PERMEABLE SHEATHING MEMBRANE

.1 Description: self-adhesive membrane composed of a tri-layer laminated polypropylene facer.

The sheathing membrane shall comply with the following criteria and values:

.1 Air permeance: Maximum 0.0025 L/s m^2 at 75 Pa to ASTM E2178-03

.2 Must pass ASTM 2357 air leakage resistance criteria.

.3 Water vapour transmission: 972 ng/pa•s•m^2 (17 perm) to ASTM E96 (Procedure ‘B’).

.2 Acceptable Products: Soprema SopraSeal Stick VP, or similar

2.2 SELF-ADHESIVE FLASHING / TRANSITION MEMBRANE

.1 Description: Self-adhering modified bituminous membrane system consisting of SBS modified bitumen and a tri-laminated woven polyethylene facer. The under face shall be covered with a silicone release paper or film. Membrane shall be available in “summer” and “winter” grades and shall comply with the following physical properties:

- .1 Thickness: 1.0 mm (40 mils) minimum.
- .2 Application temperature: as per manufacturer’s printed installation instructions.
- .3 Min. tensile strength to ASTM D5147: 11.3/15.4 kN/m (64/88 lb/in).
- .4 Min. tensile strength to ASTM D412: 11.2/31.1 MPa.
- .5 Static puncture: 400 N (90 lb) to ASTM D5602; 747 N (168 lb) to ASTM E154.

.2 Primer: as manufactured by membrane manufacturer specifically for membrane.

.3 Termination mastic: as recommended by membrane manufacturer.

.4 Ensure that self-adhering membrane is compatible with and will adhere permanently to all interfacing substrate materials and systems, including foil-faced membrane (2.2) and Membrane Roofing (Section 07 52 00).

.5 If required by the Consultant, demonstrate accelerated long-term adhesion to all substrate appropriate to this Project. Refer to Section 01 45 00.

.6 Acceptable Products:

- .1 Protecto Wrap “100/40”
- .2 Grace Construction Products ‘Perm-A-Barrier Wall Membrane’.
- .3 Soprema ‘Sopraseal Stick 1100T Summer Grade and Winter Grade with ‘Elastocol Stick’ primer.
- .4 “HT”-designated high-temperature membrane for high-temperature applications (e.g. parapet cap flashings): Lastobond Shield HT by Soprema, or Blueskin PE 200 HT by Monsey-Bakor.
- .5 Other products with similar characteristics and proven long term adhesion to moist substrates will not be excluded.

2.2 SELF-ADHESIVE FOIL-FACED MEMBRANE FLASHING

.1 Multi-purpose, self-adhering detailing membrane for use at door/window openings, vents and other interruptions in the wall membrane system.

.2 Membrane shall be composed of a proprietary base fabric/film laminated to an aluminum foil and available in various roll widths.

.3 Acceptable products:

- .1 ‘Protector Seal 45” by Protecto Wrap.
- .2 “Sopra Solin HD” by Soprema.

.3 Other products with similar characteristics and proven long term adhesion to moist substrates will not be excluded.

2.3 LIQUID-APPLIED FLASHING MEMBRANE

.1 Liquid-applied flashing membrane for use as a sealant at penetrations to the wall sheathing membrane, as a detailing sealant and as noted and detailed.

.2 Material shall be a gun grade waterproofing, adhesive and detailing compound composed of 99% solids, roller/trowel/brush applied, single component, high performance, elastomeric, silyl-terminated polyester coating/sealant exhibiting the combined benefits of silicone and urethane. Product shall meet all current VOC requirements and contain no solvents or isocyanates.

.3 Liquid-applied flashing system shall comply with the following properties when cured:

.1	Hardness, Shore A	40—45
.2	Tensile Strength	180 Psi
.3	Elongation at Break	400%
.4	Peel Strength	25 pli
.5	Accelerated Weathering	Must Pass
.6	Water Vapour Transmission	14 perms @ 12 mils
.7	Surface Burning ASTM E84	Flame Spread: 0 Smoke Developed: 15 NFPA and ICC Class A Building Material

.4 Uncured properties:

.1	Tack Free Time	<30 minutes
.2	Cure Rate	3/16 inch/24 hours
.3	Volatile Organic Content	1.5% by wt. 27 g/Lt .2 lbs/gal
.4	Water Vapour Transmission	6.34 grains/hour/Ft^2

.5 An example of the accepted product is “R-Guard Fast Flash” as manufactured by Prosoco. Other products having the same demonstratable characteristics will not be excluded.

2.4 ACCESSORIES

.1 Termination Bar: Minimum 18 Ga. steel, or 1/16” aluminium. Material G200 galvanized steel or aluminium. Size 1.5” (38 mm) wide x continuous lengths where possible. Install gum lip, where applicable.

PART 3 EXECUTION

3.1 PREPARATION

.1 Preparation of all surfaces to receive self-adhering membranes including substrate, joints, cracks, coves etc. shall be carried out in accordance with manufacturer's written directions.

.2 Ensure that all substrate surfaces are smooth, dry and firm. Remove any frost, ice, loose particles, ridges, laitance, cracks, grease, asphalt, oil and other foreign matter which could prevent adhesion of the membrane to the substrate.

.3 Do not install membranes until other work which penetrates membrane has been completed.

.4 Seal around membrane penetrating elements in accordance with manufacturer’s printed installation instructions.

3.2 PRIMING

.1 All surfaces to receive self-adhering membrane shall be primed at the rate recommended by the manufacturer. Primer shall be uniformly applied.

.2 Open time of 30 minutes shall be allowed before installation of self-adhering membrane.

3.3 TRANSITION/FLASHING AND FOIL-FACED MEMBRANE INSTALLATION

.1 Apply self-adhering “detailing” membranes to surfaces as indicated on drawings and as specified.

.2 Application of membrane, including temperature limitations, curing requirements and all other application procedures shall be carried out in accordance with membrane manufacturer's written directions.

.3 Coordinate proper construction of roof/wall junctions between Section 07 27 13 and interfacing materials and systems to maintain continuity of the air barrier from wall to roof.

.4 Cut and seal membrane around protrusions to form tight air seal.

.5 Apply troweled bead of mastic to all terminations at end of each day's work.

.6 Inspect membrane thoroughly before being covered and make any corrections immediately. Misaligned or inadequately capped seams, punctures or other damage shall be repaired by patching and sealing with membrane manufacturer's directions.

.7 Adhere transition membrane to sheathing membrane at wall openings and flash into pockets of fenestration, louvers and doors as detailed, taking extra care to ensure continuity of the air/vapour barrier.

.8 Membrane shall be continuously supported.

.9 Extend all membrane patches a minimum 150 mm from repair location or penetration. Seal all around patch with mastic.

.10 Seal all side laps without factory bitumen edge and all top laps with mastic.

.11 Fill all joints or gaps wider than 6 mm with foam backer rod and apply 300 mm piece of membrane over joints prior to application of the field membrane.

.12 Coordinate installation of membrane with other interfacing Sections to minimize exposure of membrane.

.13 When self-adhering membrane interfaces with incompatible membranes, ensure that bond is made only to bridge membranes.

3.4 LIQUID-APPLIED FLASHING MEMBRANE APPLICATION

.1 At penetrations to all self-adhered wall sheathing and transition membranes: Apply liquid-applied flashing system onto foil-faced self-adhered membrane in strict accordance with manufacturer's printed instructions by brush, roller or towel between ambient temperatures of +1°C and 30°C.

3.5 WATERPROOFING SELF-ADHERED MEMBRANE INSTALLATION

Refer to manufacturer installation guide.

3.6 ADJUST AND CLEAN

.1 Repair, remove and clean all smears on exposed finished surfaces or surfaces to be subsequently finished. Clean off immediately as directed by and to the satisfaction of the Consultant. Protect all adjacent surfaces from damage due to self-adhered membrane operations. As work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from this work.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 All materials, equipment and installation for two-ply elastomeric modified bituminous membrane systems (SBS) to new sloped structure steel decked roofs including combination sheathing board/air/vapour barrier, base and cap plys, associated membrane flashing (stripping plys), and traffic walkways.

.2 Rigid polyisocyanurate thermal roof insulation, (factory-tapered for crickets, back-slopes and where indicated) and mineral fibre insulation/protection layer.

1.2 RELATED SECTIONS

.1	Section 06 10 00	Rough Carpentry
.2	Section 07 62 00	Sheet Metal Flashing & Trim
.3	Section 07 92 00	Joint Sealants
.4	Division 22	Plumbing
.5	Division 23	Heating, Ventilation & Air Conditioning

1.3 REFERENCES

.1 The latest version of the following tests and publications:

.2 American Society for Testing and Materials International (ASTM).

.1 ASTM D6162 / D6162M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.

.3 Canadian General Standards Board (CGSB).

.4 CAN/ULC-S704.1:2017, Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

.5 Canadian Roofing Contractors Association (CRCA).

.1 CRCA Roofing Specifications Manual – Latest Edition

.6 Roofing Contractors Association of British Columbia (RCABC)

.1 Roofing Practices Manual – Latest Edition

.7 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act, 1999 (CEPA)

.8 Factory Mutual (FM Global).

.1 FM Approvals – Roofing Products.

.9 Health Canada / Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.10 National Building Code of Canada, 2015 (NBCC) and BC Building Code, 2018 (BCBC).

.11 ASHRAE 90.1, 2010

1.4 PERFORMANCE REQUIREMENTS

.1 Compatibility between components of roofing system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.

.2 The roof assemblies shall have a minimum Class A designation in accordance with NBCC, 2010 (3.1.15.2.1) and ULC S107.

1.5 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00 – Submittals

.2 Submit two copies of most recent technical roofing components data sheets describing materials' physical properties.

.3 Submit WHMIS MSDS – Material Safety Data Sheets in accordance with Section 01 35 33 – Health and Safety Requirements.

- .1 Indicate VOC content for:
  - .1 Primers
  - .2 Asphalt
  - .3 Sealers
  - .4 Tapered Insulation

.4 Provide layout for factory-tapered insulation.

.5 Manufacturer's Certificate: certify that products meet or exceed specified requirements.

.6 Provide to the Departmental Representative the "RCABC Roofing System Record" upon completion of the work. Record shall include copies of inspection reports and roof maintenance guide.

.7 Submit copies of underwriter's certification for roof covering materials.

1.6 QUALITY ASSURANCE

.1 Unless otherwise specified, all materials and roofing practice shall conform to the recommendation of the RCABC as contained in their manual, Roofing Practices in British Columbia. Where this manual is silent, the recommendation of the CRCA as contained in their manual Roofing Specifications, shall be followed.

.2 This Contractor shall at all times, have in his Field Office, a copy of said manuals.

.3 All work shall be done by a member of the Roofing Contractor's Association of British Columbia and in accordance with the manufacturer's instructions and latest standards of RCABC

.4 Obtain all roofing materials from the same source to ensure compatibility.

.5 Roofing and sheet metal work shall be performed in conformance with the roofing manufacturer's written recommendations, as well as the requirements of the ULC laboratories, Factory Mutual FM-190

.6 The manufacturer of elastomeric bitumen products shall provide proof of ISO9001 Certification.

1.7 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 33 Health and Safety Requirements.

1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store all materials in their original containers in undamaged condition, sealed with labels intact, having manufacturer's name, brand, weight, CSA and other references to accepted standards clearly shown.

.2 Store materials in weatherproof shelters, having floors which will protect the materials from moisture. Store rolled materials on ends. Avoid prolonged exposure of light and heat sensitive materials to sunlight. Remove only as much material from storage as can be applied and made weathertight in the same day.

.3 Do not place roof insulation in direct contact with the earth, road surface, or roof deck. Place suitable supports under the insulation upon delivery to protect it from absorbing dampness.

.4 Do not store materials in concentrations which exceed design live load.

.5 In the event material is damaged by the elements, improper handling or other causes, such material will be rejected and shall be replaced at no extra cost to the Departmental Representative.

.6 Place plywood runways over completed Work to enable movement of material and other traffic.

.7 Store sealants at +5 degrees C minimum.

.8 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.

1.9 PROTECTION

.1 Respect safety measures described in the manufacturer's written directives, as well as RCABC written recommendations.

.2 At the end of each work day, use an infrared detector to spot any smoldering or concealed fire. Job planning must be organized to ensure workers are still on location at least one hour after torch application.

.3 Never apply the torch directly to dry wood surfaces. Comply with the fire safety recommendations of the manufacturer and the RCABC.

.4 Throughout roofing installation, maintain a clean site and have one approved ABC fire extinguisher within 6 meters of each roofing torch. Respect all safety measures described in technical data sheets. Torches must never be placed near combustible or flammable products.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

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

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Separate for reuse and recycling and place in designated containers in accordance with Waste Management Plan.

.5 Place materials defined as hazardous or toxic in designated containers.

.6 Handle and dispose of hazardous materials in accordance with Laws and regulations.

.7 Clearly label location of salvaged material's storage areas and provide barriers and security devices.

.8 Ensure emptied containers are sealed and stored safely.

.9 Divert unused materials from landfill to recycling facility as approved by Departmental Representative.

.10 Unused adhesives, sealant, and asphalt materials must not be disposed on into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.11 Dispose of unused adhesive material at official hazardous material collections site approved by Departmental Representative.

1.11 CO-OPERATION WITH OTHER TRADES

.1 Advise all other trades of their responsibility in having pipes, sleeves, A/C unit fan, and cowl bases installed on the roof in adequate time so that the roofing work is not delayed. Coordinate roofing with mechanical and electrical trades.

.2 The mechanical trades shall be responsible for cap and counterflashing of any ducts, vents, stacks, or other sheet metal projecting through the roof. This section shall provide base flashing over wood or metal curbs, etc., and seal lead flashings for service lines into the roof members.

1.12 JOB CONDITIONS

.1 Conform to the ambient air temperature and humidity requirements and limitations as set forth by the membrane system manufacturer, the RCABC and the Roofing Inspection Agency for installation of all systems and materials.

.2 Minimum installation air temperature for solvent-based adhesives and compounds is (-) 5-degree C.

.3 Protect roof decks from damage due to roofing or sheet metal operations. Protect work of other trades from damage; replace and/or make good any and all such damages caused by work of this section.

.4 Protect all adjacent surfaces and work during roofing from damage, with special protection adjacent to hoist.

.5 Inspect surfaces to receive work of this section and report any defects in writing to the Departmental Representative.

.6 Commencement of work will imply acceptance an approval of such surfaces and no claim for defects in workmanship will subsequently be allowed.

.7 Provide all temporary tarps and structures, at no additional cost to the Departmental Representative, required to protect building and roofing from weather conditions, which may cause a delay in meeting project schedules.

1.13 INSPECTION AND WARRANTIES

.1 The Contractor shall, at no additional cost to the Departmental Representative, arrange for the supplier/manufacturer of the membrane system, to inspect the work in progress after base sheet installation and during seaming, and upon completion, to ensure that the complete system is installed in full compliance with the supplier's/manufacturer's specifications, recommendations, and details.

.2 There will be no Installation Guarantee for work of this section. However, there shall be roof inspection services. Roof inspection shall be performed by an independent inspection agency appointed by the Departmental Representative. Costs for inspections and warranty shall by paid for by the Contractor. Inspection service shall include additional inspection of roof immediately prior to interim completion of this Contract.

.3 The Contractor shall co-operate with the appointed inspection agency; provide material samples when requested and provide access to the work in progress.

.4 The Contractor shall obtain from the manufacturer of the elastomeric bitumen membrane system, a written warranty stating that its products are free of manufacturing defects and shall provide a waterproof surface for 20 years after installation. If infiltration happens due to faulty material, the manufacturer shall make the necessary repairs, at its expense.

PART 2 PRODUCTS

2.1 COMPONENT COMPATIBILITY

.1 Ensure that all components of the membrane systems are compatible. All membrane, accessories and associated mastic/sealant compounds shall be products of the same manufacturer.

2.2 VAPOUR BARRIER

. Refer to Section 07 26 00 - Vapour Barriers

2.3 ROOF INSULATION (BASE LAYER)

.1 High strength molded closed cell polyisocyanurate foam core integrally laminated to heavy, black, non-asphaltic fibre reinforced glass facers, adhered to substrate.

.2 Insulation shall conform to CAN/ULC-S704.1:2017 Const No. C34 and CAN/ULC-S770-2000 for determination of long term thermal resistance of closed cell insulating forms and shall meet or exceed the physical property values from the following table:

PROPERTY	TEST METHOD	VALUES
Dimensional Stability (Length and Width)	ASTM D2126	<2%
Compressive Strength (10% Deformation)	ASTM D1621	140 kPa
Water Absorption	ASTM C209 ASTM D2842	<1% <3.5%
Moisture Vapour Transmission	ASTM E96	<1.5 perm (85.0 ng/(Pa•s•m^2))
Product Density	ASTM D1622	Nominal 32.04 kg/m^3
Flame Spread	ASTM E84 (Full 10 min. Test)	25-50**
Smoke Developed	ASTM E84 (Full 10 min. Test)	50-170**
Tensile Strength	ASTM D1623	>35 kPa
Service Temperature	-	-73 to 122°C

.3 Insulation shall be engineered factory-tapered to create crickets, back slopes and where indicated. Insulation shall be applied in 2 layers to yield an effective R value of 36 to 40. Add extra layer to achieve roof slops.

2.4 MINERAL FIBRE INSULATION PROTECTION LAYER

.1 Mineral wool board, made from basalt rock and slag, with bitumen-impregnated rigid upper face compatible with roofing membranes and resistant to torch application of base roofing ply.

.2 Applied as top layer (75 mm thick) over base layer of polyisocyanurate insulation as protection from “insulation creep” and complying with following Table of Properties:

Property	Test Method	Values
Thermal Resistance (RSI Value – m^2K/W for 25.4 mm at 75°F)	ASTM C518 (C177)	0.68 m^2K/W (R-3.8 hr ft^2 F / BTU for 1 in 75°F)
Compressive Strength - Top Layer at 10% - Top Layer at 25% - Entire Board (3 in Thickness) at 10% - Entire Board (3 in Thickness) at 25% - Point load at 5 mm compression	ASTM C165	139 kPa (20.2 psi) 252 kPa (37.0 psi) 71 kPa (10.3 psi) 103.5 kPa (150 psi)
	EN 12430	205 kPa (30.0 psi)
Density - Top Layer - Bottom Layer * Formed as a monolithic structure	ASTM C612-14	13.75 lb/ft^3 (22 kg/m^3) 10.0 lb/ft^3 (160 kg/m^3)
Dimensional Stability, Linear Shrinkage 24 hours at 1200°F (650°C)	ASTM C356	0.71%
Water Absorption	ASTM C209	<1.0%
Water Vapour Absorption	ASTM C1104	0.15%

.3 Accepted products:

.1 “Soprarock DD Plus” by Soprema.

.2 “Toprock DD Plus” by Roxul.

.3 Other products with the same demonstratable characteristics will not be excluded.

2.5 ADHESIVE

.1 Adhesive for securing roof insulation: two-part polyurethane foamed adhesive as acceptable to manufacturers of all components to be bonded and to RCABC.

.2 Accepted product: “Duo Tack” by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

2.6 MEMBRANES

.1 All membranes must meet or exceed ASTM D6162, CSA A123.21-10, FM4470, CAN/CGSB 37.56 M, ULC-S107.

.2 Base Sheet (and Base Stripping Ply at Non-Combustible Substrates):

.1 Membrane shall be composed of a composite reinforcement and SBS modified bitumen, 2.5 mm thick, with both faces covered with a thermofusible plastic film. This membrane shall be torch-applied.

.2 Reinforcement: composite.

.3 Elastomeric asphalt: mix of selected bitumen and minimum 12% SBS thermoplastic polymer.

.4 Physical properties: (as per CAN/CGSB-37.56-M, 9th Draft)

	Properties	**MD**	**XD**
.1	Strain energy	7.8 kN/m	7.2 kN/m
.2	Breaking strength	15 kN/m	13.5 kN/m
.3	Ultimate elongation	60%	65%
.4	Tear resistance	125 N	
.5	Static puncture resistance	560 N	
.6	Dimensional stability	0.2%	0%
.7	Plastic flow	≥110°C (230°F)	
.8	Cold bending at -30°C (-22°F)	No cracking	
.9	Lap joint strength	Pass > 4 kN/m	

.5 Accepted product: “Sopraply Base 520” by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

.3 Self-Adhesive Membrane:

(Base Stripping Ply at Combustible Substrates and Where Required)

.1 Membrane shall be self-adhesive SBS modified bitumen, with composite reinforcement, covered with a thermofusible plastic film. Membrane shall be available in both summer and winter grades. Thickness: 3.0 mm.

.2 Physical properties:

.1	Strain energy, MD/XD (kN/m)	7.8 / 7.2
.2	Breaking strength, MD/XD (kN/m)	15 / 13.5
.3	Ultimate elongation, MD/XD (%)	60 / 65
.4	Tear resistance (N)	125
.5	Static puncture (N)	560
.6	Cold bending (C) - Initial	-30
	- 90 days at 70°C	-30

.3 Accepted product: “Sopralene Flam Stick” by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

.4 Cap Sheet:

.1 3.7 mm thick Styrene Butadiene Styrene (SBS) high performance membrane shall have a composite reinforcement and thermofusible elastomeric asphalt. Under side shall be protected by a thermofusible plastic film. This membrane shall be applied by torching only. Top surface of membrane shall be covered with highly reflective white granules. Membrane shall be factory-treated with fire retardant.

.2 Membrane shall have a minimum SRI of 86 regarding heat island.

.3 Physical Properties: (as per CAN/CGSB-37.56-M, 9th Draft).

	Properties	**MD**	**XD**
.1	Strain energy	11.9 kN/m	9.5 kN/m
.2	Breaking strength	19.5 kN/m	15.1 kN/m
.3	Ultimate elongation	61%	75%
.4	Tear resistance	70 N	
.5	Static puncture resistance	470 N	
.6	Dimensional stability	-0.2%	0.1%
.7	Plastic flow	≥110°C (230°F)	
.8	Cold bending at -30°C (-22°F)	No cracking	
.9	Lap joint strength	Pass > 4 kN/m	
.10	SRI (ASTM E1980)	86	

.4 Accepted product: “Suprastar Flam HDGR FR” by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

.5 Cap Stripping Ply

.1 4.0 mm thick Styrene Butadiene Styrene (SBS) high performance membrane shall have a composite reinforcement and thermofusible elastomeric asphalt. Under side shall be protected by a thermofusible plastic film. This membrane shall be applied by torching only. Top surface of membrane shall be covered with highly reflective white granules. Membrane shall be factory-treated with fire retardant.

.2 Physical Properties:

	PROPERTIES	MD	XD
.1	Strain energy	7.8 kN/m	7.2 kN/m
.2	Breaking strength	15 kN/m	13.5 kN/m
.3	Ultimate elongation	60%	65%
.4	Tear resistance	125 N	
.5	Static puncture resistance	560 N	
.6	Dimensional stability	0.2%	0%
.7	Plastic flow	≥110°C (230°F)	
.8	Cold bending at -30°C (-22°F)	No cracking	
.9	Lap joint strength	Pass > 4 kN/m	

.3 Accepted product: “Sopraply Traffic Cap FR 561” by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

2.7 ACCEPTABLE PRODUCTS

.1 Soprema.

.2 Siplast.

.3 Other products having the same characteristics will not be excluded.

