APPENDIX "G"

Part 1 General

1.1 SECTION INCLUDES

.1 Shop Drawings and Product data.

.2 Certificates and transcripts.

1.2 RELATED SECTIONS

.1 Section 01 60 00 – Product Requirements.

.2 Section 01 78 15 - Closeout Documentation.

.3 Other sections requesting submittals.

.4 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 ADMINISTRATIVE

.1 Submit to Consultant submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

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

.3 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents.

.4 Submittals not stamped, signed, dated, identified as to specific project, and attesting to their being reviewed will be returned without being examined and shall be considered rejected.

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

.6 Verify field measurements and affected adjacent Work are coordinated.

.7 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.

.8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.

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

1.4 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 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 coordinated, regardless of Section under which

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

.3 Allow seven (7) days for Consultant's review of each submission.

.4 Adjustments made on Shop Drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

.5 Make changes in Shop Drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of any revisions other than those requested.

.6 Submissions to 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 other parts of the Work.

.7 After Consultant's review, distribute copies.

.8 Submit one (1) electronic copy of Product data sheets or brochures for requirements requested in specification sections and as requested by Consultant where Shop Drawings will not be prepared due to standardized manufacture of Product.

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

.10 If upon review by Consultant, 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 re-submission of corrected Shop Drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Close-out submittals.

1.2 RELATED SECTIONS

.1 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on a paper copy titled RECORD DRAWINGS.

.2 Record information concurrently with construction progress. Do not conceal Work of the Project until required information is accurately recorded.

.3 Contract Drawings and Shop Drawings - legibly mark each item to record actual construction, including:

.1 Field changes of dimension and detail.

.2 Changes made by change orders.

.3 Details not on original Contract Drawings.

.4 References to related Shop Drawings and modifications.

.4 Specifications: Legibly 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.

1.4 WARRANTIES AND BONDS

.1 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of the applicable item of work. Designate name on warranty document in the name of the Owner.

1.5 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: Include product data, with catalogue number, size, composition, and colour and texture designations for inclusion in the Maintenance Manual.

.2 Include instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

1.6 STORAGE, HANDLING AND PROTECTION

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration. Store in original and undamaged condition with manufacturer's seal and labels intact.

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

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Inspections and declarations.

.2 Closeout submittals

.3 Record (as-built) documents and samples.

.4 Record documents.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 INSPECTIONS AND DECLARATIONS

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

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

.2 Request Consultant's Review.

.2 Consultant's Review: Consultant and Contractor will perform a review of Work to identify defects or deficiencies. Correct defective and deficient 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, and are fully operational.

.4 Certificates required by authorities having jurisdiction have been submitted.

.5 Work is complete and ready for Final Inspection.

.4 Final Inspection: When items noted above are completed, request final inspection of Work by Consultant, and Contractor. If Work is deemed incomplete by Consultant, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: When Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for Substantial Performance of the Work.

.6 Commencement of Warranty Periods: The date of Substantial Performance of the Work shall be the date for commencement of the warranty period.

.7 Commencement of Lien Periods: The date of publication of the certificate of Substantial Performance of the Work shall be the date for commencement of the lien period, unless required otherwise by the lien legislation applicable at the Place of the Work.

.8 Final Payment: When Consultant consider final deficiencies and defects have been corrected and it appears requirements of Contract have been completed, make application for final payment.

.9 Payment of Hold-back: After issuance of certificate of Substantial Performance of the Work, submit an application for payment of hold-back amount.

1.4 CLOSEOUT SUBMITTALS

.1 One (1) week prior to Substantial Performance of the Work, submit to the Consultant, two (2) final copies of operating and maintenance manuals in Canadian English.

.2 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as Products provided in

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

.4 Pay costs of transportation.

1.5 RECORD (AS-BUILT) DOCUMENTS AND SAMPLES

.1 In addition to requirements in General Conditions, maintain at the site for Consultant and Owner one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to the Contract.

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

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Maintain as-built documents in clean, dry and legible condition. Do not use as-built documents for construction purposes.

.3 Keep as-built documents and samples available for inspection by Consultant.

1.6 RECORD DOCUMENTS

.1 Prior to Substantial Performance of the Work, transfer the marked up information from the as-built documents to a master set of drawing and specification files provided by the Consultant, as follows:

.1 Drawings: Paper copy.

.2 Specifications: Adobe Acrobat (PDF).

.2 Mark revised documents as RECORD DOCUMENTS. Include all revisions, with special emphasis on mechanical, electrical, and fire & life safety systems and features.

.3 Submit completed record documents to Consultant as two (2) hard copy sets.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Foamed-in-place insulation at exterior and interior wall crevices requiring a thermal seal.

.2 Foamed-in-place insulation at junctions of dissimilar wall and roof materials to achieve a thermal and air seal.

1.2 RELATED SECTIONS

.1 Section 07 22 16 – Roof Board Insulation: Continuity of thermal insulation.

1.3 REFERENCES

.1 CAN/ULC-S705.1-01 - Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Material - Specification (Includes Amendments 1 and 2, 2005).

.2 CAN/ULC-S705.2-05 - Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density - Application.

.3 CUFCA (The Canadian Urethane Foam Contractors Association).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Section 01 31 00: Project management and coordination procedures.

.2 Coordination:

.1 Coordinate with other work having a direct bearing on work of this section.

.2 Coordinate work to ensure timely placement of insulation within construction spaces.

.3 Pre-installation Requirements: Coordinate with architect before starting work of this section.

1.5 SUBMITTALS FOR REVIEW

.1 Section 01 33 00: Submission procedures.

.2 Product Data: Provide product description and insulation properties.

1.6 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

.2 Installation Data: Manufacturer's special installation requirements, preparation requirements.

.3 Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.7 CLOSEOUT SUBMITTALS

.1 Section 01 78 10: Submission procedures.

1.8 QUALITY ASSURANCE

.1 Products of This Section: Manufactured to ISO 14000 certification requirements.

.2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years documented experience.

.3 Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years documented experience, and licensed and certified by the SPF Quality Assurance Program used by [CUFCA].

1.9 REGULATORY REQUIREMENTS

.1 Conform to applicable code for flame and smoke and concealment requirements.

Part 2 Products

2.1 MATERIALS

.1 Insulation: Spray-applied rigid cellular polyurethane:

.1 Thermal Resistance: R-24.

.2 Compressive Strength (at yield or 10 % deformation): 25 psi.

.3 Water Vapor Permeability (maximum): 3.0 perm-inches.

.4 Water Absorption (maximum): 4%.

.5 Tensile Strength (minimum): 32 psi.

.6 Closed cell content (minimum): 90%.

.7 Flame Spread (maximum): 500.

.2 Insulation: CAN/ULC-S705.1, spray-applied rigid cellular polyurethane insulation, medium density.

Part 3 Execution

3.1 EXAMINATION

.1 Verify work within construction spaces or crevices is complete prior to insulation application.

.2 Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.

3.2 PREPARATION

.1 Mask and protect adjacent surfaces from over spray or dusting.

.2 Apply primer in accordance with manufacturer's written instructions.

3.3 INSTALLATION

.1 Apply insulation to CAN/ULC-S705.2 and manufacturer's written instructions.

.2 Apply insulation by spray method, to a uniform monolithic density without voids.

.3 Apply to achieve a thermal resistance R-24.

.4 Coordinate installation of protective covering to achieve fire rating required.

.5 Patch damaged areas.

3.4 FIELD QUALITY CONTROL

.1 Inspection will include verification of insulation thickness.

3.5 PROTECTION OF FINISHED WORK

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

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Board insulation