2.8 CATALYZED RESIN LIQUID FLASHING SYSTEM

.1 Multi-component, fully reinforced, flexible polymethyl methacrylate based (PMMA) liquid flashing membrane system by same manufacturer as roofing membranes and complying with the following Table of Properties:

Property	Test Method	Values
Membrane thickness	ASTM D5147 Sec 5	2.9 mm (115 mils)
Peak load @ 23°C (73°F) avg.	ASTM D5147 Sec 6	12.3 kN/m (70 lbf/in)
Elongation @ peak load, avg.	ASTM D5147 Sec 6	42%
Peak load @ 23°C (73°F) avg.	ASTM D412(dumbbell)	15.8 kN/m (90 lbf/in)
Elongation @ peak load, avg.	ASTM D412(dumbbell)	55%
Shore A hardness, avg.	ASTM D2240	81
Water absorption, (Method I) (24h @ 23°C (73°F))	ASTM D570	0.41%
Water absorption, (Method II) (48h @ 50°C (122°F))	ASTM D570	1.57%
Low temperature flexibility	ASTM D5147 Sec 11	-25°C (-13°F)
Dimensional stability (max. movement)	ASTM D5147 Sec 10	-0.063%
Tear strength	ASTM D5147 Sec 7	0.5 kN (107 lbf)

.2 Liquid flashing shall be available in “summer” and “winter” grades, be supplied with companion primer for non-metallic substrates, catalyst and fleece reinforcement. Employ where noted and required.

.3 Accepted product: “Alsan RS230 System” by Soprema or equal product produced by Siplast. Other products with similar characteristics will not be excluded.

2.9 SEALANTS

.1 As approved by membrane system manufacturer and by RCABC as being compatible with membrane system.

.2 Plastic cement: asphalt, to CAN/CGSB-37.5 coal tar, to CGSB 37-GP-19M.

.3 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.

2.10 FASTENERS AND ACCESSORIES

.1 Fasteners for mechanically fastening fire barrier sheathing board to steel roof deck shall be wind uplift and corrosion-resistant type as recommended and acceptable to the board manufacturer and to RCABC.

.2 Fire Protection Tape: Fire retardant treated, 165 mm wide tape, composed of glass fleece reinforcement and SBS bitumen. The top side is sanded and the bottom side is covered with a silicone release film.

.3 Splash Blocks: for use where scuppers from elevated roofs spill onto main roof. 600 x 600 x 50 mm stock pre-cast lightweight concrete patio pavers.

PART 3 EXECUTION

3.1 WORKMANSHIP - GENERAL

.1 All workmanship shall be at least in accordance with RCABC standards for a 10 year guarantee for the various systems described.

.2 Use materials and systems in accordance with manufacturer's specifications and instructions.

.3 Leave no work exposed during unsettled weather. Glaze and finish membranes at end of each work period, to direction of roofing inspector.

.4 Work to; and around all features, voids, and edges, in best trade manner to produce watertight and weatherproof insulation.

.5 Follow approved stripping and membrane flashing methods at eaves, curb, parapets, etc., in accordance with RCABC system guidelines.

.6 All seams of granular surfaced cap membranes and wall covering shall be carefully heat welded with propane torch. No visible bleed-out of bitumens will be accepted. Bleed-out at joints shall be covered with granular material to match cap sheets. Surfaces when completed shall present a neat, even appearance.

.7 Apply only as much insulation to the roof as can be covered the same day with roofing membrane. At the conclusion of each day's work, seal exposed edges of the roof insulation. This seal shall be cut and lifted upon continuation of the work.

3.2 EXAMINATION OF ROOF DECKS

.1 Before commencing roofing work, this section, together with the Departmental Representative and the Contractor, shall inspect all surfaces scheduled to receive membranes for condition, slopes, nailing supports, sheet metal parapet facing, roof drains, stack vents, mechanical and electrical penetrations, building joints, etc.

.2 All surfaces must be smooth, dry, clean and free of ice and debris. No salt or calcum shall be used to remove snow or ice.

.3 Surfaces scheduled to receive membranes must possess a smooth surface with an even finish; free of excessive moisture, ridges, hollows and sharp corners.

.4 If defects are found, a non-compliance notice will be issued to the Contractor so that adjustments can be made. Proposals for correction of defects shall be submitted to the Departmental Representative for approval.

.5 Corrections of defects shall be made at no additional cost to the Departmental Representative using materials which adhere to the substrate, are stable, do not deform under traffic loads and are compatible with bituminous materials. The deck must be clean, dry, and free of contamination by treatment products, lubricating oils, diesel oil or grease, which could affect the adhesion of the waterproofing or the physical integrity of the membrane itself.

.6 Commencement of roofing/waterproofing work shall imply acceptance of surfaces and conditions.

3.3 PREPARATION

.1 Supply to the various sections concerned in ample time: all inserts, reglets, and accessories required to be built into the work of other sections. Instruct as to the proper location and position of such items.

.2 Co-operate with, and coordinate work with Mechanical trades and other providers of interfacing materials and systems to ensure watertight junctions at roof drains, vents, and other items passing through the roof.

.3 Minimize exposure of the roof deck to the elements by proceeding as soon as the roof deck is completed. Do not work during rain, fog, sleet, ice, or snow. Warm roofing materials before using in cold weather.

.4 Sweep clean and remove all debris from roof deck surfaces before commencement of work.

3.4 EQUIPMENT

.1 Maintain all equipment and tools in good working order.

.2 Use torch types recommended by the manufacturer of the elastomeric asphalt membranes, and acceptable to RCABC and ULC.

3.5 ROOFING SYSTEM DESCRIPTIONS

.1 Roof Assembly Type ‘R1’ (Class A-Insulated):

.1 6 mil Poly Vapour Barrier

.2 13mm Protection Board

.3 Two layers polyiso roof insulation, total R Value 36 to 40, adhesive-applied, factory-tapered at crickets and back-slopes.

.4 One-layer 100 mm mineral fibre insulation/protection, (R11.5), adhesive-applied with joints staggered from those of previous layer.

.5 Base sheet torch-applied.

.6 Granular cap sheet torch-applied.

.7 Stripping and membrane flashing, granular-surfaced where exposed to view.

.8 All Parapets and Vergers:

.1 Prepare and prime sheet metal parapet facing.

.2 Torch-applied base stripping ply full height

.3 Granular cap sheet torch-applied

3.6 PRIMER APPLICATION

.1 Apply all primers in accordance with the manufacturer's directions to all surfaces prior to application of membranes and other roofing components.

3.8 FIRE RETARDANT TAPE APPLICATION (WHERE REQUIRED)

.1 Prior to the application of any torch on base sheet materials, install a width of tape over substrate cracks, voids in the construction, angle changes at curbs, parapets, penetrations, walls, and penetrations to prevent contact of flame with combustible materials or construction debris.

3.10 INSULATION INSTALLATION

.1 Insulation: adhesive application.

.1 Apply insulation in following order: polyisocyanurate in 2 layers with staggered joints and 75mm mineral fiber top layer.

.2 Adhere insulation to substrate and preceding layers using adhesive applied in accordance with manufacturer's instructions, Factory Mutual and RCABC requirements.

.3 Place boards in parallel rows with ends staggered, and in firm contact with one another.

.4 Cut end boards to suit.

3.11 MEMBRANE APPLICATION

.1 Base sheet application:

.1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.

.2 Unroll and torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.

.3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.

.4 Application shall be free of blisters, wrinkles and fishmouths.

.2 Cap sheet application:

.1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.

.2 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.

.3 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.

.4 Application shall be free of blisters, fishmouths and wrinkles.

.3 Membrane Flashing (Stipping Plies) Application:

.1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.

.2 Apply base and cap sheet onto substrate in 1 meter wide strips.

.3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal.

.4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.

.5 Provide 75 mm minimum side lap and seal.

.6 Torch-weld cap stripping ply and base stripping at non-combustible substrates. Self-adhesive-apply base stripping to combustible substrates.

3.12 INTERIM COMPLETION INSPECTION

.1 Inspect the roofs at or just before the date of substantial completion. Remove all nails and other debris which will cause damage to roof membranes. Ensure the roof has not been damaged by construction activities and the interfacing with the existing roof membrane system is complete and free of any defects. Leave the entire roof ready for final inspection by Inspection Company.

.2 Provide the Departmental Representative with a written certificate that this inspection has been completed.

3.13 ADJUST AND CLEAN

.1 Repair, remove and clean all drips or smears of adhesive and asphalt on exposed finished surfaces or surface to be subsequently finished. Clean off immediately as directed by Departmental Representative.

.2 As the work progresses and at completion of the work, clean up and remove from the site, all rubbish and debris resulting from roofing and sheet metal work.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for two ply SBS modified bituminous membranes in a protected membrane waterproofing system.

1.2 RELATED SECTIONS

.1	Section 06 10 00	Rough Carpentry
.2	Section 07 62 00	Sheet Metal Flashing & Trim
.3	Section 07 92 00	Joint Sealants
.4	Division 22	Plumbing
.5	Division 23	Heating, Ventilation & Air Conditioning

1.3 REFERENCES

.1 The latest version of the following tests and publications:

.2 American Society for Testing and Materials International (ASTM).

.1 ASTM D6162 / D6162M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.

.3 Canadian General Standards Board (CGSB).

.1 CSA A123.23-15 Product specification for polymer modified bitumen sheet, prefabricated and reinforced.

.4 Canadian Roofing Contractors Association (CRCA).

.1 CRCA Roofing Specifications Manual – Latest Edition

.5 Roofing Contractors Association of British Columbia (RCABC)

.1 RCABC Guarantee Corp. RCABC Roofing Practices Manual-[Latest Edition].

.2 RGC Guarantee Standards [E Waterproofing].

.6 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act, 1999 (CEPA)

.7 Factory Mutual (FM Global).

.1 FM Approvals – Roofing Products.

.8 Health Canada / Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.9 National Building Code of Canada, 2015 (NBCC) and BC Building Code, 2018 (BCBC).

.10 ASHRAE 90.1, 2010

1.4 PERFORMANCE REQUIREMENTS

.1 Compatibility between components of roofing system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.

.2 The roof assemblies shall have a minimum Class A designation in accordance with NBCC, 2010 (3.1.15.2.1) and ULC S107.

1.5 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00 – Submittals.

.2 Submit two copies of most recent technical roofing components data sheets describing materials' physical properties.

.3 Submit WHMIS MSDS – Material Safety Data Sheets in accordance with Section 01 35 33 – Health and Safety.

- .1 Indicate VOC content for:
  - .1 Primers
  - .2 Asphalt
  - .3 Sealers
  - .4 Tapered Insulation

.4 Provide layout for factory-tapered insulation.

.5 Manufacturer's Certificate: certify that products meet or exceed specified requirements.

.6 Provide to the Departmental Representative the "RCABC Roofing System Record" upon completion of the work. Record shall include copies of inspection reports and roof maintenance guide.

.7 Submit copies of underwriter's certification for roof covering materials.

1.6 QUALITY ASSURANCE

.1 Unless otherwise specified, all materials and roofing practice shall conform to the recommendation of the RCABC as contained in their manual, Roofing Practices in British Columbia. Where this manual is silent, the recommendation of the CRCA as contained in their manual Roofing Specifications, shall be followed.

.2 This Contractor shall at all times, have in his Field Office, a copy of said manuals.

.3 All work shall be done by a member of the Roofing Contractor's Association of British Columbia and in accordance with the manufacturer's instructions and latest standards of RCABC

.4 Obtain all roofing materials from the same source to ensure compatibility.

.5 Roofing and sheet metal work shall be performed in conformance with the roofing manufacturer's written recommendations, as well as the requirements of the ULC laboratories, Factory Mutual FM-190 and CGSB 47-GP-56M (latest).

.6 The manufacturer of elastomeric bitumen products shall provide proof of ISO9001 Certification.

1.7 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety.

1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store all materials in their original containers in undamaged condition, sealed with labels intact, having manufacturer's name, brand, weight, CSA and other references to accepted standards clearly shown.

.2 Store materials in weatherproof shelters, having floors which will protect the materials from moisture. Store rolled materials on ends. Avoid prolonged exposure of light and heat sensitive materials to sunlight. Remove only as much material from storage as can be applied and made weathertight in the same day.

.3 Do not place roof insulation in direct contact with the earth, road surface, or roof deck. Place suitable supports under the insulation upon delivery to protect it from absorbing dampness.

.4 Do not store materials in concentrations which exceed design live load.

.5 In the event material is damaged by the elements, improper handling or other causes, such material will be rejected and shall be replaced at no extra cost to the Departmental Representative.

.6 Place plywood runways over completed Work to enable movement of material and other traffic.

.7 Store sealants at +5 degrees C minimum.

.8 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.

1.9 PROTECTION

.1 Respect safety measures described in the manufacturer's written directives, as well as RCABC written recommendations.

.2 At the end of each work day, use an infrared detector to spot any smoldering or concealed fire. Job planning must be organized to ensure workers are still on location at least one hour after torch application.

.3 Never apply the torch directly to dry wood surfaces. Comply with the fire safety recommendations of the manufacturer and the RCABC.

.4 Throughout roofing installation, maintain a clean site and have one approved ABC fire extinguisher within 6 meters of each roofing torch. Respect all safety measures described in technical data sheets. Torches must never be placed near combustible or flammable products.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

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

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Separate for reuse and recycling and place in designated containers in accordance with Waste Management Plan.

.5 Place materials defined as hazardous or toxic in designated containers.

.6 Handle and dispose of hazardous materials in accordance with Laws and regulations.

.7 Clearly label location of salvaged material's storage areas and provide barriers and security devices.

.8 Ensure emptied containers are sealed and stored safely.

.9 Divert unused materials from landfill to recycling facility as approved by Departmental Representative.

.10 Unused adhesives, sealant, and asphalt materials must not be disposed on into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.11 Dispose of unused adhesive material at official hazardous material collections site approved by Departmental Representative.

1.11 CO-OPERATION WITH OTHER TRADES

.1 Advise all other trades of their responsibility in having pipes, sleeves, A/C unit fan, and cowl bases installed on the roof in adequate time so that the roofing work is not delayed. Coordinate roofing with mechanical and electrical trades.

.2 The mechanical trades shall be responsible for cap and counterflashing of any ducts, vents, stacks, or other sheet metal projecting through the roof. This section shall provide base flashing over wood or metal curbs, etc., and seal lead flashings for service lines into the roof members.

1.12 JOB CONDITIONS

.1 Conform to the ambient air temperature and humidity requirements and limitations as set forth by the membrane system manufacturer, the RCABC and the Roofing Inspection Agency for installation of all systems and materials.

.2 Minimum installation air temperature for solvent-based adhesives and compounds is (-) 5 degree C.

.3 Protect roof decks from damage due to roofing or sheet metal operations. Protect work of other trades from damage; replace and/or make good any and all such damages caused by work of this section.

.4 Protect all adjacent surfaces and work during roofing from damage, with special protection adjacent to hoist.

.5 Inspect surfaces to receive work of this section and report any defects in writing to the Departmental Representative.

.6 Commencement of work will imply acceptance an approval of such surfaces and no claim for defects in workmanship will subsequently be allowed.

.7 Provide all temporary tarps and structures, at no additional cost to the Departmental Representative, required to protect building and roofing from weather conditions, which may cause a delay in meeting project schedules.

1.13 INSPECTION AND WARRANTIES

.1 The Contractor shall, at no additional cost to the Departmental Representative, arrange for the supplier/manufacturer of the membrane system, to inspect the work in progress after base sheet installation and during seaming, and upon completion, to ensure that the complete system is installed in full compliance with the supplier's/manufacturer's specifications, recommendations, and details.

.2 There will be no Installation Guarantee for work of this section. However, there shall be roof inspection services. Roof inspection shall be performed by an independent inspection agency appointed by the Departmental Representative. Costs for inspections and warranty shall by paid for by the Contractor. Inspection service shall include additional inspection of roof immediately prior to interim completion of this Contract.

.3 The Contractor shall co-operate with the appointed inspection agency; provide material samples when requested and provide access to the work in progress.

.4 The Contractor shall obtain from the manufacturer of the elastomeric bitumen membrane system, a written warranty stating that its products are free of manufacturing defects and shall provide a waterproof surface for 20 years after installation. If infiltration happens due to faulty material, the manufacturer shall make the necessary repairs, at its expense.

PART 2 PRODUCTS

2.1 COMPONENT COMPATIBILITY

.1 Ensure that all components of the membrane systems are compatible. All membrane, accessories and associated mastic/sealant compounds shall be products of the same manufacturer.

2.2 GYPSUM BOARD

.1 Where the fiberglass-matt faced gypsum roof boards for application directly under roof membranes have been damaged, the replacement roof board shall meet or exceed the property values listed here in:

1. Thickness: 1/2 inch.
2. Width: 4 feet.
3. Length: [4 feet] [8 feet].
4. Weight: 2.0 lb/sq. ft.

5. Surfacing: Primed Fiberglass Mat.
6. Flexural Strength, Parallel (ASTM C473): 80 lbf, minimum.
7. Flute Span (ASTM E661): 5 inches.
8. Permeance (ASTM E96): Greater than 23 perms.
9. R-Value (ASTM C518): 0.56.
10. Water Absorption (ASTM C473): Less than 5 percent of weight.
11. Surface Water Absorption (ASTM C473): Nominal 1.0 grams.
12. Compressive Strength (Applicable Sections of ASTM C472): Nominal 900 pounds per square inch.
13. Flame Spread/ Smoke Development (ASTM E84): Not more than 0 Flame Spread, 0 Smoke Development
14. Combustibility (ASTM E136): Noncombustible
15. Fire resistance rating (UL 790 and ASTM E108): Class A
16. Mold Resistance (ASTM D3273): Scored a 10

.2 Acceptable Product: GP Gypsum, DensDeck® Prime Roof Boards. Other products having the same characteristics will not be excluded.

2.3 PRIMER

.1 The primer applied to the dens deck shall meet or exceed the following physical properties:
- .1 Colour: Black
- .2 Specific gravity at 25 °C 0.94 kg/L
- .3 Coverage 0.15 à 0.25 L/m²*

.2 Acceptable Product: Elastocol 500, Soprema or equal.

2.4 SBS MODIFIED BITUMEN MEMBRANE(S)

.1 Supply and install a double layer of sheet roof membranes composed of SBS modified Bitumen and non-woven polyester reinforcement.

.2 Sheet Membrane specifications:
- .1 Thickness - 3.0 mm (118 mils)
- .2 Reinforcement Non-woven polyester
- .3 Dimensions - 10 x 1 m (33 x 3.3 ft)
- .4 Weight - 3.6 kg/m2 (0.7 lb/ft2)
- .5 Selvedge width - 75 mm (3 in)
- .6 Surface – Thermo-fusible plastic film
- .7 Under face Thermo-fusible plastic film

.3 Sheet membrane properties:

Properties	Before Heat Conditioning	After Heat Conditioning
Strain energy, min MD/XD At 23 °C ± 2 °C (73.4 °F ± 3.6 °F) At -18 °C ± 2 °C (0 °F ± 3.6 °F)	6.5/6.5 kN/m (37/37 lbf/in) 8.0/4.0 kN/m (46/23 lbf/in)	5.5/5.5 kN/m (31/31 lbf/in) 3.1/3.1 kN/m (18/18 lbf/in)
Peak load, min MD/XD At 23 °C ± 2 °C (73.4 °F ± 3.6 °F) At -18 °C ± 2 °C (0 °F ± 3.6 °F)	15/11 kN/m (86/63 lbf/in) 22/17 kN/m (126/97 lbf/in)	14/10 kN/m (80/57 lbf/in) 19/11 kN/m (108/63 lbf/in)
Elongation at peak load, min MD/XD At 23 °C ± 2 °C (73.4 °F ± 3.6 °F) At -18 °C ± 2 °C (0 °F ± 3.6 °F)	50/60 % 30/30 %	15/50 % 7/21 %
Ultimate elongation, MD/XD At 23 °C ± 2 °C (73.4 °F ± 3.6 °F)	55/70 %	45/45 %
Dimensional stability, max MD/XD	±0.5/±0.1 %	
Low temperature flexibility, max MD/XD	18/-18 °C (0/0 °F)	--18/-18 °C (0/0 °F)
Compound stability at 102 °C (216 °F)	121/121 °C (250/250 °F)	

2.5 ROOF INSULATION

.1 Supply and install rigid thermal insulation board made of extruded polystyrene (XPS) composed of closed cell foam.

.2 The XPS insulation shall not have any CFC and HCFC – Zero ozone depletion potential.

.3 Provide a layer of XPS at 38 mm thickness. Insulation boards shall be laid flat on the roof. A second 38 mm layer of XPS shall be installed with staggered joints on top of the base layer. All XPS boards are to have a shiplap profile,

.4 XPS insulation properties:

- .1 Thermal Resistance1 -(RSI-Value [R Value] / 25.4 mm [1 in] @ 24°C [75 °F]) ASTM C518, RSI- 0.88 (R – 5.0)
- .2 Water Vapour Permeance: ASTM E96, 52 ng/Pa•m2•s (0.9 perm)
- .3 Flame spread rating: CAN/ULC-S102.22 > 25 < 500
- .4 Dimensional Stability to ASTM D2126.
- .5 Min. Flexural Strength to ASTM C203, shall be 640 kPa (93 psi)
- .6 Water Absorption, 0.7% by volume, max to ASTM D2842
- .7 Min. Compressive Strength3 to ASTM D1621, shall be 241 kPa (35 psi)
- .8 Limiting Oxygen Index to ASTM D2863, shall be 24 %

2.6 FILTER MAT

.1 Supply and Install filter mat on top of the XPS insulation. The filter material shall be made of non-woven needle punctured polypropylene and polyester fibers.

.2 Filter mat specifications:

.1 Materials: Polypropylene / Polyester

.2 Colour: Grey

.3 Thickness: 1 mm (39.4 mil)

.4 Dimensions: 3.5 x 150 m (11.5 x 492 ft) 1.5 x 75 m (5.75 x 246 ft)

.5 Roll weight: 94 kg (207 lb) 23.6 kg (52 lb)

Properties	Standards	Requirements
Total weight	ASTM D5291	80 g/m2 (0.016 lb/ft2)
Thickness	ASTM D5199	1 mm (39.4 mil)
Ultimate elongation	CAN/ONGC-148.1 (No.7.3)	40-100 %
Breaking strength, typical/minimum	CAN/ONGC-148.1 (No.7.3)	500/450 N (112/101 lbf)
Trapezoidal tear, typical/minimum	CAN/ONGC-4.2 (No.12.2)	230/210 N (52/47 lbf)
Mullen burst, typical/minimum	CAN/ONGC-4.2 (No.11.1)	1500/1350 kPa (218/196 psi)
Permeability	CAN/ONGC-148.1 (No.4)	1.4 mm/sec (55 mil/sec)
Filtration opening size FOS	CAN/ONGC-148.1 (No.10)	90-120 microns (3.5-4.7 mil)

2.7 BALLAST

.1 Gravel ballast used to secure the protected roof membrane assembly must be clean, washed, round or crushed stone falling within the following gradations:

.1 35 mm (1 ½") - 100 % Passing

.2 20 mm (¾") 5 - 20 % Passing

.3 12.7 mm (½") 0 - 6 % Passing

.4 5 mm (3/16") 0 - 2 % Passing

2.8 ACCEPTABLE PRODUCTS

.1 Soprema.

.2 Siplast.

.3 Other products having the same characteristics will not be excluded.

2.9 SEALANTS

.1 As approved by membrane system manufacturer and by RCABC as being compatible with membrane system.

.2 Plastic cement: asphalt, to CAN/CGSB-37.5 coal tar, to CGSB 37-GP-19M.

.3 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.

2.10 FASTENERS AND ACCESSORIES

.1 Fasteners for mechanically fastening fire barrier sheathing board to steel roof deck shall be wind uplift and corrosion-resistant type as recommended and acceptable to the board manufacturer and to RCABC.

.2 Fire Protection Tape: Fire retardant treated, 165 mm wide tape, composed of glass fleece reinforcement and SBS bitumen. The top side is sanded and the bottom side is covered with a silicone release film.

.3 Splash Blocks: for use where scuppers from elevated roofs spill onto main roof. 600 x 600 x 50 mm stock pre-cast lightweight concrete patio pavers.

PART 3 EXECUTION

3.1 WORKMANSHIP - GENERAL

.1 All workmanship shall be at least in accordance with RCABC standards for a 10 year guarantee for the various systems described.

.2 Use materials and systems in accordance with manufacturer's specifications and instructions.

.3 Leave no work exposed during unsettled weather. Glaze and finish membranes at end of each work period, to direction of roofing inspector.

.4 Work to; and around all features, voids and edges, in best trade manner to produce watertight and weatherproof insulation.

.5 Follow approved stripping and membrane flashing methods at eaves, curb, parapets, etc., in accordance with RCABC system guidelines.

.6 Do priming for modified asphalt roofing in accordance with CGSB 37-GO-15M.

3.2 EXAMINATION OF ROOF DECKS

.1 Before commencing roofing work, this section, together with the Departmental Representative and the Contractor, shall inspect all surfaces scheduled to receive membranes for condition, slopes, nailing supports, sheet metal parapet facing, roof drains, stack vents, mechanical and electrical penetrations, building joints, etc.

.2 All surfaces must be smooth, dry, clean and free of ice and debris. No salt or calcium shall be used to remove snow or ice.

.3 Surfaces scheduled to receive membranes must possess a smooth surface with an even finish; free of excessive moisture, ridges, hollows and sharp corners.

.4 If defects are found, a non-compliance notice will be issued to the Contractor so that adjustments can be made. Proposals for correction of defects shall be submitted to the Departmental Representative for approval.

.5 Corrections of defects shall be made at no additional cost to the Departmental Representative using materials which adhere to the substrate, are stable, do not deform under traffic loads and are compatible with bituminous materials. The deck must be clean, dry, and free of contamination by treatment products, lubricating oils, diesel oil or grease, which could affect the adhesion of the waterproofing or the physical integrity of the membrane itself.

.6 Commencement of roofing/waterproofing work shall imply acceptance of surfaces and conditions.

3.3 PREPARATION

.1 Supply to the various sections concerned in ample time: all inserts, reglets, and accessories required to be built into the work of other sections. Instruct as to the proper location and position of such items.

.2 Co-operate with, and coordinate work with Mechanical trades and other providers of interfacing materials and systems to ensure watertight junctions at roof drains, vents, and other items passing through the roof.

.3 Minimize exposure of the roof deck to the elements by proceeding as soon as the roof deck is completed. Do not work during rain, fog, sleet, ice, or snow. Warm roofing materials before using in cold weather.

.4 Sweep clean and remove all debris from roof deck surfaces before commencement of work.

3.4 EQUIPMENT

.1 Maintain all equipment and tools in good working order.

.2 Use torch types recommended by the manufacturer of the elastomeric asphalt membranes, and acceptable to RCABC and ULC.

3.5 ROOFING SYSTEM DESCRIPTIONS

.1 Roof Assembly Type ‘R1’ (Class A-Insulated):

.1 6 mil Poly Vapour Barrier

.2 13mm Protection Board

.3 Two layers EPS roof insulation, total R Value 36 to 40, adhesive-applied, factory-tapered at crickets and back-slopes.

.4 One-layer 100 mm mineral fibre insulation/protection, (R11.5), adhesive-applied with joints staggered from those of previous layer.

.5 Base sheet torch applied.

.6 Granular cap sheet torch applied.

.7 Stripping and membrane flashing, granular surfaced where exposed to view.

.8 All Parapets and Vergers:

.1 Prepare and prime sheet metal parapet facing.

.2 Torch-applied base stripping ply full height

.3 Granular cap sheet torch-applied

3.6 COMBINATION FIRE BARRIER SHEATHING BOARD / VAPOUR BARRIER INSTALLATION

.1 Install board with long side of sheet resting on and perpendicular to direction of flutes in deck. Short side shall rest on top of flute. Ensure edges are butted tightly.

.2 Stagger end joints a minimum of 600 mm.

.3 Secure board in place with self-drilling non-corrosive screws and companion plates applied at the spacing specified by the board manufacturer and acceptable to RCABC.

3.7 PRIMER APPLICATION

.1 Apply all primers in accordance with the manufacturer's directions to all surfaces prior to application of membranes and other roofing components.

3.8 FIRE RETARDANT TAPE APPLICATION (WHERE REQUIRED)

.1 Prior to the application of any torch on base sheet materials, install a width of tape over substrate cracks, voids in the construction, angle changes at curbs, parapets, penetrations, walls, and penetrations to prevent contact of flame with combustible materials or construction debris.

3.9 MEMBRANE APPLICATION

.1 Base sheet application:

.1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.

.2 Unroll and torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.

.3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.

.4 Application shall be free of blisters, wrinkles and fishmouths.

3.10 INSULATION INSTALLATION

.1 Insulation: adhesive application.

.1 Apply insulation in following order: Extruded polystyrene in 2 layers with staggered joints.

.2 Adhere insulation to substrate and preceding layers using adhesive applied in accordance with manufacturer's instructions, Factory Mutual and RCABC requirements.

.3 Place boards in parallel rows with ends staggered, and in firm contact with one another.

.4 Cut end boards to suit.

.2 Membrane Flashing (Stipping Plies) Application:

.1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.

.2 Apply base and cap sheet onto substrate in 1 meter wide strips.

.3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal

.4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.

.5 Provide 75 mm minimum side lap and seal.

.6 Torch-weld cap stripping ply and base stripping at non-combustible substrates. Self-adhesive-apply base stripping to combustible substrates.

3.11 INTERIM COMPLETION INSPECTION

.1 Inspect the roofs at or just before the date of substantial completion. Remove all nails and other debris which will cause damage to roof membranes. Ensure the roof has not been damaged by construction activities and the interfacing with the existing roof membrane system is complete and free of any defects. Leave the entire roof ready for final inspection by Inspection Company.

.2 Provide the Departmental Representative with a written certificate that this inspection has been completed.

3.12 ADJUST AND CLEAN

.1 Repair, remove and clean all drips or smears of adhesive and asphalt on exposed finished surfaces or surface to be subsequently finished. Clean off immediately as directed by Departmental Representative.

.2 As the work progresses and at completion of the work, clean up and remove from the site, all rubbish and debris resulting from roofing and sheet metal work.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

1. Section 01 45 00 — Quality Control
2. Section 07 27 13 — Self-Adhered Membranes
3. Section 07 52 00 — Modified Bituminous Membrane Roofing
4. Section 07 90 00 — Sealants

1.2 REFERENCES

1. American Society for Testing and Materials (ASTM International).
   - .1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. Roofing Practices Manual as published by the Roofing Contractors Association of British Columbia.
3. Sheet Metal and Air Conditioning Contractor's National Association, Inc., "Architectural Sheet Metal Manual" (SMACNA).

1.3 SUBMITTALS

1. All submittals shall be in accordance with Section 01 33 00 – Submittals.
2. Samples:
   - .1 Submit 100 x 150 mm samples of each type of sheet metal material, colour and finish.

Part 2 PRODUCTS

2.1 EXPOSED CAP FLASHING (PARAPETS AND GUARD WALLS)

.1 Cap flashing formed from ASTM Standard Specification A653 / A653M, Sheet Steel, Zinc-Coated (galvanized) or Zinc-Iron Alloy Coated (galvanized) by the hot dip process, minimum Grade 33, with a design thickness of 22 gauge (0.853mm) or thicker and a minimum zinc coating designation Z275.

1. Colour as selected by Consultant to match existing cap flashings on site from manufacturer’s standard colour range

2.2 SHEET FLASHING MATERIALS

1. Powder coated finish steel sheet: Commercial quality to ASTM A653/A653M, with Z275 designation zinc coating. Factory-finished with a 2-coat min. silicone modified polyester (SMP) paint system, cured by baking.

.1 Metal thickness shall be minimum 24 gauge but adjusted to accommodate use and span in order to yield a smooth, non-oil-canned surface.

2. Flashings associated with aluminum cladding and curtain walls to match colour and finish as existing flashings on site.

2.3 ACCESSORIES

1. Isolation coating: alkali resistant bituminous paint.

2. Self-adhered Membrane: in accordance with Section 07 27 13.

3. Sealants: in accordance with Section 07 92 00.

4. Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

5. Fasteners: of same material as sheet metal, to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing application.

6. Washers: of same material as sheet metal, 1 mm thick with rubber packings.

7. Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

1. Fabricate metal flashings and other sheet metal work in accordance with applicable RCABC details, SMACNA details and as indicated.

2. Form pieces in 2438 mm maximum lengths. Make allowance for expansion at joints.

3. Hem exposed edges on underside 13 mm. Mitre and seal corners with sealant.

4. Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

5. Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS AND FORMED SHEET METAL

1. Form flashings, copings, cap flashings and fascias to profiles indicated from minimum 24-gauge material.

2. For roof edge metal upstands (“Sheet Metal Parapet”) or other descriptions noted on drawings from minimum 1.22 mm thick galvanized steel or as otherwise noted thickness on drawings.

2.6 FASTENERS

.1 Steel pan head screws with fine thread for metal. Can be self tapping or self drilling.

.2 #8 x 1/2" (minimum) long stainless steel suitable for metal flashing application. Stainless to be 300 Series when exposed- otherwise 300 or 400 Series is acceptable.

.3 For exposed conditions use pan head stainless steel screws, with neoprene washer, heads coloured to match flashing.

2.7 OVERFLOW SCUPPERS

1. Form scuppers from min. 22-gauge thick material.

2. Sizes and profiles as indicated and as per requirements of RCABC and SMACNA.

3. Provide necessary fastenings.

Part 3 EXECUTION

3.1 INSTALLATION

1. Install sheet metal work in accordance with RCABC details, SMACNA details and as indicated.

2. Use concealed fastenings except where approved before installation.

3. Counter flash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock seams forming tight fit over hook strips, as detailed.

4. Use standing seams at corners.

5. Lock end joints and caulk with sealant.

6. Install head & sill flashings at windows & doors in one continuous piece whenever possible.

7. Install flashings lapped "shingle" style with membranes to divert water to the exterior.

8. Install all flashings so that all surfaces have a minimum slope of 1:4 to the exterior.

9. Extend flashing min. 13mm past all cladding, complete with a drip-edge.

3.2 INSTALLATION OF SCUPPERS

1. Install scuppers as indicated and to requirements of RCABC and SMACNA.

END OF SECTION

1.1 GENERAL

1.2 RELATED REQUIREMENTS

.1 This Section shall be read in conjunction with all other Sections in all Divisions.

1.3 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115 (latest edition) Fire Tests of Fire stop Systems.

1.4 DEFINITIONS

.1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.

.2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.

.3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

.4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of non-combustible construction or have "0" annular space in buildings of combustible construction.

.1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.5 SUBMITTALS

.1 Shop Drawings:

.1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CANULC-S102 for surface burning characteristics.

.1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

.2 Closeout Submittals:

.1 Contractor shall provide certificate of completion for firestopping that all firestopping has been installed in accordance with manufacturer's written instructions. Incorporate into Operations and Maintenance Manual.

1.6 QUALITY ASSURANCE

Qualifications:

.1 Installer: person specializing in fire stopping installations

PART 2 PRODUCTS

2.1 MATERIALS

.1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.

.1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULCS115 and not to exceed opening sizes for which they are intended.

.2 Fire stop system rating: to match existing.

.2 Service penetration assemblies: systems tested to CAN-ULC-S115.

.3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.

.4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

.5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.9 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.10 Sealants for vertical joints: non-sagging.

.11 Standard of acceptance: Hilti, 3M, or approved alternate.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.

.1 Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

.1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

.6 Fire stop and smoke seal at:

.1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.

.2 Edge of floor slabs at curtain wall and precast concrete panels.

.3 Top of fire-resistance rated masonry and gypsum board partitions.

.4 Intersection of fire-resistance rated masonry and gypsum board partitions.

.5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

.6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.

.7 Openings and sleeves installed for future use through fire separations.

.8 Around mechanical and electrical assemblies penetrating fire separations.

.9 Rigid ducts: greater than 129 cm^2: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

3.4 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed by Consultant.

.2 Install floor fire stopping before interior partition erections.

.3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.

.4 Mechanical pipe insulation: not required.

3.5 FIELD QUALITY CONTROL

.1 Consultant’s Review: notify Consultant when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

.1 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 This section specifies standards for caulking and sealants applied by this and other sections.

.2 Refer to other sections for additional caulking and sealants.

1.2 ENVIRONMENTAL AND SAFETY REQUIREMENTS

.1 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.

.2 Comply with requirements specified in the following sections:

.1 Division 1 – Environmental Procedures

.2 Division 1 – Waste Management and Disposal

.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 Sealant and substrate materials to be minimum 5° C.

.5 Should it become necessary to apply sealants below 5° C, consult sealant manufacturer and follow their recommendations.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Division 1 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 SEALANT MATERIALS

.1 Sealants acceptable for use on this Project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONSs

.1 Urethanes One Part.

.1 Acceptable materials:

.1 Tremco Dymonic 100.

.2 Tremco Dymonic FC.

.3 BASF Masterseal NP1.

.4 Other products having the same characteristics will not be excluded.

.2 Silicones One Part.

.1 Single component neutral cure silicone

.2 Acceptable materials :

.1 Dow Corning 795 (where both sides consist of nonporous surfaces)

.2 Dow Corning 790 Low modulus (where both sides consist of cementitious substrates)

.3 Other products having the same characteristics will not be excluded.

.3 Air Barrier Sealant (for poor bonding surfaces). To adhere to spun bonded polyolefin and fibrous or woven air barrier sheet material and poly faced self adhered membranes.

.1 Acceptable material: Dow Corning 758. Other products having the same characteristics will not be excluded.

.4 Acoustical Sealant

.1 To CAN/CGSB-19.21

.5 Butyl Sealant

.1 Non-curing, flexible polyisobutylene sealant.

.2 Acceptable products: Tremco Butyl sealant. Other products having the same characteristics will not be excluded.

.6 Acrylic Latex One Part.

.1 To CGSB 19-17.

.7 Preformed Compressible and Non-Compressible back-up materials.

.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.

.1 Extruded closed cell foam backer rod.

.2 Size: oversize 40 to 50%.

.2 Neoprene or Butyl Rubber

.1 Round solid of Shore A hardness 70.

.3 High Density Foam.

.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m^3 density, or neoprene foam backer, size as recommended by manufacturer.

.4 Bond Breaker Tape.

.1 Polyethylene bond breaker tape, which will not bond to sealant.

2.3 SEALANT SELECTION

.1 Perimeters of exterior openings where frames meet exterior façade of building: Sealant type: one component Silicone, non-sag.

.2 Coping joints and coping-to-façade joints & flashing joints: Sealant type: butyl.

.3 Interior control and expansion joints in floor surfaces: Sealant type: one component urethane self-levelling.

.4 Countertops (e.g. sinks, urinals, basins, vanities): Sealant type: silicone, mildew resistant.

.5 Exposed interior control joints in drywall: Sealant type: acrylic latex.

.6 Concealed joints in sound attenuated walls and ceilings: Sealant type: acoustic.

.7 Colour of sealants: selected by Consultant from manufacturer's standard range to match adjacent surfaces.

.8 Joint cleaner: xylol, methyl ethyl ketone or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

2.4 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 Primer: as recommended by manufacturer.

PART 3 EXECUTION

3.1 PREPARATION OF JOINT SURFACES

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil, grease, and other matter which may impair work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility in materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.2 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

3.3 BACK UP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.4 MIXING

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

3.5 APPLICATION

.1 Sealant.

- .1 Apply sealant in accordance with manufacturer's written instruction.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.2 Apply sealant in continuous beads.

.3 Apply sealant using gun with proper size nozzle.

.4 Use sufficient pressure to fill voids and joints solid.

.5 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.6 Tool exposed surfaces before skinning begins to give slightly concave shape.

.7 Remove excess compound promptly as work progresses and upon completion.

.8 Curing.

- .1 Cure sealants in accordance with sealant manufacturer's instructions.
- .2 Do not cover up sealants until proper curing has taken place.

.9 Cleanup.

- .1 Clean adjacent surfaces immediately and leave work neat and clean.
- .2 Remove excess and droppings, using recommended cleaners as work progresses,
- .3 Remove masking tape after initial set of sealant.

END OF SECTION

PART 1 GENERAL

1.1 RELATED WORK

.1 Section 07 21 00 Insulation

.2 Section 07 92 00 Joint Sealants

1.2 REFERENCE STANDARDS

.1 ASTM C 473 Standard Test Methods for Physical Testing of Gypsum Panel Products.

.2 ASTM C 630 Standard Specification for Water-Resistant Gypsum Backing Board.

.3 ASTM C 840 Standard Specification for Application and Finishing of Gypsum Board.

.4 ASTM C 1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

.5 ASTM C 1396 Standard Specification for Gypsum Board.

.6 ASTM C 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

.7 Unless otherwise shown or specified, materials and workmanship shall meet the standards detailed in the Specification Standards Manual of the British Columbia Wall and Ceiling Industry and printed matter issued by the product manufacturers.

.8 Where standards are outlined herein it will not preclude the use of other standards included in the Specification Standards Manual where such standards are approved in writing by the Departmental Representative.

.9 Reference in these project specifications to Section numbers, Parts, and Item numbers means those within Section 9.6 of the Specification Standards Manual.

.10 National Building Code of Canada (NBCC), 2015, and BC Building Code (BCBC) 2018.

1.3 QUALITY ASSURANCE

.1 Contractor executing the work of this section shall have experience in successful installation of work of type and quality indicated and specified.

.2 Single source responsibility: Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.

1.4 SUBMITTALS

.1 All submittals shall be in accordance with Division 1 – Submittal Procedures.

.2 Product Data Sheets:

1. Submit manufacturer’s product data sheets for products proposed for use in the work of this section.

1.5 ENVIRONMENTAL REQUIREMENTS

.1 Environmental requirements, general: Comply with requirements of referenced gypsum board application standards and recommendations of gypsum board manufacturer, for environmental conditions before, during and after application of gypsum boards.

.2 Cold Weather Protection: When ambient outdoor temperatures are below 12°C maintain continuous, uniform comfortable building working temperatures of not less than 12°C for a minimum period of 48 hours before, during and following application of gypsum board and joint treatment materials or bonding of adhesives.

.3 Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.

.4 Protection: Provide adequate protection of materials and work of this section from damage by weather and other causes. Protect work of other trades from damage resulting from work of this section. Make good such damage at no additional cost to the Departmental Representative.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Store materials in protected dry areas. Store gypsum board flat in piles with edges protected.

.2 Ensure that finish metal members are not bent, dented, or otherwise deformed.

.3 Deliver products supplied under the work of this section only to those who are responsible for installation, to the place they direct, and to meet installation schedules.

.4 Package fire rated materials with labels attached.

PART 2 PRODUCTS

2.3 EXTERIOR SHEATHING BOARD

.1 Exterior grade fiberglass mat faced on front and back sides and long edges, silicone-treated water-resistant gypsum core, to ASTM C1177/C1177M-06 Type ‘X’, fire rated where indicated.

.2 Exposure to weather: Comply with manufacturer’s printed instructions. Provide protection prior to exposure for periods greater than manufacturer’s recommendations and warranty.

.3 Acceptable products:

.1 CertainTeed ‘GlasRoc Sheathing’.

.2 CGC ‘Securock Glass-Mat Sheathing’.

.3 Georgia-Pacific ‘Dens-Glass Gold’.

.4 Other products having the same characteristics will not be excluded.

PART 3 EXECUTION

3.9 CLEAN-UP

.1 Clean-up rubbish daily and take care to avoid defacing adjoining work.

END OF SECTION

Public Works and Government Services Canada

Requisition No:_____

SPECIFICATIONS
for
Fisheries & Oceans Canada- Institute of Ocean Sciences
Roofing Remediation – Stage 1, Sidney, BC

Project No.: November 2020

APPROVED BY:

_____ _____
Regional Manager, AES Date

_____ _____
Construction Safety Coordinator Date

TENDER:

_____ _____
Project Manager Date

Real Property Services Branch,
Professional and Technical Services, Pacific Region
Room 219 - 800 Burrard Street, Vancouver, B.C., V6Z 0B9

PART 1 - SPECIFICATIONS

PART 2- DRAWINGS

Architectural Drawings: 5

ARCHITECTURE	STRUCTURAL

END OF SECTION

Part 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises remediation of the roofs identified in the drawings dated August 2020 titled “Fisheries & Oceans Canada Institute of Ocean Sciences Roof Remediation”

1.2 DESCRIPTION OF WORK

.1 Remediation of roofs identified in areas over the Pacific Geoscience Centre in the drawings dated August 2020.

.2 The Work includes, but is not limited to, the following general scope;

.1 Site Demolition of roof areas to be replaced.

.2 Making good any collateral damage created by the demolition including damage to the building and or the site.

.3 Disposal of all materials removed.

.4 Replacement of all roof assemblies identified in the Remediation Drawings.

.5 Tarps and hoarding to protect interior areas from water ingress during removal and replacement of roof systems as indicated in the drawings.

.3 Include all temporary means and facilities required to advance the work in a timely manner, and to keep the property protected, safe and secure during the performance of the work. Contractor Staging Area and Access to the Site: refer to Site Plan and Division 1 requirements.

1.3 WORK SEQUENCE

.1 Construct Work in stages to accommodate Owner's continued use of premises during construction.

.2 Co-ordinate Progress Schedule and co-ordinate with Owner site use during construction.

.3 Maintain fire access/control.

.4 Refer to Section 01 52 00 Construction Facilities for road access limitations.

1.4 CONTRACTOR USE OF PREMISES

.1 Unrestricted use of site until Substantial Performance, road access subject to Section 01 52 00 Construction Facilities.

.2 Co-ordinate use of premises under direction of Departmental Representative.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.5 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.5 OWNER OCCUPANCY

.1 Owner will occupy premises outside of construction area during entire construction period for execution of normal operations.

.2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.6 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance normal use of premises. Arrange with the Department Representative to facilitate execution of work.

1.7 EXISTING SERVICES

.1 Notify, the Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 5 working days notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to pedestrian, vehicular traffic and tenant operations.

.3 Provide alternative routes for personnel, pedestrian and vehicular traffic.

.4 Establish location and extent of service lines in area of work before starting Work. Notify the Departmental Representative of findings.

.5 Submit schedule to and obtain approval from the Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.6 Provide temporary services when directed by the Departmental Representative to maintain critical building and tenant systems.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise the Departmental Representative and confirm findings in writing.

.9 Protect, relocate, or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations of maintained, re-routed, and abandoned service lines.

.11 Construct barriers in accordance with Section 01 52 00 – Construction Facilities.

1.8 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

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

END OF SECTION

Part 1 GENERAL

1.1 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Provide sanitary facilities for the work force in accordance with governing regulations and ordinances. Remove temporary facilities from site when directed by the Departmental Representative.

.5 Use only assigned elevators, stairwells, or paths of travel in existing in building for moving workers and material.

.6 Closures: protect work temporarily until permanent enclosures are completed.

.7 Workers shall refrain from use of loud and vulgar language. Non- compliance to this policy will result in the specific worker(s) involved being required to immediately leave the site and to be permanently removed from any subsequent involvement on this project by the Contractor.

.8 Use of loud radios shall be prohibited.

.9 Pets are not allowed on site.

.10 Vehicles must be parked in designated areas.

.11 The Departmental Representative will designate storage areas for tools and equipment. The Contractor shall assign and coordinate storage facilities for sub-Contractors within these designated areas

1.2 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING SYSTEMS

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

1.3 EXISTING SERVICES

.1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services give Departmental Representative Consultant a minimum of 5 working days of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel and pedestrian and vehicular traffic.

.4 Construct barriers in accordance with WorkSafeBC, safety authority, Authority Having Jurisdiction, and Departmental Representative.

1.4 SPECIAL REQUIREMENTS

.1 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.2 Keep within limits of work and avenues of ingress and egress.

1.5 SECURITY

.1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

END OF SECTION

Part 1 GENERAL

1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting five days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

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

.7 Reproduce and distribute copies of minutes within [three] days after meetings and transmit to meeting participants and Departmental Representative.

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

1.2 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 Establish time and location of meeting and notify parties concerned minimum 10 days before meeting.

.3 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work: in accordance with Section 01 32 16.07 - Construction Schedule - Bar (GANTT) Chart.

.3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittals.

.4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

.5 Delivery schedule of specified equipment.

.6 Site security in accordance with Section 01 52 00 - Construction Facilities.

.7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.8 Owner provided products.

.9 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

.10 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.12 Monthly progress claims, administrative procedures, photographs, hold backs.

.13 Appointment of inspection and testing agencies or firms.

1.3 PROGRESS MEETINGS

.1 During course of Work and 2 weeks prior to project completion, schedule progress regular bi-weekly meetings

.2 Notify parties minimum 5 days prior to meetings.

.3 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.

.4 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.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 01 33 00 Submittals

1.2 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally, Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday or Saturday, inclusive, will provide five to six day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element: usually expressed as workdays or work weeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

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

1.4 SUBMITTALS

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

.2 Submit to Departmental Representative within 15 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to the Departmental Representative within 10 working days of receipt of acceptance of Master Plan.

1.5 PROJECT MILESTONES

.1 Project milestones form interim targets for Project Schedule.

.1 Project completed before March 31, 2021.

1.6 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

1.7 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.
.2 Shop Drawings, Samples.
.3 Mobilization.
.4 Project Completion

END OF SECTION

Part 1 GENERAL

1.1 SECTION INCLUDES

.1 Shop drawings and product data.

.2 Samples.

.3 Certificates and transcripts.

1.2 PRECEDENCE

.1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Document.

1.3 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

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

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

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

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

.7 Verify field measurements and affected adjacent Work is co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

1.4 SUBCONTRACTOR LIST

.1 Submit list of all subcontractors including contact information to Departmental Representative within 10 business days of contract award.

1.5 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of BC, Canada.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 2 days for Departmental Representative’s review of each submission.

.5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in shop drawings as Departmental Representative require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions, other than those requested.

.7 Accompany submissions with transmittal letter, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 Details of appropriate portions of Work as applicable:

.1 Fabrication.

.2 Layout, showing dimensions, including identified field dimensions, and clearances.

.3 Setting or erection details.

.4 Capacities.

.5 Performance characteristics.

.6 Standards.

.7 Operating weight.

.8 Wiring diagrams.

.9 Single line and schematic diagrams.

.10 Relationship to adjacent work.

.9 After Departmental Representative’s review, distribute copies.

.10 Submit electronic copies of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit electronic copies of product data sheets or brochures for requirements requested in specification sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product, or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system, or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit electronic copies of manufacturer’s instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.17 Delete information not applicable to project.

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

.19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.20 The review of shop drawings by Fisheries & Oceans Canada (DFO) is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that DFO approves detail design inherent in shop drawings. Responsibility for which shall remain with Contractor submitting, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.6 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to the Owner.

.3 Notify the Owner in writing, at time of submission of deviations in samples from requirements of Contract Documents.

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

.5 Adjustments made on samples by the Owner are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Owner prior to proceeding with Work.

.6 Make changes in samples, which the Engineer may require, consistent with Contract Documents.

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

1.7 PROGRESS PHOTOGRAPHS

.1 Submit progress photographs in accordance as requested by the Departmental Representative

1.8 CERTIFICATES AND TRANSCRIPTS

.1 Compliance certificates, material and product certificates shall be maintained in the document of compliance records.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

.1 Canada Labour Code, Canada Occupational Safety and Health Regulations.

.2 American National Standards Institute (ANSI):

.1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.

.3 Canadian Standards Association (CSA):

.1 CSA S269.1-1975 (R1998), Falsework for Construction Purposes.

.2 CSA S269.2-M87 (R1998), Access Scaffolding for Construction Purposes.

.3 CSA S350-M1980 (R1998), Code of Practice for Safety in Demolition of Structures.

.4 Fire Commissioner of Canada (FCC):

.1 FCC No. 301-1982, Standard for Construction Operations.

.2 FCC No. 302-1982, Standard for Welding and Cutting.

.5 National Building Code of Canada (NBC):

.1 Part 8, Safety Measures at Construction and Demolition Sites.

.6 Province of British Columbia:

.1 Workers Compensation Act (Occupational Health & Safety), Amendment Act, BC Reg. 185/99, herein referred to as the Workers Compensation Act (WCA).

1.2 RELATED SECTIONS

.1 Refer to the following sections as required:

.1 Section 01 33 00 – Submittals.

1.3 WORKERS COMPENSATION BOARD COVERAGE

.1 Comply fully with the Work Safe BC regulations and orders made pursuant thereto, and any amendments up to the completion of the work.

.2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

1.4 COMPLIANCE WITH REGULATIONS

.1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.

.2 It is the Contractor's responsibility to ensure that all workers are qualified, competent, and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

1.5 SUBMITTALS

.1 Perform submittals, if required in accordance with Section 01 33 00

.2 The following shall be in the Records Document:

.1 Health and Safety Plan.

.2 Copies of reports or directions issued by federal and provincial health and safety inspectors.

.3 Copies of incident and accident reports.

.4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.

.5 Emergency Procedures.

.3 Records of Health and Safety Plan, and any revised version, to the Owner is to be a part of the Records Document and It shall not:

.1 Be construed to imply approval by the Owner.

.2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.

.3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

1.6 RESPONSIBILITY

.1 Be responsible for:

.1 The safety of persons and property on site; and

.2 The protection of persons off site, and the environment to the extent that they may be affected by the conduct of the work.

1.7 GENERAL PROTECTION

.1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.

.2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.

.3 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.

.4 Secure site at nighttime or provide security guard as deemed necessary to protect site against entry.

1.8 REGULATORY REQUIREMENTS

.1 Comply with specified codes, acts, bylaws, standards, and regulations to ensure safe operations at site.

.2 In event of conflict between any provisions of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Engineer will advise on the course of action to be followed.

1.9 WORK PERMITS

.1 Obtain all necessary permits related to the project before start of work.

1.10 HEALTH AND SAFETY PLAN

.1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.

.2 Prepare and comply with a job-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:

- .1 Primary requirements:
  - .1 Contractor's safety policy.
  - .2 Identification of applicable compliance obligations
  - .3 Definition of responsibilities for project safety/organization chart for project.
  - .4 General safety rules for project.
  - .5 Job-specific safe work procedures.
  - .6 Inspection policy and procedures
  - .7 Incident reporting and investigation policy and procedures
  - .8 Occupational Health and Safety Committee/Representative procedures.
  - .9 Occupational Health and Safety meetings
  - .10 Occupational Health and Safety communications and record keeping procedures.
- .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
- .3 List hazardous materials to be brought on site as required by work.
- .4 Indicate engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
- .5 Identify personal protective equipment (PPE) to be used by workers.
- .6 Identify personnel and alternates responsible for site safety and health.
- .7 Identify personnel training requirements and training plan, including site orientation for new workers.

.3 Develop the plan in collaboration with all sub-contractors. Ensure that work/activities of sub-contractors are included in the hazard assessment and are reflected in the plan.

.4 Revise and update Health and Safety Plan as required and re-submit to the Engineer.

1.11 EMERGENCY PROCEDURES

.1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:

.1 Designated personnel from own company.

.2 Regulatory agencies applicable to work and as per legislated regulations.

.3 Local emergency resources.

.4 Engineer and site staff.

.2 Include the following provisions in the emergency procedures:

.1 Notify workers and the first aid attendant, of the nature and location of the emergency.

.2 Evacuate all workers safely

.3 Check and confirm the safe evacuation of all workers.

.4 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.

.5 Notify Engineer and staff.

.3 Provide written rescue/evacuation procedures as required for, but not limited to:

.1 Work at high angles.

.2 Work in confined spaces or where there is a risk of entrapment.

.3 Work with hazardous substances.

.4 Underground work.

.5 Work on, over, under and adjacent to water.

.6 Workplaces where there are persons who require physical assistance to be moved.

.4 Design and mark emergency exit routes to provide quick and unimpeded exit.

.5 At least once each year, emergency drills must be held to ensure awareness and effectiveness of emergency exit routes and procedures, and a record of the drills must be kept.

.6 Revise and update emergency procedures as required, and re-submit to the Engineer.

1.12 MEETINGS

.1 Contractor to hold health and safety meetings related to execution of the work.

1.13 HEALTH AND SAFETY OFFICER

.1 The Health and Safety Officer must:

.1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.

.2 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.

.3 Be on site during execution of work.

1.14 HAZARDOUS PRODUCTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Engineer and in accordance with the Canada Labour Code.

.2 Where use of hazardous and toxic products cannot be avoided:

.1 Obtain appropriate permission beforehand of the product(s) intended for use.

.2 Submit applicable MSDS and WHMIS documents as per Section 01 33 00.

.3 Provide adequate means of ventilation in accordance with WCB of British Columbia.

1.15 REMOVAL OF LEAD-CONTAINING PAINTS

.1 All paints containing TCLP lead concentrations above 5 ppm are classified as hazardous.

1.16 ELECTRICAL SAFETY REQUIREMENTS

.1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.

.2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

1.17 ELECTRICAL LOCK-OUT

.1 Develop, implement and enforce use of established procedures to provide electrical lock-out and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

.2 Prepare the lock-out procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have the procedures available for review upon request by the Owner.

.3 Keep the documents and lock-out tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Owner or by any authorized safety representative.

1.18 OVERLOADING

.1 Ensure no part of work is subjected to a load, which will endanger its safety or will cause permanent deformation.

1.19 FALSEWORK

.1 Design and construct falsework in accordance with CSA S269.1.

1.20 SCAFFOLDING

.1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CAN/CSA-S269.2.

1.21 CONFINED SPACES

.1 Carry out work in confined spaces in compliance with provincial regulations.

1.22 BLASTING

.1 Not Required.

1.23 POWDER-ACTUATED DEVICES

.1 Use powder-actuated devices in accordance with ANSI A10.3 only after receipt of written permission from the Engineer.

1.24 FIRE SAFETY REQUIREMENTS

.1 Store oily/paint-soaked 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.

1.25 FIRE PROTECTION AND ALARM SYSTEMS

.1 Fire protection and alarm systems shall not be:

.1 Obstructed.

.2 Shut off.

.3 Left Inactive at the end of a working day or shift.

.2 Do not use fire hydrants, standpipes, and hose systems for purposes other than firefighting.

.3 Be responsible/liable for costs incurred from the fire department and the building owner and tenants, resulting from false alarms.

1.26 POSTED DOCUMENTS

.1 Post legible versions of the following documents on site:

.1 Health and Safety Plan.

.2 Sequence of work.

.3 Emergency procedures.

.4 Drawing showing project layout, locations of the first aid station, evacuation route and marshalling station, and the emergency transportation provisions.

.5 Floor plans

.6 Notice as to where a copy of the workers' Compensations Act and Regulations are available on the work site for review by employees and workers.

.7 Workplace Hazardous Materials Information System (WHMIS) documents.

.8 Material Safety Data Sheets (MSDS).

.9 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable.

.2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.

1.27 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues as directed by the appropriate regulators.

.2 Record action taken to correct non-compliance with health and safety issues identified by the appropriate regulators.

END OF SECTION

Part 1 GENERAL

1.1 INSPECTION

.1 Allow Departmental Representative or Consultant Engineer access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative or Consultant Engineer instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.2 ACCESS TO WORK

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

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

1.3 PROCEDURES

.1 Notify Departmental Representative or Consultant Engineer 5 days in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

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

1.4 REJECTED WORK

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

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

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

END OF SECTION

Part 1 GENERAL

1.1 REFERENCE STANDARDS

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC-2 (2008), Stipulated Price Contract.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.3 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121-M1978(R2003), Douglas Fir Plywood.

.3 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.

.4 CAN/CSA-Z321-[96(R2001)], Signs and Symbols for the Occupational Environment.

.4 Public Works Government Services Canada (PSPC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions 'C', In Effect as of: May 14, 2004.

.5 U.S. Environmental Protection Agency (EPA) / Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Provide construction facilities in order to execute work expeditiously.

.5 Remove from site all such work after use.

1.3 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

1.4 HOISTING

.1 Provide, operate and maintain hoists [cranes]required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.

.2 Hoists [cranes]to be operated by qualified operator.

1.5 SITE STORAGE/LOADING

.1 Refer to CCDC-2, GC 3.12.

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

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

1.6 CONSTRUCTION PARKING

.1 Parking will not be permitted on site. Arrangements as follows:

.1 Parking available for the Contractor; sub contractors will require a visitor pass.

.2 Parking area near loading bay and large generator.

.2 Provide and maintain adequate access to project site.

.3 Clean runways and taxi areas where used by Contractor's equipment.

1.7 OFFICES

.1 Contractor to provide temporary office facilities on premises, location as directed by the Departmental Representative.

.2 Subcontractors to provide their own offices as necessary, location as per Departmental Representative.

.3 Provide marked and fully stocked first-aid case in a readily available location.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.9 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.10 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by the Departmental Representative.

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs

.4 Protect travelling public from damage to person and property.

.5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.7 Construct access and haul roads necessary.

.8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.10 Dust control: adequate to ensure safe operation at all times.

.11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

.12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

.13 Provide snow removal during period of Work.

.14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.11 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

Part 2 PRODUCTS

2.1 NOT USED

.1 Not Used.

Part 3 EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

.1 Within text of each specifications section, reference may be made to reference standards. List of standards reference writing organizations is contained in each section.

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

.3 If there is question as to whether products or systems are in conformance with applicable standards, the Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 Cost for such testing will be born by the Departmental Representative in event of conformance with Contract Documents or by the Contractor in event of non-conformance.

1.2 WARRANTY

.1 Where the contractor supplies equipment purchased from a contractor manufacturer, the Contractor shall obtain from the Manufacturer the normal warranty period and such warranty shall be made out to Her Majesty the Queen in right of Canada.

1.3 QUALITY

.1 Products, materials, equipment, and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.

.2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

.3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.4 Should disputes arise as to quality or fitness of products, decision rests strictly with [Departmental Representative] based upon requirements of Contract Documents.

.5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 AVAILABILITY

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

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

1.5 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration, and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

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

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of the Departmental Representative.

.9 Touch-up damaged factory finished surfaces to the Departmental Representative's. Use touch-up materials to match original. Do not paint over name plates.

1.6 TRANSPORTATION

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

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

1.7 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 the Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that the Departmental Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.8 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. The Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.9 CO-ORDINATION

.1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

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

1.10 CONCEALMENT

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

.2 Before installation inform the Departmental Representative if there is interference. Install as directed by the Departmental Representative.

1.11 REMEDIAL WORK

.1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.

.2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.12 LOCATION OF FIXTURES

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

.2 Inform the Departmental Representative of conflicting installation. Install as directed.

1.13 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.14 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.15 PROTECTION OF WORK IN PROGRESS

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

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 minimum of disturbance to the Work.

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

END OF SECTION

Part 1 GENERAL

1.1 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify the Departmental Representative of findings.

.2 Perform Ground Penetrating Radar scans of all areas to be excavated and/or where equipment is to be installed outdoors prior to commencing Work.

1.2 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures, and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform the Departmental Representative of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by the Departmental Representative.

1.3 RECORDS

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

.2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles, and elevations of Work.

.3 Record locations of maintained, re-routed, and abandoned service lines.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit name and address of Contractor performing Ground Penetrating Radar scans to the Departmental Representative.

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

1.5 SUBSURFACE CONDITIONS

.1 Promptly notify Departmental Representative and Consultants in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Consultant determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

END OF SECTION

Part 1 GENERAL

1.1 PROJECT CLEANLINESS

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

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Departmental Representative. Do not burn waste materials on site, unless approved by the Departmental Representative.

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

.4 Dispose of waste materials and debris off site.

.5 Store volatile waste in covered metal containers and remove from premises at end of each working day.

.6 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.7 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.2 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris including that caused by Owner or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.

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

.7 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, floors.

.8 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

END OF SECTION

Part 1 GENERAL

1.1 WASTE MANAGEMENT GOALS

.1 Prior to start of Work conduct meeting with the Departmental Representative to review and discuss waste management goals and Contractor's Waste Reduction Workplan.

.2 Waste Management Goal is to divert all materials considered recyclable from landfill sites.

.3 Target percentage goals are achievable for waste diversion. Contractor to review and confirm the Departmental Representative's Waste Audit acceptable values.

.4 Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse, and recycling of solid waste.

.5 Protect environment and prevent environmental pollution damage.

1.2 DISPOSAL OF WASTES

.1 Debris and waste will be managed and disposed of in a proper manner as approved by the Departmental Representative. Permits for waste handling and disposal will be obtained by the Contractor. Do not bury rubbish or waste materials.

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

.3 Keep records of construction waste including:

.1 Number and size of bins.

.2 Waste type of each bin.

.3 Total tonnage generated.

.4 Reused or recycled waste destination.

.4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in the waste audit.

1.3 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 EXECUTION

2.1 APPLICATION

.1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

2.2 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

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

END OF SECTION

Part 1 GENERAL

1.1 INSPECTION AND DECLARATION

.1 Contractor's Inspection: Contractor conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify the Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.

.2 Request the Departmental Representative Inspection.

.2 Departmental Representative Inspection: the Departmental Representative, Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.

.3 Completion: submit written certificate that following have been performed:

.1 Work has been completed and inspected for compliance with Contract Documents.

.2 Defects have been corrected and deficiencies have been completed.

.3 Equipment and systems have been tested, adjusted and are fully operational.

.4 Operation of systems have been demonstrated to Owner's personnel.

.5 Work is complete and ready for final inspection.

.4 Final Inspection: when items noted above are completed, request final inspection of Work by the Departmental Representative and Engineer Consultant. If Work is deemed incomplete by the Departmental Representative and Engineer Consultant, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Owner and the Departmental Representative and Engineer consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be dated for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment: when the Owner and the Departmental Representative consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. If Work is deemed incomplete by the Owner, the Departmental Representative, and the Consultant, complete outstanding items and request re-inspection.

.8 Payment of Holdback: after issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount

1.2 CLEANING

.1 In accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 77 00 Closeout Procedures

1.2 REFERENCES

.1 Canadian Environmental Protection Act (CEPA)

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-warranty Meeting:

.1 Convene meeting one week prior to contract completion with the Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify Project requirements.

.2 Review warranty requirements.

.2 The Departmental Representative to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative 2 final copies of operating and maintenance manuals.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

1.5 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings.

.1 Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by Section numbers and sequence of Table of Contents.

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

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab.

.1 Bind in with text; fold larger drawings to size of text pages.

.9 Provide scaled CAD files in dwg format.

1.6 CONTENTS - PROJECT RECORD DOCUMENTS

.1 Table of Contents for Each Volume: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

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

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data.

.1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.7 AS -BUILT DOCUMENTS AND SAMPLES

.1 Maintain, [in addition to requirements in General Conditions, at site for the Departmental Representative one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Maintain record documents in clean, dry and legible condition.

.1 Do not use record documents for construction purposes.

.3 Keep record documents and samples available for inspection by the Departmental Representative.

1.8 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

.1 Record information on set of drawings.

.2 Use felt tip marking pens.

.3 Record information concurrently with construction progress.

.1 Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

.7 Provide digital photos, if requested, for site records.

1.9 EQUIPMENT AND SYSTEMS

.1 For each item of equipment and each system include description of unit or system, and component parts.

.1 Give function, normal operation characteristics and limiting conditions.

.2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.

.1 Include regulation, control, stopping, shut-down, and emergency instructions.

.2 Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Include manufacturer's printed operation and maintenance instructions.

.7 Include sequence of operation by controls manufacturer.

.8 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.9 Provide installed control diagrams by controls manufacturer.

.10 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.

.11 Additional requirements: as specified in individual specification sections.

1.10 MATERIALS AND FINISHES

.1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.

.2 Additional requirements: as specified in individual specifications sections.

1.11 MAINTENANCE MATERIALS

.1 Spare Parts:

.1 Provide spare parts, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Departmental Representative.

.2 Include approved listings in Maintenance Manual.

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

.2 Extra Stock Materials:

.1 Provide maintenance and extra materials, in quantities specified in individual specification sections.

.2 Provide items of same manufacture and quality as items in Work.

.3 Deliver to site location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to the Departmental Representative.

.2 Include approved listings in Maintenance Manual.

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

.3 Special Tools:

.1 Provide special tools, in quantities specified in individual specification section.

.2 Provide items with tags identifying their associated function and equipment.

.3 Deliver to location as directed; place and store.

.4 Receive and catalogue items.

.1 Submit inventory listing to Departmental Representative.

.2 Include approved listings in Maintenance Manual.

1.12 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

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

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and for review by the Departmental Representative.

1.13 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Warranty management plan to include required actions and documents to assure that the Departmental Representative receives warranties to which it is entitled.

.3 Submit, warranty information made available during construction phase, to the Departmental Representative.

.4 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, commissioned systems, fire protection, alarm systems, sprinkler systems, lightning protection systems.

.3 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.4 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.5 Respond in timely manner to oral or written notification of required construction warranty repair work.

.6 Written verification to follow oral instructions.

.1 Failure to respond will be cause for the Departmental Representative to proceed with action against the Contractor.

END OF SECTION

PART 1 GENERAL

1.1 RELATED WORK

.1	Section 01 74 19	Construction Waste Management and Disposal
.2	Section 06 10 00	Rough Carpentry

1.2 PROTECTION

.1 Take precautions during demolition to support parts of building elements not being demolished, and if safety of same appears to be endangered, cease operations, and notify Consultant.

.2 Prevent debris from blocking drainage which must remain in operation.

.3 Take precaution during demolition to protect all adjacent finished surfaces. Make good any damage to adjacent surfaces.

.4 Make good any damages due to demolition. Where exterior envelope elements are removed, provide temporary secure and weathertight closures.

.5 Fire burning and selling of waste of materials is not permitted on site.

.6 Do not bury waste or materials on site.

.7 Do not dispose of waste or volatile materials such as: mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into storm or sanitary sewers. Ensure proper disposal procedures are maintained throughout project.

1.3 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 33 – Health and Safety Requirements and the Workers' Compensation Board of BC latest regulations.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste management materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal and the Waste Reduction Workplan, and the Waste Management Plan to the maximum extent economically possible.

PART 2 LOCATIONS

2.1

.1 Site demolition: existing roof areas as shown on drawings.

.2 Elements for removal and re-use are noted on the drawings.

PART 3 EXECUTION

3.1 WORK

.1 Dispose of demolished materials off site except where noted otherwise. Refer to Section 01 74 19.

.2 Carefully remove all noted material in areas of roof remediation. Qualified tradesmen shall be used for the removal of all material scheduled for re-use. Contractor shall be responsible for making good, to the satisfaction of the Consultant, all damage to materials and equipment to be reinstalled.

.3 Site-examine and record locations, conditions, etc., of all elements which must be removed then re-installed and made good after re-installation work.

.4 Where existing piping, conduits, wall assemblies, wiring, applied items and other elements are removed, patch and make good affected surfaces which are to remain. Patching and remedial materials shall match adjacent existing unless otherwise noted.

.5 Protect all existing elements and finishes not scheduled for replacement and store where directed as required. Make good where damaged.

.6 Layout and execute all cutting and demolition such as to cause the least amount of disruption to remaining existing finishes, materials, elements and equipment.

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

.1 Exterior Condensing Unit (Unistrut).

1.2 REFERENCES

.1 ASTM International

.1 ASTM A 53/A 53M-20, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A 269 08, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc- Coated Welded and Seamless. REPLACE WITH BELOW:

ASTM A269 / A269M Standard Specification for seamless and welded austentic stainless steel tubing for general service.

.3 ASTM A 307-14e1, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60,000 PSI Tensile Strength.

.4 ASTM B 209, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

.5 ASTM B 221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.

.2 CSA International

.1 CSA G40.20-13/G40.21-13 (R2018), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CAN/CSA G164-18, Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA S16:19, Design of Steel Structures.

.4 CSA W48-18, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).

.5 CSA W59-18, Welded Steel Construction (Metal Arc Welding) [Metric].

.1 GS-11-2008, 2nd Edition], Paints and Coatings.

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 The Master Painters Institute (MPI)

.1 Architectural Painting Specification Manual - current edition.

.5 Green Seal Environmental Standard GS 03 (anti-corrosive primer).

1.3 SUBMITTALS

.1 Submit in accordance with Division 1.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for sections, plates, pipe, tubing, bolts and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS in accordance with Division 1.

.1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia. Submit Letter of Assurance Schedule B1, B2 and C-B.

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

1.4 QUALITY ASSURANCE

.1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE & HANDLING

.1 Deliver, store and handle materials in accordance with Division 1 and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Division 1.

.5 Packaging Waste Management: remove for reuse of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Division 1.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Steel sections and plates: to CSA G40.20-13/G40.21-13, Grade 350W.

.2 Welding materials: to CSA W59-18.

.3 Welding electrodes: to CSA W48-18 Series.

.4 Bolts and anchor bolts: to ASTM A 307-14e1.

.5 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

.6 Aluminum: to ASTM B209, clear anodized finish.

.7 Grout: non-shrink, non-metallic flowable, 15MPC at 24 hours.

.8 Security fasteners: screws and bolts with spanner type heads to prevent removal except with special tools; non-corrosive type.

.9 Shop coat primer: to CAN/CGSB-1.40M.

.10 Galvanize touch-up primer: zinc rich, read mix to CGSB-1-GP-181M.

.11 Pedestal roof Anchors: Stainless steel rotatable head weld-in place roof anchors, to suit BC Work Safe regulations. An example of an acceptable product is Type C from Atlas Anchor Systems.

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 610 g/m² to CAN/CSA-G164-18.

.2 Shop coat primer: CGSB 1GP 40M in accordance with chemical component limits and restrictions requirements and VOC limits of GC-03. Prepare surface to an abrasive blast specification SSPC-SP10.

.3 Zinc primer: To CGSB-1.212-2004, CISC/CPMA 1-73A, CISC/CPMA 2-75 in accordance with chemical component limits and restrictions requirements and VOC limits of GC-03. Prepare surface to an abrasive blast SSPC-SP10.

2.4 ISOLATION COATING

.1 Isolate 2 different metals 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 Primer: VOC limit 250 g/L maximum to GC-03.

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

.3 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 degrees C.

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

PART 3 EXECUTION

3.1 EXAMINATION

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

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

.4 Contractor shall verify field measurements are as shown on shop drawings prior to fabrication.

3.2 ERECTION

.1 Do welding work in accordance with CSA W59-18 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 Departmental Representative 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 Supply components for work by other trades in accordance with shop drawings and schedule.

.6 Weld field connection.

.7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.

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

.9 Primer: maximum VOC limit 250 g/L to GC-03.

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

.11 Primer: maximum VOC limit 250 g/L to GC-03.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Division 1.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Division 1.

.3 Waste Management: separate waste materials for recycling in accordance with Division 1.

3.4 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCE STANDARDS

.1 American National Standards Institute/National Particleboard Association (ANSI/NPA) (latest edition)

- .1 ANSI/NPA A208.1 Particleboard.

.2 ASTM International, (latest edition)

- .1 ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .3 ASTM A307 Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength.
- .4 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .5 ASTM D 5055, Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists.
- .6 ASTM D 5456, Standard Specification for Evaluation of Structural Composite Lumber Products.
- .7 ASTM F1667 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.

.3 Canadian General Standards Board (CGSB), (latest edition)

- .1 CAN/CGSB-11.3-M87, Hardboard.
- .2 CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.

.4 Canadian Wood Council, (latest edition)

- .1 Wood Design Manual
- .2 Engineering Guide for Wood Frame Construction

.5 CSA International, (latest edition)

- .1 CAN/CSA-A123.2, Asphalt Coated Roofing Sheets.
- .2 CSA B111, Wire Nails, Spikes and Staples.
- .3 CSA O86 Engineered Design in Wood
- .4 CSA O112.9, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
- .5 CSA O121, Douglas Fir Plywood.
- .6 CSA O141-05(R2014), Softwood Lumber.
- .7 CSA O151, Canadian Softwood Plywood.
- .8 CSA O153, Poplar Plywood.
- .9 CSA O325, Construction Sheathing.
- .10 CAN/CSA-S406, Construction of Preserved Wood Foundations.

.11 CAN/CSA-Z809, Sustainable Forest Management.

.6 Forest Stewardship Council (FSC), (latest edition)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.7 National Lumber Grades Authority (NLGA), (latest edition)

.1 Standard Grading Rules for Canadian Lumber.

.8 National Research Council Canada (NRC)

.1 National Building Code of Canada 2015 (NBC).

.9 South Coast Air Quality Management District (SCAQMD), California State (SCAQMD)

.1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

.10 Underwriters' Laboratories of Canada (ULC), (latest edition)

.1 CAN/ULC-S706, Standard for Wood Fibre Insulating Boards for Buildings.

1.2 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store materials off ground with moisture barrier at both ground level and as a cover forming a well-ventilated enclosure, with drainage to prevent standing water.

.3 Stack, lift, brace, cut and notch engineered lumber products in strict accordance with manufacturer’s instructions and recommendations.

.4 Store and protect architecturally exposed lumber from nicks, scratches, and blemishes.

.5 Replace defective or damaged materials with new.

.6 Store separated reusable wood waste convenient to cutting station and work areas.

Part 2 PRODUCTS

2.1 SUSTAINABILITY CHARACTERISTICS

.1 Provide wood framing products as specified and with the following sustainability characteristics.

.2 Lumber, Finger Jointed Lumber , I-Joists , structural composite lumber (SCL) , : to be CAN/CSA-Z809 or FSC or SFI certified.

.3 Plywood: urea-formaldehyde free and certified to, CAN/CSA-Z809 or FSC or SFI.

.4 Adhesives: limit 120 g/L maximum to GS-36.

.5 Provide engineered wood products certified as meeting requirements of respective ANSI standard for formaldehyde emissions and low VOC emissions when tested in accordance with ASTM D6330.

2.2 FURRING AND BLOCKING

.1 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 Where indicated, provide pressure treated materials for furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers in accordance with Section 06 05 73.

2.3 PANEL MATERIALS AND APPLICATION

.1 Roof sheathing:

.1 Plywood, as shown in drawings.

.2 Exterior wall sheathing:

.1 Plywood, as shown in drawings

.3 Where indicated, provide pressure treated panel materials.

2.4 TREATED WOOD

.1 Lumber and panel materials as shown on drawing S002 to: CAN/CSA-S406.

.1 Preservative treatment in accordance with Section 06 05 00- Wood Treatment.

.2 Unless noted otherwise on drawings, fasteners and connectors, moisture barrier, sealant and field applied preservative: to CAN/CSA-S406 and in accordance with Section 06 05 00- Wood Treatment.

2.5 ACCESSORIES

.1 Subflooring adhesive: to CAN/CGSB-71.26, cartridge loaded.

.2 General purpose adhesive: to CSA O112.9.

.3 Nails, spikes and staples: to ASTM F1667.

.4 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.

.5 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.

.6 Joist hangers, connectors and fasteners: in accordance with accepted shop drawings, minimum 1 mm thick sheet steel, galvanized to minimum ZF001 coating designation.

.7 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, fibre, formed to prevent dishing. Bell or cup shapes not acceptable.

.8 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, extruded 6063-T6 aluminum alloy type approved by Departmental Representative.

.9 Fastener Finishes:

.1 Galvanizing: to ASTM A653 G60, use galvanized fasteners for exterior and basement location and where in contacted with preservative treated lumber.

.10 Sill Plate Gasket: Closed cell polyethylene foam gasket in width to match sill plate width, 6 mm thick.

Part 3 EXECUTION

3.1 EXAMINATION

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

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 SYSTEMS INTEGRATION

.1 Install air barrier and vapour retarder sheeting around framing members to ensure continuity of protection and to lap and seal to main sheets.

.2 Install insulation in exterior wall framing cavities that will not be accessible after completion of framing.

.3 Install sill plate gasket in continuous lengths between concrete surfaces and wood framing.

3.3 FURRING AND BLOCKING

.1 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.

.2 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.

.3 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.4 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using steel fasteners.

.5 Install sleepers as indicated.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Div 1- Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Div 1- Cleaning.

3.5 WASTE MANAGEMENT

.1 Separate waste materials for recycling in accordance with Div 1-Waste Management and Disposal.

.2 Re-use scrap lumber to the greatest extent possible. Separate scrap lumber for use on site as accessory components, including shims, bracing, and blocking.

.3 Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill. Prevent saw dust and wood shavings from entering the storm drainage system.

.4 Do not burn scrap lumber that has been pressure treated.

.5 Do not send lumber treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

3.6 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by rough carpentry installation.

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

.1 Rigid thermal insulation.

1.2 RELATED WORK

.1	Section 07 21 29	Sprayed Thermal Insulation
.2	Section 07 27 13	Self Adhered Membrane

1.3 SUBMITTALS

.1 All submittals shall be in accordance with Division 1.

.2 Samples: Submit representative samples of each specified insulation material, insulation clips, adhesives, fasteners, tapes and other material for review.

.3 Manufacturer's Product Data:

.1 Submit manufacturer's product data sheets for products proposed for use in the work of this section.

.2 Submit data and installation instructions for materials and prefabricated devices, providing descriptions sufficient for identification at the site.

.3 Submit data from manufacturer's or independent laboratory indicating compatibility and adhesive results of proposed materials.

1.4 REFERENCE STANDARDS

.1 Model National Energy Code for Buildings (NECB).

.1 Wall and grade slab assemblies to NECB 2015.

PART 2 PRODUCTS

2.1 THERMAL BATT INSULATION FOR WOOD STUDS AND FRAMING

.1 Friction-fit mineral wool fibre blankets, made from basalt rock and slag, thickness as noted on drawings, width-sized to fit wood studs and framing at 400mm O.C. (or as otherwise indicated) and possessing the following characteristics:

.1	CAN/ULC-S702-14	Thermal Insulation Mineral Fibre for Buildings	Type 1, Complies
.2	CAN4-S114:2018	Determination of Non-Combustibility	Non-Combustible
.3	CAN/ULC S102:2018	Surface Burning Characteristics	Flame Spread = 0 Smoke Developed = 0
.4	CCM Evaluation Listing	MasterFormat 07210: Mineral Fibre Batt Insulation	12018-L

.5 Density (32 kg/m^3) meets NBC/ULC Standards of CAN/ULC-S702-97
4.8 kg/m^2 @ 150mm
2.8 kg/m^2 @ 89mm
2.0 kg/m^2 @ 65mm

.2 Thermal resistance rating: as indicated on drawings.

2.2 RIGID THERMAL INSULATION

.1 Extruded polystyrene insulation panels, purpose made for scheduled use including below floor panels and roof panel insulation, conforming to CAN/ULC-S701 Type 4, ship lapped edges, and meeting the values of the following table of properties:

Property and Test Method	Value
Thermal Resistance per 25 mm ASTM C518 @ 24°C mean Temp., m^2•°C/W min., R-value (RSI)	5.0 (.87)
Compressive Strength(1), ASTM D1621, kPa, min.	210
Water Absorption, ASTM D2842, % by volume, max.	<0.7
Water Vapour Permeance, ASTM E96, perm (ng/Pa•s•m^2)	0.9 (50)
Maximum Use Temperature °C	74
Coefficient of Linear Thermal Expansion, ASTM D696, mm/m•°C	6.3 x 10^{-2}

PART 3 EXECUTION

3.1 RIGID INSULATION

.1 Shop-install rigid insulation

.2 Coordinate rigid roof insulation

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 All materials, labour, equipment and services required for the manufacture and installation of spray-applied polyurethane combination thermal insulation/air barrier system to building envelope elements where indicated, detailed and required.

1.2 RELATED SECTIONS

.1	Section 07 21 00	Building Insulation
.2	Section 07 27 13	Self-Adhered Membranes

1.3 REFERENCES

.1 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC) (latest editions)

.1 CAN-ULC-S705.1-98: Standard regarding rigid polyurethane foam spray thermal insulation, intermediate density – materials specifications.

.2 CAN-ULC-S705.2-98: Standard regarding rigid polyurethane foam spray thermal insulation, intermediate density – installer responsibilities.

.3 Publications of the Canadian Urethane Foam Contractor Association (CUFCA).

.4 National Building Code of Canada (NBCC), 2015.

.5 Model National Energy Code for Buildings (NECB)

.1 Wall and grade slab assemblies to NECB 2015.

1.4 SUBMITTALS

.1 Submit in compliance with Division 1, the results of all tests conducted in order to verify if the quality of the insulation material is equal or superior to the requirements outlined in this section.

.2 Submit the results of all CCMC air barrier systems tests approved according to the CCMC's Technical Manual #07272 conducted in order to prove that the air barrier system meets National Building Code (2015) requirements.

.3 Product Data Sheets:

.1 Submit manufacturer's Product data sheets for Products proposed for use in the work of this section.

1.5 MOCK-UPS

.1 Create samples that are in compliance with Division 1.

.2 Create a sample of 5 m^2 minimum, showing both inner and outer corners. This sample may be part of the completed structure.

.3 Using the polyurethane foam insulation sample that was sprayed in place, the following trials must be conducted on site, as required by the Canadian Urethane Foam Contractor Association (CUFCA):

.1 Verify core density.

.2 Verify adhesion between any transition membranes and the substrate.

.3 Verify cohesion/adhesion between the insulation material and the substrate.

.4 Ensure results are in compliance and enter them in the CUFCA daily report.

1.6 PROTECTIVE MEASURES

.1 Ensure the work area is adequately ventilated, in compliance with requirements set out in Division 1 as well as WCB and WHMIS regulations.

.2 Ensure continuous ventilation of the work area, through a fresh air intake and the extraction of foul air, during the course of the application process and for 24 hours thereafter.

.3 Install temporary partitions in order to prevent any effect on the ambient air – outside of the work area – from the sprayed on insulation material.

.4 Ensure all structures are well protected, in accordance with the manufacturer's recommendations.

.5 Protect all adjacent surfaces and equipment against any damage that may be caused by dispersion and overspray of insulation material beyond prescribed limits.

.6 All remaining foam particles must be flushed out of the spray gun on a daily basis. This procedure must be performed in areas designated for this purpose, and the contents of the empty containers neutralized accordingly to the procedure established by the CUFCA and other authorities having jurisdiction.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Ensure that application equipment and packaged material can be accommodated by helicopter if site applied.

.2 All materials shall be delivered and stored in their original packaging bearing the manufacturer's name, quantity, CCMC numbers, and other appropriate technical indicators or references. The expiry date must also appear on the containers.

.3 Store materials above ground, in a dry location, protected from weather, moisture and areas of high humidity. Damaged packages found unsuitable for use will be rejected and removed from the project.

1.8 QUALITY ASSURANCE

.1 The insulating material shall be applied by company and personnel who are certified by the material manufacturer and CUFCA or the National Energy Conservation Association (NECA). These certified individuals must have their certification cards in their possession and available for presentation upon request.

.2 Copies of the material manufacturer's and CUFCA installation manuals for the application of sprayed on polyurethane foam shall be kept on site.

.3 Tests shall be conducted daily on both core density and cohesion/adhesion to the substrate, following procedures established by CIFCA/NECA. The results of these tests shall be entered in the daily report forms provided by CUFCA/NECA.

.4 Adhesion tests shall be conducted on all corners, as well as the wall/slab intersections. Do one test on every wall that is less than 30 meters in length.

.5 Verify the adhesion of any transition self-adhesive membranes at the perimeters of all openings.

.6 Access to the jobsite by any material manufacturer's or CUFCA/NECA representative shall be permitted for the purposes of technical assistance or verifying operator certification or the quality of the polyurethane foam application.

1.9 ENVIRONMENTAL CONDITIONS

.1 Only spray the insulating material if the surface and ambient air temperatures are within the manufacturer's prescribed limits. i.e., -10°C to +40°C.

.2 Surfaces to be covered with polyurethane foam must be clean and dry, as required by CAN/ULC-S705.2:2020. Since adhesion of the polyurethane foam is of the utmost importance, the substrate must be free of all frost, dust, oil, grease, oxidization, or any other element that may affect this property, nor should it present a high moisture content.

.3 Metallic surfaces shall be checked to ensure no oxidization has occurred. Use of a primer is strongly recommended. Refer to the CUFCA manual.

1.10 PERFORMANCE REQUIREMENTS

.1 Long Term Thermal Resistance LTTR: Tested by an independent laboratory in accordance with CAN/ULC S770-15 and achieving the following minimum values at a minimum core density of 28.34 kg/m^3 (1.77 lb/ft^3):

.1 RSI 0.91 per 25 mm @ 50 mm.

.2 RSI 0.95 per 25 mm @ 75 mm.

.3 RSI 0.98 per 25 mm @ 100 mm.

.2 Aged R-values based on test methods other than LTTR or at densities lower than specified will not be accepted.

.3 LTTR-values shall be based on density not less than minimum insitu density.

.4 Core density shall be confirmed by field testing.

1.11 COORDINATION

.1 Coordinate the work of this section with all interfacing sections, especially Section 07 27 13.

.2 Coordinate with related work to allow for installation of required materials prior to spray insulation. Perform sprayed foam installation to ensure an un-interrupted and complete thermal and air barrier installation.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Insulation: a spray polyurethane foam listed under CAN.ULC-S705.1:2015, with CCMC #12840-R for insulation and CCMC #1232-R for the air barrier system, according to CCMC technical manual #07272, with the following physical properties:

- .1 Density (ASTM D-1622) = 30.4 kg/m³, minimum Thermal resistance approved by the standard.
- .2 Dimensional stability (ASTM D-2126), % volume change after 28 days: -0.047% at -20°C, 8.45% at +100°C, 7.64% at +70°C with relative humidity >90±3%.
- .3 Flame spread classification (CAN.ULC-S102, including S127) = 375.
- .4 Compressive strength (ASTM D-1621), 10% parallel to rise = 222 kPa.
- .5 Tensile strength (ASTM D-1623) = 337 kPa.
- .6 Open cell content = <1%.
- .7 Water absorption (ASTM D-2842) by volume = 2.5%.
- .8 Water vapour permeance (ASTM E-96) = 125 ng/Pa.s.m².
- .9 VOC during curing: Below detectable limit after 24 hours or during curing.

.2 Primers: as recommended in the CIFCA/NECA Technical Manual, considering the type and condition of work surfaces.

2.2 COMPATIBILITY

.1 Ensure that materials used are compatible with all interfacing materials. Obtain confirmation from sprayed foam insulation manufacturer.

.2 Provide written proof of compatibility.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Follow the manufacturer's written instructions when spraying the polyurethane foam. Refer to manufacturer's technical product documentation, application guide section.

.2 The manufacturer's recommendations shall be followed with regard to outside air temperature and substrate conditions (refer to manufacturer's data).

.3 Spraying shall be done using a positive displacement pump with preset ratios specially designed for use with rigid polyurethane foam. Follow the directions for use and the cleaning and maintenance procedures set out in the equipment manufacturer's manual.

3.2 EXAMINATION

.1 Verify existing conditions before commencing work.

.2 Verify that substrate is free of any foreign material that will impede application.

.3 Verify that other work on and within spaces to be insulated is complete prior to application.

.4 Notify Departmental Representative of conditions that would adversely affect the application.

.5 Commencement of installation implies applicator accepts existing conditions.

3.3 PREPARATION

.1 Comply with manufacturer's written installation instructions for preparing substrates indicated to receive sprayed insulation.

.2 Mask and protect adjacent surfaces from overspray or damage.

.3 Remove foreign materials, dirt, grease, oil, paint, laitance, efflorescence, and other substances that will affect application.

3.4 APPLICATION

.1 Shop-apply insulation to building envelope elements where indicated on drawings and reasonably required.

.2 Spray the foam in consecutive layers of no less than 12.5 mm and no more than 50 mm thick each, for a total thickness as indicated on drawings.

.3 Cover all excessively wide joints prior to application of polyurethane foam insulation.

.4 Spray apply polyurethane foam with a tolerance of +6/-0 mm in relation to the specified thickness.

.5 When spraying polyurethane foam, avoid the formation of sub-layer air pockets.

.6 Avoid spraying the foam on any surfaces other than those indicated. Use drop sheets or masking tape to protect other surfaces.

.7 Once the foam has hardened, remove all overspray from non-prescribed surfaces while at the same time taking care not to damage them.

.8 Do not allow polyurethane foam, once applied, to be damaged during work by other trades, unless prior agreement has been reached.

.9 Ensure the subsequent coverage of the applied insulating foam will be completed within the manufacturer's prescribed time frame. Refer to manufacturer's technical product documentation.

.10 Spray apply the polyurethane foam in overlapping layers, so as to obtain a smooth, uniform surfaces.

.11 In cold weather when applying on a flat surface of more than 15 lineal meters in either direction, apply the first layer in 3-meter strips at 1 meter intervals. After the curing period (±4 hours) has elapsed, spray the polyurethane foam on the unfilled spaces.

.12 Do not spray polyurethane foam any closer than 75 mm from chimneys, heating vents, steam pipes, recessed lighting fixtures, and other heat sources. Do not spray the insides of any exit openings or electrical junction boxes (refer to the CUFCA/NECA manual).

.13 Cover all mechanical fixtures and electrical boxes with polyurethane foam in order to reduce thermal bridging.

.14 Completely fill voids between metal stud flanges and exterior concrete walls with sprayed thermal insulation.

.15 Leave sprayed thermal insulation ready for covering with drywall at walls and sprayed fire resistive crust at soffits.

3.5 FIELD QUALITY CONTROL

.1 Inspect application for insulation thickness and density. Rectify deficiencies.

3.6 PROTECTION AND CLEANING

.1 Do not permit subsequent work to disturb applied insulation.

.2 As work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from this work.

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

.1 Proprietary plastic moisture barrier system below concrete slab on grade.

.2 Bentonite sub-grade geotextile waterproofing system.

1.2 RELATED WORK

.1	Section 07 21 00	Building Insulation
.2	Section 07 27 13	Self-Adhered Membranes

1.3 SUBMITTALS

.1 All submittals shall be in accordance with Division 1;

.2 Product Data Sheets:

.1 Submit manufacturer's product data sheets for products proposed for use in the work of this section.

.3 Samples:

.1 Submit sample of proposed products for review by Departmental Representative.

PART 2 PRODUCTS

2.1 MOISTURE BARRIER MEMBRANE - ROOF

.1 Membrane Material:

.1 Permeance, as tested after conditioning: 0.6 ng (Pa*s *m^2)(0.01 perms (gm/ft^2/in-Hg)) to ASTM E1745-09 paragraphs 7.1.2 through 7.1.5.

.2 Strength: Class A to ASTM E1745-09.

.3 Thickness of plastic:

1. For Roof, 0.152 mm (6 mils) minimum,

.4 Moisture barrier membrane joint tape:

.1 Description: High density polyethylene tape, pressure sensitive, 100 mm wide, product as per vapour barrier membrane manufacturer's installation instructions.

.5 Penetration flashing:

.1 Vapour barrier membrane material and vapour barrier joint tape in accordance with manufacturer's instructions.

.6 Acceptable Products:

.1 "SOPRAVAP'R", by Soprema.

.2 Or approved equal.

PART 3 EXECUTION

3.1 ROOF VAPOUR BARRIER INSTALLATION

.1 Install polyethylene on warm side of insulation as indicated and tight to insulation.

.2 Side laps must be a minimum of 75 mm (3 in) and end laps must be a minimum of 150 mm (6 in).

.3 Tape seal at points of penetration.

.4 Extend vapour barrier tight to perimeter

.5 All end laps on steel deck shall be supported by a metal plate 15 cm x 106 cm (6 in x 42 in)

.6 Once installed, pressure must be applied over the whole surface using a roller to ensure a perfect adhesion

END OF SECTION

PART 1 GENERAL

1.1 WORK INCLUDED

.1 Sheet-applied self-adhesive combination air/vapour barrier sheathing and flashing/transition membrane.

.2 Sheet-applied self-adhesive foil-faced membrane flashing required to provide continuity detailing at interruptions in wall envelope such as fenestration.

.3 Liquid-applied flashing membrane as a wall penetration and detailing sealant.

1.2 RELATED WORK

.1	Section 07 52 00	Modified Bituminous Membrane Roofing
.2	Section 07 55 52	Modified Bituminous Protected Membrane Roofing
.3	Section 07 62 00	Sheet Metal Flashing and Trim

1.3 QUALITY ASSURANCE

.1 Qualifications: Work of this section shall be executed by competent installers with experience in the application of products, systems, and assemblies specified.

.2 Conduct quality control in accordance with Division - 1.

.3 All sealants, primers, mastics, and adhesives associated with the sheathing membrane shall be products of said sheathing membrane manufacturer.

1.4 SUBMITTALS

.1 All submittals shall be in accordance with Division 1 – Submittal Procedures.

.2 Product data sheets:

.1 Submit manufacturer’s product data sheets for products proposed for use in the work of this section.

.3 Mock-up:

.1 Construct minimum 10 m^2 area of wall assembly if requested.

.2 Locate at the place of work as part of final installation. Space installation to include exterior wall panel incorporating window, glazing system and installation.

.3 Do not proceed until mock-up has been reviewed by the Consultant.

.4 Samples:

.1 At the Consultant’s request, samples of materials shall be submitted for approval, prior to commencing work concerned.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store all materials in their original packaging in undamaged condition, sealed with labels intact, having manufacturer's name, brand, weight, CSA and other references to accepted standards clearly shown.

.2 Make all necessary arrangements with regard to delivery and storage on the site with the Departmental Representative and schedule deliveries accordingly. In general, deliver material as required for installation and keep site storage to a minimum.

.3 Provide all plant and equipment necessary for off-loading of materials to complete the work of this section.

.4 Protect materials from damage and weather, and store in a dry place.

.5 Handle materials and equipment in strict accordance with manufacturer's recommendations. Damaged or deteriorated materials shall be removed from premises.

1.6 JOB CONDITIONS

.1 Conform to membrane manufacturer's requirements for minimum application temperatures and humidity. Check surfaces and areas specified and shown to receive membrane.

.2 Report any unsatisfactory conditions and/or surfaces to the Departmental Representative in writing. Starting work shall imply acceptance of surfaces and conditions.

.3 Take all necessary measurements and levels at the building. The work shall be laid out to accurately fit the conditions at the building and with adjacent work.

.4 Notify the Departmental Representative of any variations beyond the accepted tolerances in the substrate or in the adjacent work, including membrane roofing (Section 07 52 00).

.5 Low temperature application:

.1 Perform adhesion test for membrane when ambient temperature is below -5°C. Sheathing membrane manufacturer must produce both “summer” and “winter” (low temp.) grades.

.2 Proceed with work when temperature is (or predicted) to fall below -5°C ambient temperature only with the mutual documented agreement of inspection and testing company, manufacturer and applicator.

.6 Do not perform installation during rainy or inclement weather or on wet or frost covered surfaces.

.7 Provide temporary protection of the applied membrane to prevent mechanical damage or damage from spillage of oil or solvents.

1.7 PERFORMANCE REQUIREMENTS

.1 Sheathing membrane system shall perform as a continuous air barrier and liquid water drainage plane flashed to discharge incidental condensation or water penetration to the exterior of the building envelope.

.2 The membrane flashing/universal transition membrane shall perform as flashing by providing continuity at interruptions in sheathing systems caused by openings in building structure and interfacing with other elements and systems. The membrane system is also employed as a transition membrane between envelope components and other membranes and waterproofing systems. Ensure compatibility between systems.

.3 All self-adhesive membrane systems shall accommodate substrate movement, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding the specified limits and requirements, or interruption of the drainage plane.

.4 Air barrier systems shall be joined in an airtight and flexible manner to air barrier material of adjacent building envelope systems, employing transition membrane, allowing for relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between the following unless otherwise applicable:

.1 Foundation and walls.

.2 Walls and openings (windows, doors, louvers, and other wall penetrations).

.3 Wall and roof.

.4 Wall and roof over non-climate controlled space.

.5 Walls, floor and roof across construction, control, and expansion joints.

.6 Walls, floors and roof to utility, pipe and duct penetrations.

.5 Provide temporary protection of the applied membrane to prevent mechanical damage or damage from spillage of oil or solvents.

PART 2 PRODUCTS

2.1 VAPOUR-PERMEABLE SHEATHING MEMBRANE

.1 Description: self-adhesive membrane composed of a tri-layer laminated polypropylene facer.

The sheathing membrane shall comply with the following criteria and values:

.1 Air permeance: Maximum 0.0025 L/s m^2 at 75 Pa to ASTM E2178-03

.2 Must pass ASTM 2357 air leakage resistance criteria.

.3 Water vapour transmission: 972 ng/pa•s•m^2 (17 perm) to ASTM E96 (Procedure ‘B’).

.2 Acceptable Products: Soprema SopraSeal Stick VP, or similar

2.2 SELF-ADHESIVE FLASHING / TRANSITION MEMBRANE

.1 Description: Self-adhering modified bituminous membrane system consisting of SBS modified bitumen and a tri-laminated woven polyethylene facer. The under face shall be covered with a silicone release paper or film. Membrane shall be available in “summer” and “winter” grades and shall comply with the following physical properties:

- .1 Thickness: 1.0 mm (40 mils) minimum.
- .2 Application temperature: as per manufacturer’s printed installation instructions.
- .3 Min. tensile strength to ASTM D5147: 11.3/15.4 kN/m (64/88 lb/in).
- .4 Min. tensile strength to ASTM D412: 11.2/31.1 MPa.
- .5 Static puncture: 400 N (90 lb) to ASTM D5602; 747 N (168 lb) to ASTM E154.

.2 Primer: as manufactured by membrane manufacturer specifically for membrane.

.3 Termination mastic: as recommended by membrane manufacturer.

.4 Ensure that self-adhering membrane is compatible with and will adhere permanently to all interfacing substrate materials and systems, including foil-faced membrane (2.2) and Membrane Roofing (Section 07 52 00).

.5 If required by the Consultant, demonstrate accelerated long-term adhesion to all substrate appropriate to this Project. Refer to Section 01 45 00.

.6 Acceptable Products:

- .1 Protecto Wrap “100/40”
- .2 Grace Construction Products ‘Perm-A-Barrier Wall Membrane’.
- .3 Soprema ‘Sopraseal Stick 1100T Summer Grade and Winter Grade with ‘Elastocol Stick’ primer.
- .4 “HT”-designated high-temperature membrane for high-temperature applications (e.g. parapet cap flashings): Lastobond Shield HT by Soprema, or Blueskin PE 200 HT by Monsey-Bakor.
- .5 Other products with similar characteristics and proven long term adhesion to moist substrates will not be excluded.

2.2 SELF-ADHESIVE FOIL-FACED MEMBRANE FLASHING

.1 Multi-purpose, self-adhering detailing membrane for use at door/window openings, vents and other interruptions in the wall membrane system.

.2 Membrane shall be composed of a proprietary base fabric/film laminated to an aluminum foil and available in various roll widths.

.3 Acceptable products:

- .1 ‘Protector Seal 45” by Protecto Wrap.
- .2 “Sopra Solin HD” by Soprema.

.3 Other products with similar characteristics and proven long term adhesion to moist substrates will not be excluded.

2.3 LIQUID-APPLIED FLASHING MEMBRANE

.1 Liquid-applied flashing membrane for use as a sealant at penetrations to the wall sheathing membrane, as a detailing sealant and as noted and detailed.

.2 Material shall be a gun grade waterproofing, adhesive and detailing compound composed of 99% solids, roller/trowel/brush applied, single component, high performance, elastomeric, silyl-terminated polyester coating/sealant exhibiting the combined benefits of silicone and urethane. Product shall meet all current VOC requirements and contain no solvents or isocyanates.

.3 Liquid-applied flashing system shall comply with the following properties when cured:

.1	Hardness, Shore A	40—45
.2	Tensile Strength	180 Psi
.3	Elongation at Break	400%
.4	Peel Strength	25 pli
.5	Accelerated Weathering	Must Pass
.6	Water Vapour Transmission	14 perms @ 12 mils
.7	Surface Burning ASTM E84	Flame Spread: 0 Smoke Developed: 15 NFPA and ICC Class A Building Material

.4 Uncured properties:

.1	Tack Free Time	<30 minutes
.2	Cure Rate	3/16 inch/24 hours
.3	Volatile Organic Content	1.5% by wt. 27 g/Lt .2 lbs/gal
.4	Water Vapour Transmission	6.34 grains/hour/Ft^2

.5 An example of the accepted product is “R-Guard Fast Flash” as manufactured by Prosoco. Other products having the same demonstratable characteristics will not be excluded.

2.4 ACCESSORIES

.1 Termination Bar: Minimum 18 Ga. steel, or 1/16” aluminium. Material G200 galvanized steel or aluminium. Size 1.5” (38 mm) wide x continuous lengths where possible. Install gum lip, where applicable.

PART 3 EXECUTION

3.1 PREPARATION

.1 Preparation of all surfaces to receive self-adhering membranes including substrate, joints, cracks, coves etc. shall be carried out in accordance with manufacturer's written directions.

.2 Ensure that all substrate surfaces are smooth, dry and firm. Remove any frost, ice, loose particles, ridges, laitance, cracks, grease, asphalt, oil and other foreign matter which could prevent adhesion of the membrane to the substrate.

.3 Do not install membranes until other work which penetrates membrane has been completed.

.4 Seal around membrane penetrating elements in accordance with manufacturer’s printed installation instructions.

3.2 PRIMING

.1 All surfaces to receive self-adhering membrane shall be primed at the rate recommended by the manufacturer. Primer shall be uniformly applied.

.2 Open time of 30 minutes shall be allowed before installation of self-adhering membrane.

3.3 TRANSITION/FLASHING AND FOIL-FACED MEMBRANE INSTALLATION

.1 Apply self-adhering “detailing” membranes to surfaces as indicated on drawings and as specified.

.2 Application of membrane, including temperature limitations, curing requirements and all other application procedures shall be carried out in accordance with membrane manufacturer's written directions.

.3 Coordinate proper construction of roof/wall junctions between Section 07 27 13 and interfacing materials and systems to maintain continuity of the air barrier from wall to roof.

.4 Cut and seal membrane around protrusions to form tight air seal.

.5 Apply troweled bead of mastic to all terminations at end of each day's work.

.6 Inspect membrane thoroughly before being covered and make any corrections immediately. Misaligned or inadequately capped seams, punctures or other damage shall be repaired by patching and sealing with membrane manufacturer's directions.

.7 Adhere transition membrane to sheathing membrane at wall openings and flash into pockets of fenestration, louvers and doors as detailed, taking extra care to ensure continuity of the air/vapour barrier.

.8 Membrane shall be continuously supported.

.9 Extend all membrane patches a minimum 150 mm from repair location or penetration. Seal all around patch with mastic.

.10 Seal all side laps without factory bitumen edge and all top laps with mastic.

.11 Fill all joints or gaps wider than 6 mm with foam backer rod and apply 300 mm piece of membrane over joints prior to application of the field membrane.

.12 Coordinate installation of membrane with other interfacing Sections to minimize exposure of membrane.

.13 When self-adhering membrane interfaces with incompatible membranes, ensure that bond is made only to bridge membranes.

3.4 LIQUID-APPLIED FLASHING MEMBRANE APPLICATION

.1 At penetrations to all self-adhered wall sheathing and transition membranes: Apply liquid-applied flashing system onto foil-faced self-adhered membrane in strict accordance with manufacturer's printed instructions by brush, roller or towel between ambient temperatures of +1°C and 30°C.

3.5 WATERPROOFING SELF-ADHERED MEMBRANE INSTALLATION

Refer to manufacturer installation guide.

3.6 ADJUST AND CLEAN

.1 Repair, remove and clean all smears on exposed finished surfaces or surfaces to be subsequently finished. Clean off immediately as directed by and to the satisfaction of the Consultant. Protect all adjacent surfaces from damage due to self-adhered membrane operations. As work proceeds and on completion, clean up and remove from the premises all rubbish and surplus materials resulting from this work.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 All materials, equipment and installation for two-ply elastomeric modified bituminous membrane systems (SBS) to new sloped structure steel decked roofs including combination sheathing board/air/vapour barrier, base and cap plys, associated membrane flashing (stripping plys), and traffic walkways.

.2 Rigid polyisocyanurate thermal roof insulation, (factory-tapered for crickets, back-slopes and where indicated) and mineral fibre insulation/protection layer.

1.2 RELATED SECTIONS

.1	Section 06 10 00	Rough Carpentry
.2	Section 07 62 00	Sheet Metal Flashing & Trim
.3	Section 07 92 00	Joint Sealants
.4	Division 22	Plumbing
.5	Division 23	Heating, Ventilation & Air Conditioning

1.3 REFERENCES

.1 The latest version of the following tests and publications:

.2 American Society for Testing and Materials International (ASTM).

.1 ASTM D6162 / D6162M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.

.3 Canadian General Standards Board (CGSB).

.4 CAN/ULC-S704.1:2017, Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

.5 Canadian Roofing Contractors Association (CRCA).

.1 CRCA Roofing Specifications Manual – Latest Edition

.6 Roofing Contractors Association of British Columbia (RCABC)

.1 Roofing Practices Manual – Latest Edition

.7 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act, 1999 (CEPA)

.8 Factory Mutual (FM Global).

.1 FM Approvals – Roofing Products.

.9 Health Canada / Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.10 National Building Code of Canada, 2015 (NBCC) and BC Building Code, 2018 (BCBC).

.11 ASHRAE 90.1, 2010

1.4 PERFORMANCE REQUIREMENTS

.1 Compatibility between components of roofing system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.

.2 The roof assemblies shall have a minimum Class A designation in accordance with NBCC, 2010 (3.1.15.2.1) and ULC S107.

1.5 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00 – Submittals

.2 Submit two copies of most recent technical roofing components data sheets describing materials' physical properties.

.3 Submit WHMIS MSDS – Material Safety Data Sheets in accordance with Section 01 35 33 – Health and Safety Requirements.

- .1 Indicate VOC content for:
  - .1 Primers
  - .2 Asphalt
  - .3 Sealers
  - .4 Tapered Insulation

.4 Provide layout for factory-tapered insulation.

.5 Manufacturer's Certificate: certify that products meet or exceed specified requirements.

.6 Provide to the Departmental Representative the "RCABC Roofing System Record" upon completion of the work. Record shall include copies of inspection reports and roof maintenance guide.

.7 Submit copies of underwriter's certification for roof covering materials.

1.6 QUALITY ASSURANCE

.1 Unless otherwise specified, all materials and roofing practice shall conform to the recommendation of the RCABC as contained in their manual, Roofing Practices in British Columbia. Where this manual is silent, the recommendation of the CRCA as contained in their manual Roofing Specifications, shall be followed.

.2 This Contractor shall at all times, have in his Field Office, a copy of said manuals.

.3 All work shall be done by a member of the Roofing Contractor's Association of British Columbia and in accordance with the manufacturer's instructions and latest standards of RCABC

.4 Obtain all roofing materials from the same source to ensure compatibility.

.5 Roofing and sheet metal work shall be performed in conformance with the roofing manufacturer's written recommendations, as well as the requirements of the ULC laboratories, Factory Mutual FM-190

.6 The manufacturer of elastomeric bitumen products shall provide proof of ISO9001 Certification.

1.7 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 33 Health and Safety Requirements.

1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store all materials in their original containers in undamaged condition, sealed with labels intact, having manufacturer's name, brand, weight, CSA and other references to accepted standards clearly shown.

.2 Store materials in weatherproof shelters, having floors which will protect the materials from moisture. Store rolled materials on ends. Avoid prolonged exposure of light and heat sensitive materials to sunlight. Remove only as much material from storage as can be applied and made weathertight in the same day.

.3 Do not place roof insulation in direct contact with the earth, road surface, or roof deck. Place suitable supports under the insulation upon delivery to protect it from absorbing dampness.

.4 Do not store materials in concentrations which exceed design live load.

.5 In the event material is damaged by the elements, improper handling or other causes, such material will be rejected and shall be replaced at no extra cost to the Departmental Representative.

.6 Place plywood runways over completed Work to enable movement of material and other traffic.

.7 Store sealants at +5 degrees C minimum.

.8 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.

1.9 PROTECTION

.1 Respect safety measures described in the manufacturer's written directives, as well as RCABC written recommendations.

.2 At the end of each work day, use an infrared detector to spot any smoldering or concealed fire. Job planning must be organized to ensure workers are still on location at least one hour after torch application.

.3 Never apply the torch directly to dry wood surfaces. Comply with the fire safety recommendations of the manufacturer and the RCABC.

.4 Throughout roofing installation, maintain a clean site and have one approved ABC fire extinguisher within 6 meters of each roofing torch. Respect all safety measures described in technical data sheets. Torches must never be placed near combustible or flammable products.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

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

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Separate for reuse and recycling and place in designated containers in accordance with Waste Management Plan.

.5 Place materials defined as hazardous or toxic in designated containers.

.6 Handle and dispose of hazardous materials in accordance with Laws and regulations.

.7 Clearly label location of salvaged material's storage areas and provide barriers and security devices.

.8 Ensure emptied containers are sealed and stored safely.

.9 Divert unused materials from landfill to recycling facility as approved by Departmental Representative.

.10 Unused adhesives, sealant, and asphalt materials must not be disposed on into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.11 Dispose of unused adhesive material at official hazardous material collections site approved by Departmental Representative.

1.11 CO-OPERATION WITH OTHER TRADES

.1 Advise all other trades of their responsibility in having pipes, sleeves, A/C unit fan, and cowl bases installed on the roof in adequate time so that the roofing work is not delayed. Coordinate roofing with mechanical and electrical trades.

.2 The mechanical trades shall be responsible for cap and counterflashing of any ducts, vents, stacks, or other sheet metal projecting through the roof. This section shall provide base flashing over wood or metal curbs, etc., and seal lead flashings for service lines into the roof members.

1.12 JOB CONDITIONS

.1 Conform to the ambient air temperature and humidity requirements and limitations as set forth by the membrane system manufacturer, the RCABC and the Roofing Inspection Agency for installation of all systems and materials.

.2 Minimum installation air temperature for solvent-based adhesives and compounds is (-) 5-degree C.

.3 Protect roof decks from damage due to roofing or sheet metal operations. Protect work of other trades from damage; replace and/or make good any and all such damages caused by work of this section.

.4 Protect all adjacent surfaces and work during roofing from damage, with special protection adjacent to hoist.

.5 Inspect surfaces to receive work of this section and report any defects in writing to the Departmental Representative.

.6 Commencement of work will imply acceptance an approval of such surfaces and no claim for defects in workmanship will subsequently be allowed.

.7 Provide all temporary tarps and structures, at no additional cost to the Departmental Representative, required to protect building and roofing from weather conditions, which may cause a delay in meeting project schedules.

1.13 INSPECTION AND WARRANTIES

.1 The Contractor shall, at no additional cost to the Departmental Representative, arrange for the supplier/manufacturer of the membrane system, to inspect the work in progress after base sheet installation and during seaming, and upon completion, to ensure that the complete system is installed in full compliance with the supplier's/manufacturer's specifications, recommendations, and details.

.2 There will be no Installation Guarantee for work of this section. However, there shall be roof inspection services. Roof inspection shall be performed by an independent inspection agency appointed by the Departmental Representative. Costs for inspections and warranty shall by paid for by the Contractor. Inspection service shall include additional inspection of roof immediately prior to interim completion of this Contract.

.3 The Contractor shall co-operate with the appointed inspection agency; provide material samples when requested and provide access to the work in progress.

.4 The Contractor shall obtain from the manufacturer of the elastomeric bitumen membrane system, a written warranty stating that its products are free of manufacturing defects and shall provide a waterproof surface for 20 years after installation. If infiltration happens due to faulty material, the manufacturer shall make the necessary repairs, at its expense.

PART 2 PRODUCTS

2.1 COMPONENT COMPATIBILITY

.1 Ensure that all components of the membrane systems are compatible. All membrane, accessories and associated mastic/sealant compounds shall be products of the same manufacturer.

2.2 VAPOUR BARRIER

. Refer to Section 07 26 00 - Vapour Barriers

2.3 ROOF INSULATION (BASE LAYER)

.1 High strength molded closed cell polyisocyanurate foam core integrally laminated to heavy, black, non-asphaltic fibre reinforced glass facers, adhered to substrate.

.2 Insulation shall conform to CAN/ULC-S704.1:2017 Const No. C34 and CAN/ULC-S770-2000 for determination of long term thermal resistance of closed cell insulating forms and shall meet or exceed the physical property values from the following table:

PROPERTY	TEST METHOD	VALUES
Dimensional Stability (Length and Width)	ASTM D2126	<2%
Compressive Strength (10% Deformation)	ASTM D1621	140 kPa
Water Absorption	ASTM C209 ASTM D2842	<1% <3.5%
Moisture Vapour Transmission	ASTM E96	<1.5 perm (85.0 ng/(Pa•s•m^2))
Product Density	ASTM D1622	Nominal 32.04 kg/m^3
Flame Spread	ASTM E84 (Full 10 min. Test)	25-50**
Smoke Developed	ASTM E84 (Full 10 min. Test)	50-170**
Tensile Strength	ASTM D1623	>35 kPa
Service Temperature	-	-73 to 122°C

.3 Insulation shall be engineered factory-tapered to create crickets, back slopes and where indicated. Insulation shall be applied in 2 layers to yield an effective R value of 36 to 40. Add extra layer to achieve roof slops.

2.4 MINERAL FIBRE INSULATION PROTECTION LAYER

.1 Mineral wool board, made from basalt rock and slag, with bitumen-impregnated rigid upper face compatible with roofing membranes and resistant to torch application of base roofing ply.

.2 Applied as top layer (75 mm thick) over base layer of polyisocyanurate insulation as protection from “insulation creep” and complying with following Table of Properties:

Property	Test Method	Values
Thermal Resistance (RSI Value – m^2K/W for 25.4 mm at 75°F)	ASTM C518 (C177)	0.68 m^2K/W (R-3.8 hr ft^2 F / BTU for 1 in 75°F)
Compressive Strength - Top Layer at 10% - Top Layer at 25% - Entire Board (3 in Thickness) at 10% - Entire Board (3 in Thickness) at 25% - Point load at 5 mm compression	ASTM C165	139 kPa (20.2 psi) 252 kPa (37.0 psi) 71 kPa (10.3 psi) 103.5 kPa (150 psi)
	EN 12430	205 kPa (30.0 psi)
Density - Top Layer - Bottom Layer * Formed as a monolithic structure	ASTM C612-14	13.75 lb/ft^3 (22 kg/m^3) 10.0 lb/ft^3 (160 kg/m^3)
Dimensional Stability, Linear Shrinkage 24 hours at 1200°F (650°C)	ASTM C356	0.71%
Water Absorption	ASTM C209	<1.0%
Water Vapour Absorption	ASTM C1104	0.15%

.3 Accepted products:

.1 “Soprarock DD Plus” by Soprema.

.2 “Toprock DD Plus” by Roxul.

.3 Other products with the same demonstratable characteristics will not be excluded.

2.5 ADHESIVE

.1 Adhesive for securing roof insulation: two-part polyurethane foamed adhesive as acceptable to manufacturers of all components to be bonded and to RCABC.

.2 Accepted product: “Duo Tack” by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

2.6 MEMBRANES

.1 All membranes must meet or exceed ASTM D6162, CSA A123.21-10, FM4470, CAN/CGSB 37.56 M, ULC-S107.

.2 Base Sheet (and Base Stripping Ply at Non-Combustible Substrates):

.1 Membrane shall be composed of a composite reinforcement and SBS modified bitumen, 2.5 mm thick, with both faces covered with a thermofusible plastic film. This membrane shall be torch-applied.

.2 Reinforcement: composite.

.3 Elastomeric asphalt: mix of selected bitumen and minimum 12% SBS thermoplastic polymer.

.4 Physical properties: (as per CAN/CGSB-37.56-M, 9th Draft)

	Properties	**MD**	**XD**
.1	Strain energy	7.8 kN/m	7.2 kN/m
.2	Breaking strength	15 kN/m	13.5 kN/m
.3	Ultimate elongation	60%	65%
.4	Tear resistance	125 N	
.5	Static puncture resistance	560 N	
.6	Dimensional stability	0.2%	0%
.7	Plastic flow	≥110°C (230°F)	
.8	Cold bending at -30°C (-22°F)	No cracking	
.9	Lap joint strength	Pass > 4 kN/m	

.5 Accepted product: “Sopraply Base 520” by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

.3 Self-Adhesive Membrane:

(Base Stripping Ply at Combustible Substrates and Where Required)

.1 Membrane shall be self-adhesive SBS modified bitumen, with composite reinforcement, covered with a thermofusible plastic film. Membrane shall be available in both summer and winter grades. Thickness: 3.0 mm.

.2 Physical properties:

.1	Strain energy, MD/XD (kN/m)	7.8 / 7.2
.2	Breaking strength, MD/XD (kN/m)	15 / 13.5
.3	Ultimate elongation, MD/XD (%)	60 / 65
.4	Tear resistance (N)	125
.5	Static puncture (N)	560
.6	Cold bending (C) - Initial	-30
	- 90 days at 70°C	-30

.3 Accepted product: “Sopralene Flam Stick” by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

.4 Cap Sheet:

.1 3.7 mm thick Styrene Butadiene Styrene (SBS) high performance membrane shall have a composite reinforcement and thermofusible elastomeric asphalt. Under side shall be protected by a thermofusible plastic film. This membrane shall be applied by torching only. Top surface of membrane shall be covered with highly reflective white granules. Membrane shall be factory-treated with fire retardant.

.2 Membrane shall have a minimum SRI of 86 regarding heat island.

.3 Physical Properties: (as per CAN/CGSB-37.56-M, 9th Draft).

	Properties	**MD**	**XD**
.1	Strain energy	11.9 kN/m	9.5 kN/m
.2	Breaking strength	19.5 kN/m	15.1 kN/m
.3	Ultimate elongation	61%	75%
.4	Tear resistance	70 N	
.5	Static puncture resistance	470 N	
.6	Dimensional stability	-0.2%	0.1%
.7	Plastic flow	≥110°C (230°F)	
.8	Cold bending at -30°C (-22°F)	No cracking	
.9	Lap joint strength	Pass > 4 kN/m	
.10	SRI (ASTM E1980)	86	

.4 Accepted product: “Suprastar Flam HDGR FR” by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

.5 Cap Stripping Ply

.1 4.0 mm thick Styrene Butadiene Styrene (SBS) high performance membrane shall have a composite reinforcement and thermofusible elastomeric asphalt. Under side shall be protected by a thermofusible plastic film. This membrane shall be applied by torching only. Top surface of membrane shall be covered with highly reflective white granules. Membrane shall be factory-treated with fire retardant.

.2 Physical Properties:

	PROPERTIES	MD	XD
.1	Strain energy	7.8 kN/m	7.2 kN/m
.2	Breaking strength	15 kN/m	13.5 kN/m
.3	Ultimate elongation	60%	65%
.4	Tear resistance	125 N	
.5	Static puncture resistance	560 N	
.6	Dimensional stability	0.2%	0%
.7	Plastic flow	≥110°C (230°F)	
.8	Cold bending at -30°C (-22°F)	No cracking	
.9	Lap joint strength	Pass > 4 kN/m	

.3 Accepted product: “Sopraply Traffic Cap FR 561” by Soprema Waterproofing. Other products having the same characteristics will not be excluded.

2.7 ACCEPTABLE PRODUCTS

.1 Soprema.

.2 Siplast.

.3 Other products having the same characteristics will not be excluded.

2.8 CATALYZED RESIN LIQUID FLASHING SYSTEM

.1 Multi-component, fully reinforced, flexible polymethyl methacrylate based (PMMA) liquid flashing membrane system by same manufacturer as roofing membranes and complying with the following Table of Properties:

Property	Test Method	Values
Membrane thickness	ASTM D5147 Sec 5	2.9 mm (115 mils)
Peak load @ 23°C (73°F) avg.	ASTM D5147 Sec 6	12.3 kN/m (70 lbf/in)
Elongation @ peak load, avg.	ASTM D5147 Sec 6	42%
Peak load @ 23°C (73°F) avg.	ASTM D412(dumbbell)	15.8 kN/m (90 lbf/in)
Elongation @ peak load, avg.	ASTM D412(dumbbell)	55%
Shore A hardness, avg.	ASTM D2240	81
Water absorption, (Method I) (24h @ 23°C (73°F))	ASTM D570	0.41%
Water absorption, (Method II) (48h @ 50°C (122°F))	ASTM D570	1.57%
Low temperature flexibility	ASTM D5147 Sec 11	-25°C (-13°F)
Dimensional stability (max. movement)	ASTM D5147 Sec 10	-0.063%
Tear strength	ASTM D5147 Sec 7	0.5 kN (107 lbf)

.2 Liquid flashing shall be available in “summer” and “winter” grades, be supplied with companion primer for non-metallic substrates, catalyst and fleece reinforcement. Employ where noted and required.

.3 Accepted product: “Alsan RS230 System” by Soprema or equal product produced by Siplast. Other products with similar characteristics will not be excluded.

2.9 SEALANTS

.1 As approved by membrane system manufacturer and by RCABC as being compatible with membrane system.

.2 Plastic cement: asphalt, to CAN/CGSB-37.5 coal tar, to CGSB 37-GP-19M.

.3 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.

2.10 FASTENERS AND ACCESSORIES

.1 Fasteners for mechanically fastening fire barrier sheathing board to steel roof deck shall be wind uplift and corrosion-resistant type as recommended and acceptable to the board manufacturer and to RCABC.

.2 Fire Protection Tape: Fire retardant treated, 165 mm wide tape, composed of glass fleece reinforcement and SBS bitumen. The top side is sanded and the bottom side is covered with a silicone release film.

.3 Splash Blocks: for use where scuppers from elevated roofs spill onto main roof. 600 x 600 x 50 mm stock pre-cast lightweight concrete patio pavers.

PART 3 EXECUTION

3.1 WORKMANSHIP - GENERAL

.1 All workmanship shall be at least in accordance with RCABC standards for a 10 year guarantee for the various systems described.

.2 Use materials and systems in accordance with manufacturer's specifications and instructions.

.3 Leave no work exposed during unsettled weather. Glaze and finish membranes at end of each work period, to direction of roofing inspector.

.4 Work to; and around all features, voids, and edges, in best trade manner to produce watertight and weatherproof insulation.

.5 Follow approved stripping and membrane flashing methods at eaves, curb, parapets, etc., in accordance with RCABC system guidelines.

.6 All seams of granular surfaced cap membranes and wall covering shall be carefully heat welded with propane torch. No visible bleed-out of bitumens will be accepted. Bleed-out at joints shall be covered with granular material to match cap sheets. Surfaces when completed shall present a neat, even appearance.

.7 Apply only as much insulation to the roof as can be covered the same day with roofing membrane. At the conclusion of each day's work, seal exposed edges of the roof insulation. This seal shall be cut and lifted upon continuation of the work.

3.2 EXAMINATION OF ROOF DECKS

.1 Before commencing roofing work, this section, together with the Departmental Representative and the Contractor, shall inspect all surfaces scheduled to receive membranes for condition, slopes, nailing supports, sheet metal parapet facing, roof drains, stack vents, mechanical and electrical penetrations, building joints, etc.

.2 All surfaces must be smooth, dry, clean and free of ice and debris. No salt or calcum shall be used to remove snow or ice.

.3 Surfaces scheduled to receive membranes must possess a smooth surface with an even finish; free of excessive moisture, ridges, hollows and sharp corners.

.4 If defects are found, a non-compliance notice will be issued to the Contractor so that adjustments can be made. Proposals for correction of defects shall be submitted to the Departmental Representative for approval.

.5 Corrections of defects shall be made at no additional cost to the Departmental Representative using materials which adhere to the substrate, are stable, do not deform under traffic loads and are compatible with bituminous materials. The deck must be clean, dry, and free of contamination by treatment products, lubricating oils, diesel oil or grease, which could affect the adhesion of the waterproofing or the physical integrity of the membrane itself.

.6 Commencement of roofing/waterproofing work shall imply acceptance of surfaces and conditions.

3.3 PREPARATION

.1 Supply to the various sections concerned in ample time: all inserts, reglets, and accessories required to be built into the work of other sections. Instruct as to the proper location and position of such items.

.2 Co-operate with, and coordinate work with Mechanical trades and other providers of interfacing materials and systems to ensure watertight junctions at roof drains, vents, and other items passing through the roof.

.3 Minimize exposure of the roof deck to the elements by proceeding as soon as the roof deck is completed. Do not work during rain, fog, sleet, ice, or snow. Warm roofing materials before using in cold weather.

.4 Sweep clean and remove all debris from roof deck surfaces before commencement of work.

3.4 EQUIPMENT

.1 Maintain all equipment and tools in good working order.

.2 Use torch types recommended by the manufacturer of the elastomeric asphalt membranes, and acceptable to RCABC and ULC.

3.5 ROOFING SYSTEM DESCRIPTIONS

.1 Roof Assembly Type ‘R1’ (Class A-Insulated):

.1 6 mil Poly Vapour Barrier

.2 13mm Protection Board

.3 Two layers polyiso roof insulation, total R Value 36 to 40, adhesive-applied, factory-tapered at crickets and back-slopes.

.4 One-layer 100 mm mineral fibre insulation/protection, (R11.5), adhesive-applied with joints staggered from those of previous layer.

.5 Base sheet torch-applied.

.6 Granular cap sheet torch-applied.

.7 Stripping and membrane flashing, granular-surfaced where exposed to view.

.8 All Parapets and Vergers:

.1 Prepare and prime sheet metal parapet facing.

.2 Torch-applied base stripping ply full height

.3 Granular cap sheet torch-applied

3.6 PRIMER APPLICATION

.1 Apply all primers in accordance with the manufacturer's directions to all surfaces prior to application of membranes and other roofing components.

3.8 FIRE RETARDANT TAPE APPLICATION (WHERE REQUIRED)

.1 Prior to the application of any torch on base sheet materials, install a width of tape over substrate cracks, voids in the construction, angle changes at curbs, parapets, penetrations, walls, and penetrations to prevent contact of flame with combustible materials or construction debris.

3.10 INSULATION INSTALLATION

.1 Insulation: adhesive application.

.1 Apply insulation in following order: polyisocyanurate in 2 layers with staggered joints and 75mm mineral fiber top layer.

.2 Adhere insulation to substrate and preceding layers using adhesive applied in accordance with manufacturer's instructions, Factory Mutual and RCABC requirements.

.3 Place boards in parallel rows with ends staggered, and in firm contact with one another.

.4 Cut end boards to suit.

3.11 MEMBRANE APPLICATION

.1 Base sheet application:

.1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.

.2 Unroll and torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.

.3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.

.4 Application shall be free of blisters, wrinkles and fishmouths.

.2 Cap sheet application:

.1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.

.2 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.

.3 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.

.4 Application shall be free of blisters, fishmouths and wrinkles.

.3 Membrane Flashing (Stipping Plies) Application:

.1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.

.2 Apply base and cap sheet onto substrate in 1 meter wide strips.

.3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal.

.4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.

.5 Provide 75 mm minimum side lap and seal.

.6 Torch-weld cap stripping ply and base stripping at non-combustible substrates. Self-adhesive-apply base stripping to combustible substrates.

3.12 INTERIM COMPLETION INSPECTION

.1 Inspect the roofs at or just before the date of substantial completion. Remove all nails and other debris which will cause damage to roof membranes. Ensure the roof has not been damaged by construction activities and the interfacing with the existing roof membrane system is complete and free of any defects. Leave the entire roof ready for final inspection by Inspection Company.

.2 Provide the Departmental Representative with a written certificate that this inspection has been completed.

3.13 ADJUST AND CLEAN

.1 Repair, remove and clean all drips or smears of adhesive and asphalt on exposed finished surfaces or surface to be subsequently finished. Clean off immediately as directed by Departmental Representative.

.2 As the work progresses and at completion of the work, clean up and remove from the site, all rubbish and debris resulting from roofing and sheet metal work.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

.1 Materials and installation for two ply SBS modified bituminous membranes in a protected membrane waterproofing system.

1.2 RELATED SECTIONS

.1	Section 06 10 00	Rough Carpentry
.2	Section 07 62 00	Sheet Metal Flashing & Trim
.3	Section 07 92 00	Joint Sealants
.4	Division 22	Plumbing
.5	Division 23	Heating, Ventilation & Air Conditioning

1.3 REFERENCES

.1 The latest version of the following tests and publications:

.2 American Society for Testing and Materials International (ASTM).

.1 ASTM D6162 / D6162M-16, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.

.3 Canadian General Standards Board (CGSB).

.1 CSA A123.23-15 Product specification for polymer modified bitumen sheet, prefabricated and reinforced.

.4 Canadian Roofing Contractors Association (CRCA).

.1 CRCA Roofing Specifications Manual – Latest Edition

.5 Roofing Contractors Association of British Columbia (RCABC)

.1 RCABC Guarantee Corp. RCABC Roofing Practices Manual-[Latest Edition].

.2 RGC Guarantee Standards [E Waterproofing].

.6 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act, 1999 (CEPA)

.7 Factory Mutual (FM Global).

.1 FM Approvals – Roofing Products.

.8 Health Canada / Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.9 National Building Code of Canada, 2015 (NBCC) and BC Building Code, 2018 (BCBC).

.10 ASHRAE 90.1, 2010

1.4 PERFORMANCE REQUIREMENTS

.1 Compatibility between components of roofing system is essential. Provide written declaration to Departmental Representative stating that materials and components, as assembled in system, meet this requirement.

.2 The roof assemblies shall have a minimum Class A designation in accordance with NBCC, 2010 (3.1.15.2.1) and ULC S107.

1.5 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00 – Submittals.

.2 Submit two copies of most recent technical roofing components data sheets describing materials' physical properties.

.3 Submit WHMIS MSDS – Material Safety Data Sheets in accordance with Section 01 35 33 – Health and Safety.

- .1 Indicate VOC content for:
  - .1 Primers
  - .2 Asphalt
  - .3 Sealers
  - .4 Tapered Insulation

.4 Provide layout for factory-tapered insulation.

.5 Manufacturer's Certificate: certify that products meet or exceed specified requirements.

.6 Provide to the Departmental Representative the "RCABC Roofing System Record" upon completion of the work. Record shall include copies of inspection reports and roof maintenance guide.

.7 Submit copies of underwriter's certification for roof covering materials.

1.6 QUALITY ASSURANCE

.1 Unless otherwise specified, all materials and roofing practice shall conform to the recommendation of the RCABC as contained in their manual, Roofing Practices in British Columbia. Where this manual is silent, the recommendation of the CRCA as contained in their manual Roofing Specifications, shall be followed.

.2 This Contractor shall at all times, have in his Field Office, a copy of said manuals.

.3 All work shall be done by a member of the Roofing Contractor's Association of British Columbia and in accordance with the manufacturer's instructions and latest standards of RCABC

.4 Obtain all roofing materials from the same source to ensure compatibility.

.5 Roofing and sheet metal work shall be performed in conformance with the roofing manufacturer's written recommendations, as well as the requirements of the ULC laboratories, Factory Mutual FM-190 and CGSB 47-GP-56M (latest).

.6 The manufacturer of elastomeric bitumen products shall provide proof of ISO9001 Certification.

1.7 HEALTH AND SAFETY

.1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety.

1.8 PRODUCT DELIVERY, STORAGE, AND HANDLING

.1 Deliver and store all materials in their original containers in undamaged condition, sealed with labels intact, having manufacturer's name, brand, weight, CSA and other references to accepted standards clearly shown.

.2 Store materials in weatherproof shelters, having floors which will protect the materials from moisture. Store rolled materials on ends. Avoid prolonged exposure of light and heat sensitive materials to sunlight. Remove only as much material from storage as can be applied and made weathertight in the same day.

.3 Do not place roof insulation in direct contact with the earth, road surface, or roof deck. Place suitable supports under the insulation upon delivery to protect it from absorbing dampness.

.4 Do not store materials in concentrations which exceed design live load.

.5 In the event material is damaged by the elements, improper handling or other causes, such material will be rejected and shall be replaced at no extra cost to the Departmental Representative.

.6 Place plywood runways over completed Work to enable movement of material and other traffic.

.7 Store sealants at +5 degrees C minimum.

.8 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.

1.9 PROTECTION

.1 Respect safety measures described in the manufacturer's written directives, as well as RCABC written recommendations.

.2 At the end of each work day, use an infrared detector to spot any smoldering or concealed fire. Job planning must be organized to ensure workers are still on location at least one hour after torch application.

.3 Never apply the torch directly to dry wood surfaces. Comply with the fire safety recommendations of the manufacturer and the RCABC.

.4 Throughout roofing installation, maintain a clean site and have one approved ABC fire extinguisher within 6 meters of each roofing torch. Respect all safety measures described in technical data sheets. Torches must never be placed near combustible or flammable products.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 – Waste Management and Disposal.

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

.3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Separate for reuse and recycling and place in designated containers in accordance with Waste Management Plan.

.5 Place materials defined as hazardous or toxic in designated containers.

.6 Handle and dispose of hazardous materials in accordance with Laws and regulations.

.7 Clearly label location of salvaged material's storage areas and provide barriers and security devices.

.8 Ensure emptied containers are sealed and stored safely.

.9 Divert unused materials from landfill to recycling facility as approved by Departmental Representative.

.10 Unused adhesives, sealant, and asphalt materials must not be disposed on into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.11 Dispose of unused adhesive material at official hazardous material collections site approved by Departmental Representative.

1.11 CO-OPERATION WITH OTHER TRADES

.1 Advise all other trades of their responsibility in having pipes, sleeves, A/C unit fan, and cowl bases installed on the roof in adequate time so that the roofing work is not delayed. Coordinate roofing with mechanical and electrical trades.

.2 The mechanical trades shall be responsible for cap and counterflashing of any ducts, vents, stacks, or other sheet metal projecting through the roof. This section shall provide base flashing over wood or metal curbs, etc., and seal lead flashings for service lines into the roof members.

1.12 JOB CONDITIONS

.1 Conform to the ambient air temperature and humidity requirements and limitations as set forth by the membrane system manufacturer, the RCABC and the Roofing Inspection Agency for installation of all systems and materials.

.2 Minimum installation air temperature for solvent-based adhesives and compounds is (-) 5 degree C.

.3 Protect roof decks from damage due to roofing or sheet metal operations. Protect work of other trades from damage; replace and/or make good any and all such damages caused by work of this section.

.4 Protect all adjacent surfaces and work during roofing from damage, with special protection adjacent to hoist.

.5 Inspect surfaces to receive work of this section and report any defects in writing to the Departmental Representative.

.6 Commencement of work will imply acceptance an approval of such surfaces and no claim for defects in workmanship will subsequently be allowed.

.7 Provide all temporary tarps and structures, at no additional cost to the Departmental Representative, required to protect building and roofing from weather conditions, which may cause a delay in meeting project schedules.

1.13 INSPECTION AND WARRANTIES

.1 The Contractor shall, at no additional cost to the Departmental Representative, arrange for the supplier/manufacturer of the membrane system, to inspect the work in progress after base sheet installation and during seaming, and upon completion, to ensure that the complete system is installed in full compliance with the supplier's/manufacturer's specifications, recommendations, and details.

.2 There will be no Installation Guarantee for work of this section. However, there shall be roof inspection services. Roof inspection shall be performed by an independent inspection agency appointed by the Departmental Representative. Costs for inspections and warranty shall by paid for by the Contractor. Inspection service shall include additional inspection of roof immediately prior to interim completion of this Contract.

.3 The Contractor shall co-operate with the appointed inspection agency; provide material samples when requested and provide access to the work in progress.

.4 The Contractor shall obtain from the manufacturer of the elastomeric bitumen membrane system, a written warranty stating that its products are free of manufacturing defects and shall provide a waterproof surface for 20 years after installation. If infiltration happens due to faulty material, the manufacturer shall make the necessary repairs, at its expense.

PART 2 PRODUCTS

2.1 COMPONENT COMPATIBILITY

.1 Ensure that all components of the membrane systems are compatible. All membrane, accessories and associated mastic/sealant compounds shall be products of the same manufacturer.

2.2 GYPSUM BOARD

.1 Where the fiberglass-matt faced gypsum roof boards for application directly under roof membranes have been damaged, the replacement roof board shall meet or exceed the property values listed here in:

1. Thickness: 1/2 inch.
2. Width: 4 feet.
3. Length: [4 feet] [8 feet].
4. Weight: 2.0 lb/sq. ft.

5. Surfacing: Primed Fiberglass Mat.
6. Flexural Strength, Parallel (ASTM C473): 80 lbf, minimum.
7. Flute Span (ASTM E661): 5 inches.
8. Permeance (ASTM E96): Greater than 23 perms.
9. R-Value (ASTM C518): 0.56.
10. Water Absorption (ASTM C473): Less than 5 percent of weight.
11. Surface Water Absorption (ASTM C473): Nominal 1.0 grams.
12. Compressive Strength (Applicable Sections of ASTM C472): Nominal 900 pounds per square inch.
13. Flame Spread/ Smoke Development (ASTM E84): Not more than 0 Flame Spread, 0 Smoke Development
14. Combustibility (ASTM E136): Noncombustible
15. Fire resistance rating (UL 790 and ASTM E108): Class A
16. Mold Resistance (ASTM D3273): Scored a 10

.2 Acceptable Product: GP Gypsum, DensDeck® Prime Roof Boards. Other products having the same characteristics will not be excluded.

2.3 PRIMER

.1 The primer applied to the dens deck shall meet or exceed the following physical properties:
- .1 Colour: Black
- .2 Specific gravity at 25 °C 0.94 kg/L
- .3 Coverage 0.15 à 0.25 L/m²*

.2 Acceptable Product: Elastocol 500, Soprema or equal.

2.4 SBS MODIFIED BITUMEN MEMBRANE(S)

.1 Supply and install a double layer of sheet roof membranes composed of SBS modified Bitumen and non-woven polyester reinforcement.

.2 Sheet Membrane specifications:
- .1 Thickness - 3.0 mm (118 mils)
- .2 Reinforcement Non-woven polyester
- .3 Dimensions - 10 x 1 m (33 x 3.3 ft)
- .4 Weight - 3.6 kg/m2 (0.7 lb/ft2)
- .5 Selvedge width - 75 mm (3 in)
- .6 Surface – Thermo-fusible plastic film
- .7 Under face Thermo-fusible plastic film

.3 Sheet membrane properties:

Properties	Before Heat Conditioning	After Heat Conditioning
Strain energy, min MD/XD At 23 °C ± 2 °C (73.4 °F ± 3.6 °F) At -18 °C ± 2 °C (0 °F ± 3.6 °F)	6.5/6.5 kN/m (37/37 lbf/in) 8.0/4.0 kN/m (46/23 lbf/in)	5.5/5.5 kN/m (31/31 lbf/in) 3.1/3.1 kN/m (18/18 lbf/in)
Peak load, min MD/XD At 23 °C ± 2 °C (73.4 °F ± 3.6 °F) At -18 °C ± 2 °C (0 °F ± 3.6 °F)	15/11 kN/m (86/63 lbf/in) 22/17 kN/m (126/97 lbf/in)	14/10 kN/m (80/57 lbf/in) 19/11 kN/m (108/63 lbf/in)
Elongation at peak load, min MD/XD At 23 °C ± 2 °C (73.4 °F ± 3.6 °F) At -18 °C ± 2 °C (0 °F ± 3.6 °F)	50/60 % 30/30 %	15/50 % 7/21 %
Ultimate elongation, MD/XD At 23 °C ± 2 °C (73.4 °F ± 3.6 °F)	55/70 %	45/45 %
Dimensional stability, max MD/XD	±0.5/±0.1 %	
Low temperature flexibility, max MD/XD	18/-18 °C (0/0 °F)	--18/-18 °C (0/0 °F)
Compound stability at 102 °C (216 °F)	121/121 °C (250/250 °F)	

2.5 ROOF INSULATION

.1 Supply and install rigid thermal insulation board made of extruded polystyrene (XPS) composed of closed cell foam.

.2 The XPS insulation shall not have any CFC and HCFC – Zero ozone depletion potential.

.3 Provide a layer of XPS at 38 mm thickness. Insulation boards shall be laid flat on the roof. A second 38 mm layer of XPS shall be installed with staggered joints on top of the base layer. All XPS boards are to have a shiplap profile,

.4 XPS insulation properties:

- .1 Thermal Resistance1 -(RSI-Value [R Value] / 25.4 mm [1 in] @ 24°C [75 °F]) ASTM C518, RSI- 0.88 (R – 5.0)
- .2 Water Vapour Permeance: ASTM E96, 52 ng/Pa•m2•s (0.9 perm)
- .3 Flame spread rating: CAN/ULC-S102.22 > 25 < 500
- .4 Dimensional Stability to ASTM D2126.
- .5 Min. Flexural Strength to ASTM C203, shall be 640 kPa (93 psi)
- .6 Water Absorption, 0.7% by volume, max to ASTM D2842
- .7 Min. Compressive Strength3 to ASTM D1621, shall be 241 kPa (35 psi)
- .8 Limiting Oxygen Index to ASTM D2863, shall be 24 %

2.6 FILTER MAT

.1 Supply and Install filter mat on top of the XPS insulation. The filter material shall be made of non-woven needle punctured polypropylene and polyester fibers.

.2 Filter mat specifications:

.1 Materials: Polypropylene / Polyester

.2 Colour: Grey

.3 Thickness: 1 mm (39.4 mil)

.4 Dimensions: 3.5 x 150 m (11.5 x 492 ft) 1.5 x 75 m (5.75 x 246 ft)

.5 Roll weight: 94 kg (207 lb) 23.6 kg (52 lb)

Properties	Standards	Requirements
Total weight	ASTM D5291	80 g/m2 (0.016 lb/ft2)
Thickness	ASTM D5199	1 mm (39.4 mil)
Ultimate elongation	CAN/ONGC-148.1 (No.7.3)	40-100 %
Breaking strength, typical/minimum	CAN/ONGC-148.1 (No.7.3)	500/450 N (112/101 lbf)
Trapezoidal tear, typical/minimum	CAN/ONGC-4.2 (No.12.2)	230/210 N (52/47 lbf)
Mullen burst, typical/minimum	CAN/ONGC-4.2 (No.11.1)	1500/1350 kPa (218/196 psi)
Permeability	CAN/ONGC-148.1 (No.4)	1.4 mm/sec (55 mil/sec)
Filtration opening size FOS	CAN/ONGC-148.1 (No.10)	90-120 microns (3.5-4.7 mil)

2.7 BALLAST

.1 Gravel ballast used to secure the protected roof membrane assembly must be clean, washed, round or crushed stone falling within the following gradations:

.1 35 mm (1 ½") - 100 % Passing

.2 20 mm (¾") 5 - 20 % Passing

.3 12.7 mm (½") 0 - 6 % Passing

.4 5 mm (3/16") 0 - 2 % Passing

2.8 ACCEPTABLE PRODUCTS

.1 Soprema.

.2 Siplast.

.3 Other products having the same characteristics will not be excluded.

2.9 SEALANTS

.1 As approved by membrane system manufacturer and by RCABC as being compatible with membrane system.

.2 Plastic cement: asphalt, to CAN/CGSB-37.5 coal tar, to CGSB 37-GP-19M.

.3 Sealing compound: to CAN/CGSB-37.29, rubber asphalt type.

2.10 FASTENERS AND ACCESSORIES

.1 Fasteners for mechanically fastening fire barrier sheathing board to steel roof deck shall be wind uplift and corrosion-resistant type as recommended and acceptable to the board manufacturer and to RCABC.

.2 Fire Protection Tape: Fire retardant treated, 165 mm wide tape, composed of glass fleece reinforcement and SBS bitumen. The top side is sanded and the bottom side is covered with a silicone release film.

.3 Splash Blocks: for use where scuppers from elevated roofs spill onto main roof. 600 x 600 x 50 mm stock pre-cast lightweight concrete patio pavers.

PART 3 EXECUTION

3.1 WORKMANSHIP - GENERAL

.1 All workmanship shall be at least in accordance with RCABC standards for a 10 year guarantee for the various systems described.

.2 Use materials and systems in accordance with manufacturer's specifications and instructions.

.3 Leave no work exposed during unsettled weather. Glaze and finish membranes at end of each work period, to direction of roofing inspector.

.4 Work to; and around all features, voids and edges, in best trade manner to produce watertight and weatherproof insulation.

.5 Follow approved stripping and membrane flashing methods at eaves, curb, parapets, etc., in accordance with RCABC system guidelines.

.6 Do priming for modified asphalt roofing in accordance with CGSB 37-GO-15M.

3.2 EXAMINATION OF ROOF DECKS

.1 Before commencing roofing work, this section, together with the Departmental Representative and the Contractor, shall inspect all surfaces scheduled to receive membranes for condition, slopes, nailing supports, sheet metal parapet facing, roof drains, stack vents, mechanical and electrical penetrations, building joints, etc.

.2 All surfaces must be smooth, dry, clean and free of ice and debris. No salt or calcium shall be used to remove snow or ice.

.3 Surfaces scheduled to receive membranes must possess a smooth surface with an even finish; free of excessive moisture, ridges, hollows and sharp corners.

.4 If defects are found, a non-compliance notice will be issued to the Contractor so that adjustments can be made. Proposals for correction of defects shall be submitted to the Departmental Representative for approval.

.5 Corrections of defects shall be made at no additional cost to the Departmental Representative using materials which adhere to the substrate, are stable, do not deform under traffic loads and are compatible with bituminous materials. The deck must be clean, dry, and free of contamination by treatment products, lubricating oils, diesel oil or grease, which could affect the adhesion of the waterproofing or the physical integrity of the membrane itself.

.6 Commencement of roofing/waterproofing work shall imply acceptance of surfaces and conditions.

3.3 PREPARATION

.1 Supply to the various sections concerned in ample time: all inserts, reglets, and accessories required to be built into the work of other sections. Instruct as to the proper location and position of such items.

.2 Co-operate with, and coordinate work with Mechanical trades and other providers of interfacing materials and systems to ensure watertight junctions at roof drains, vents, and other items passing through the roof.

.3 Minimize exposure of the roof deck to the elements by proceeding as soon as the roof deck is completed. Do not work during rain, fog, sleet, ice, or snow. Warm roofing materials before using in cold weather.

.4 Sweep clean and remove all debris from roof deck surfaces before commencement of work.

3.4 EQUIPMENT

.1 Maintain all equipment and tools in good working order.

.2 Use torch types recommended by the manufacturer of the elastomeric asphalt membranes, and acceptable to RCABC and ULC.

3.5 ROOFING SYSTEM DESCRIPTIONS

.1 Roof Assembly Type ‘R1’ (Class A-Insulated):

.1 6 mil Poly Vapour Barrier

.2 13mm Protection Board

.3 Two layers EPS roof insulation, total R Value 36 to 40, adhesive-applied, factory-tapered at crickets and back-slopes.

.4 One-layer 100 mm mineral fibre insulation/protection, (R11.5), adhesive-applied with joints staggered from those of previous layer.

.5 Base sheet torch applied.

.6 Granular cap sheet torch applied.

.7 Stripping and membrane flashing, granular surfaced where exposed to view.

.8 All Parapets and Vergers:

.1 Prepare and prime sheet metal parapet facing.

.2 Torch-applied base stripping ply full height

.3 Granular cap sheet torch-applied

3.6 COMBINATION FIRE BARRIER SHEATHING BOARD / VAPOUR BARRIER INSTALLATION

.1 Install board with long side of sheet resting on and perpendicular to direction of flutes in deck. Short side shall rest on top of flute. Ensure edges are butted tightly.

.2 Stagger end joints a minimum of 600 mm.

.3 Secure board in place with self-drilling non-corrosive screws and companion plates applied at the spacing specified by the board manufacturer and acceptable to RCABC.

3.7 PRIMER APPLICATION

.1 Apply all primers in accordance with the manufacturer's directions to all surfaces prior to application of membranes and other roofing components.

3.8 FIRE RETARDANT TAPE APPLICATION (WHERE REQUIRED)

.1 Prior to the application of any torch on base sheet materials, install a width of tape over substrate cracks, voids in the construction, angle changes at curbs, parapets, penetrations, walls, and penetrations to prevent contact of flame with combustible materials or construction debris.

3.9 MEMBRANE APPLICATION

.1 Base sheet application:

.1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.

.2 Unroll and torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.

.3 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.

.4 Application shall be free of blisters, wrinkles and fishmouths.

3.10 INSULATION INSTALLATION

.1 Insulation: adhesive application.

.1 Apply insulation in following order: Extruded polystyrene in 2 layers with staggered joints.

.2 Adhere insulation to substrate and preceding layers using adhesive applied in accordance with manufacturer's instructions, Factory Mutual and RCABC requirements.

.3 Place boards in parallel rows with ends staggered, and in firm contact with one another.

.4 Cut end boards to suit.

.2 Membrane Flashing (Stipping Plies) Application:

.1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.

.2 Apply base and cap sheet onto substrate in 1 meter wide strips.

.3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal

.4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.

.5 Provide 75 mm minimum side lap and seal.

.6 Torch-weld cap stripping ply and base stripping at non-combustible substrates. Self-adhesive-apply base stripping to combustible substrates.

3.11 INTERIM COMPLETION INSPECTION

.1 Inspect the roofs at or just before the date of substantial completion. Remove all nails and other debris which will cause damage to roof membranes. Ensure the roof has not been damaged by construction activities and the interfacing with the existing roof membrane system is complete and free of any defects. Leave the entire roof ready for final inspection by Inspection Company.

.2 Provide the Departmental Representative with a written certificate that this inspection has been completed.

3.12 ADJUST AND CLEAN

.1 Repair, remove and clean all drips or smears of adhesive and asphalt on exposed finished surfaces or surface to be subsequently finished. Clean off immediately as directed by Departmental Representative.

.2 As the work progresses and at completion of the work, clean up and remove from the site, all rubbish and debris resulting from roofing and sheet metal work.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

1. Section 01 45 00 — Quality Control
2. Section 07 27 13 — Self-Adhered Membranes
3. Section 07 52 00 — Modified Bituminous Membrane Roofing
4. Section 07 90 00 — Sealants

1.2 REFERENCES

1. American Society for Testing and Materials (ASTM International).
   - .1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. Roofing Practices Manual as published by the Roofing Contractors Association of British Columbia.
3. Sheet Metal and Air Conditioning Contractor's National Association, Inc., "Architectural Sheet Metal Manual" (SMACNA).

1.3 SUBMITTALS

1. All submittals shall be in accordance with Section 01 33 00 – Submittals.
2. Samples:
   - .1 Submit 100 x 150 mm samples of each type of sheet metal material, colour and finish.

Part 2 PRODUCTS

2.1 EXPOSED CAP FLASHING (PARAPETS AND GUARD WALLS)

.1 Cap flashing formed from ASTM Standard Specification A653 / A653M, Sheet Steel, Zinc-Coated (galvanized) or Zinc-Iron Alloy Coated (galvanized) by the hot dip process, minimum Grade 33, with a design thickness of 22 gauge (0.853mm) or thicker and a minimum zinc coating designation Z275.

1. Colour as selected by Consultant to match existing cap flashings on site from manufacturer’s standard colour range

2.2 SHEET FLASHING MATERIALS

1. Powder coated finish steel sheet: Commercial quality to ASTM A653/A653M, with Z275 designation zinc coating. Factory-finished with a 2-coat min. silicone modified polyester (SMP) paint system, cured by baking.

.1 Metal thickness shall be minimum 24 gauge but adjusted to accommodate use and span in order to yield a smooth, non-oil-canned surface.

2. Flashings associated with aluminum cladding and curtain walls to match colour and finish as existing flashings on site.

2.3 ACCESSORIES

1. Isolation coating: alkali resistant bituminous paint.

2. Self-adhered Membrane: in accordance with Section 07 27 13.

3. Sealants: in accordance with Section 07 92 00.

4. Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

5. Fasteners: of same material as sheet metal, to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing application.

6. Washers: of same material as sheet metal, 1 mm thick with rubber packings.

7. Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

1. Fabricate metal flashings and other sheet metal work in accordance with applicable RCABC details, SMACNA details and as indicated.

2. Form pieces in 2438 mm maximum lengths. Make allowance for expansion at joints.

3. Hem exposed edges on underside 13 mm. Mitre and seal corners with sealant.

4. Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

5. Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS AND FORMED SHEET METAL

1. Form flashings, copings, cap flashings and fascias to profiles indicated from minimum 24-gauge material.

2. For roof edge metal upstands (“Sheet Metal Parapet”) or other descriptions noted on drawings from minimum 1.22 mm thick galvanized steel or as otherwise noted thickness on drawings.

2.6 FASTENERS

.1 Steel pan head screws with fine thread for metal. Can be self tapping or self drilling.

.2 #8 x 1/2" (minimum) long stainless steel suitable for metal flashing application. Stainless to be 300 Series when exposed- otherwise 300 or 400 Series is acceptable.

.3 For exposed conditions use pan head stainless steel screws, with neoprene washer, heads coloured to match flashing.

2.7 OVERFLOW SCUPPERS

1. Form scuppers from min. 22-gauge thick material.

2. Sizes and profiles as indicated and as per requirements of RCABC and SMACNA.

3. Provide necessary fastenings.

Part 3 EXECUTION

3.1 INSTALLATION

1. Install sheet metal work in accordance with RCABC details, SMACNA details and as indicated.

2. Use concealed fastenings except where approved before installation.

3. Counter flash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock seams forming tight fit over hook strips, as detailed.

4. Use standing seams at corners.

5. Lock end joints and caulk with sealant.

6. Install head & sill flashings at windows & doors in one continuous piece whenever possible.

7. Install flashings lapped "shingle" style with membranes to divert water to the exterior.

8. Install all flashings so that all surfaces have a minimum slope of 1:4 to the exterior.

9. Extend flashing min. 13mm past all cladding, complete with a drip-edge.

3.2 INSTALLATION OF SCUPPERS

1. Install scuppers as indicated and to requirements of RCABC and SMACNA.

END OF SECTION

1.1 GENERAL

1.2 RELATED REQUIREMENTS

.1 This Section shall be read in conjunction with all other Sections in all Divisions.

1.3 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115 (latest edition) Fire Tests of Fire stop Systems.

1.4 DEFINITIONS

.1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.

.2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.

.3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

.4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of non-combustible construction or have "0" annular space in buildings of combustible construction.

.1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.5 SUBMITTALS

.1 Shop Drawings:

.1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CANULC-S102 for surface burning characteristics.

.1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

.2 Closeout Submittals:

.1 Contractor shall provide certificate of completion for firestopping that all firestopping has been installed in accordance with manufacturer's written instructions. Incorporate into Operations and Maintenance Manual.

1.6 QUALITY ASSURANCE

Qualifications:

.1 Installer: person specializing in fire stopping installations

PART 2 PRODUCTS

2.1 MATERIALS

.1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.

.1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULCS115 and not to exceed opening sizes for which they are intended.

.2 Fire stop system rating: to match existing.

.2 Service penetration assemblies: systems tested to CAN-ULC-S115.

.3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.

.4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

.5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.9 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.10 Sealants for vertical joints: non-sagging.

.11 Standard of acceptance: Hilti, 3M, or approved alternate.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.

.1 Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

.1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

.6 Fire stop and smoke seal at:

.1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.

.2 Edge of floor slabs at curtain wall and precast concrete panels.

.3 Top of fire-resistance rated masonry and gypsum board partitions.

.4 Intersection of fire-resistance rated masonry and gypsum board partitions.

.5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

.6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.

.7 Openings and sleeves installed for future use through fire separations.

.8 Around mechanical and electrical assemblies penetrating fire separations.

.9 Rigid ducts: greater than 129 cm²: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

3.4 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed by Consultant.

.2 Install floor fire stopping before interior partition erections.

.3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.

.4 Mechanical pipe insulation: not required.

3.5 FIELD QUALITY CONTROL

.1 Consultant's Review: notify Consultant when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

.1 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

END OF SECTION

PART 1 GENERAL

1.1 SUMMARY

.1 This section specifies standards for caulking and sealants applied by this and other sections.

.2 Refer to other sections for additional caulking and sealants.

1.2 ENVIRONMENTAL AND SAFETY REQUIREMENTS

.1 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.

.2 Comply with requirements specified in the following sections:

.1 Division 1 – Environmental Procedures

.2 Division 1 – Waste Management and Disposal

.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 Sealant and substrate materials to be minimum 5° C.

.5 Should it become necessary to apply sealants below 5° C, consult sealant manufacturer and follow their recommendations.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Division 1 - Waste Management and Disposal.

PART 2 PRODUCTS

2.1 SEALANT MATERIALS

.1 Sealants acceptable for use on this Project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONSs

.1 Urethanes One Part.

.1 Acceptable materials:

.1 Tremco Dymonic 100.

.2 Tremco Dymonic FC.

.3 BASF Masterseal NP1.

.4 Other products having the same characteristics will not be excluded.

.2 Silicones One Part.

.1 Single component neutral cure silicone

.2 Acceptable materials :

.1 Dow Corning 795 (where both sides consist of nonporous surfaces)

.2 Dow Corning 790 Low modulus (where both sides consist of cementitious substrates)

.3 Other products having the same characteristics will not be excluded.

.3 Air Barrier Sealant (for poor bonding surfaces). To adhere to spun bonded polyolefin and fibrous or woven air barrier sheet material and poly faced self adhered membranes.

.1 Acceptable material: Dow Corning 758. Other products having the same characteristics will not be excluded.

.4 Acoustical Sealant

.1 To CAN/CGSB-19.21

.5 Butyl Sealant

.1 Non-curing, flexible polyisobutylene sealant.

.2 Acceptable products: Tremco Butyl sealant. Other products having the same characteristics will not be excluded.

.6 Acrylic Latex One Part.

.1 To CGSB 19-17.

.7 Preformed Compressible and Non-Compressible back-up materials.

.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.

.1 Extruded closed cell foam backer rod.

.2 Size: oversize 40 to 50%.

.2 Neoprene or Butyl Rubber

.1 Round solid of Shore A hardness 70.

.3 High Density Foam.

.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m^3 density, or neoprene foam backer, size as recommended by manufacturer.

.4 Bond Breaker Tape.

.1 Polyethylene bond breaker tape, which will not bond to sealant.

2.3 SEALANT SELECTION

.1 Perimeters of exterior openings where frames meet exterior façade of building: Sealant type: one component Silicone, non-sag.

.2 Coping joints and coping-to-façade joints & flashing joints: Sealant type: butyl.

.3 Interior control and expansion joints in floor surfaces: Sealant type: one component urethane self-levelling.

.4 Countertops (e.g. sinks, urinals, basins, vanities): Sealant type: silicone, mildew resistant.

.5 Exposed interior control joints in drywall: Sealant type: acrylic latex.

.6 Concealed joints in sound attenuated walls and ceilings: Sealant type: acoustic.

.7 Colour of sealants: selected by Consultant from manufacturer's standard range to match adjacent surfaces.

.8 Joint cleaner: xylol, methyl ethyl ketone or non-corrosive type recommended by sealant manufacturer and compatible with joint forming materials.

2.4 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 Primer: as recommended by manufacturer.

PART 3 EXECUTION

3.1 PREPARATION OF JOINT SURFACES

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil, grease, and other matter which may impair work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility in materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.2 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

3.3 BACK UP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.4 MIXING

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

3.5 APPLICATION

.1 Sealant.

- .1 Apply sealant in accordance with manufacturer's written instruction.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.2 Apply sealant in continuous beads.

.3 Apply sealant using gun with proper size nozzle.

.4 Use sufficient pressure to fill voids and joints solid.

.5 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.6 Tool exposed surfaces before skinning begins to give slightly concave shape.

.7 Remove excess compound promptly as work progresses and upon completion.

.8 Curing.

- .1 Cure sealants in accordance with sealant manufacturer's instructions.
- .2 Do not cover up sealants until proper curing has taken place.

.9 Cleanup.

- .1 Clean adjacent surfaces immediately and leave work neat and clean.
- .2 Remove excess and droppings, using recommended cleaners as work progresses,
- .3 Remove masking tape after initial set of sealant.

END OF SECTION

PART 1 GENERAL

1.1 RELATED WORK

.1 Section 07 21 00 Insulation

.2 Section 07 92 00 Joint Sealants

1.2 REFERENCE STANDARDS

.1 ASTM C 473 Standard Test Methods for Physical Testing of Gypsum Panel Products.

.2 ASTM C 630 Standard Specification for Water-Resistant Gypsum Backing Board.

.3 ASTM C 840 Standard Specification for Application and Finishing of Gypsum Board.

.4 ASTM C 1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

.5 ASTM C 1396 Standard Specification for Gypsum Board.

.6 ASTM C 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

.7 Unless otherwise shown or specified, materials and workmanship shall meet the standards detailed in the Specification Standards Manual of the British Columbia Wall and Ceiling Industry and printed matter issued by the product manufacturers.

.8 Where standards are outlined herein it will not preclude the use of other standards included in the Specification Standards Manual where such standards are approved in writing by the Departmental Representative.

.9 Reference in these project specifications to Section numbers, Parts, and Item numbers means those within Section 9.6 of the Specification Standards Manual.

.10 National Building Code of Canada (NBCC), 2015, and BC Building Code (BCBC) 2018.

1.3 QUALITY ASSURANCE

.1 Contractor executing the work of this section shall have experience in successful installation of work of type and quality indicated and specified.

.2 Single source responsibility: Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.

1.4 SUBMITTALS

.1 All submittals shall be in accordance with Division 1 – Submittal Procedures.

.2 Product Data Sheets:

1. Submit manufacturer’s product data sheets for products proposed for use in the work of this section.

1.5 ENVIRONMENTAL REQUIREMENTS

.1 Environmental requirements, general: Comply with requirements of referenced gypsum board application standards and recommendations of gypsum board manufacturer, for environmental conditions before, during and after application of gypsum boards.

.2 Cold Weather Protection: When ambient outdoor temperatures are below 12°C maintain continuous, uniform comfortable building working temperatures of not less than 12°C for a minimum period of 48 hours before, during and following application of gypsum board and joint treatment materials or bonding of adhesives.

.3 Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.

.4 Protection: Provide adequate protection of materials and work of this section from damage by weather and other causes. Protect work of other trades from damage resulting from work of this section. Make good such damage at no additional cost to the Departmental Representative.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Store materials in protected dry areas. Store gypsum board flat in piles with edges protected.

.2 Ensure that finish metal members are not bent, dented, or otherwise deformed.

.3 Deliver products supplied under the work of this section only to those who are responsible for installation, to the place they direct, and to meet installation schedules.

.4 Package fire rated materials with labels attached.

PART 2 PRODUCTS

2.3 EXTERIOR SHEATHING BOARD

.1 Exterior grade fiberglass mat faced on front and back sides and long edges, silicone-treated water-resistant gypsum core, to ASTM C1177/C1177M-06 Type ‘X’, fire rated where indicated.

.2 Exposure to weather: Comply with manufacturer’s printed instructions. Provide protection prior to exposure for periods greater than manufacturer’s recommendations and warranty.

.3 Acceptable products:

.1 CertainTeed ‘GlasRoc Sheathing’.

.2 CGC ‘Securock Glass-Mat Sheathing’.

.3 Georgia-Pacific ‘Dens-Glass Gold’.

.4 Other products having the same characteristics will not be excluded.

PART 3 EXECUTION

3.9 CLEAN-UP

.1 Clean-up rubbish daily and take care to avoid defacing adjoining work.

END OF SECTION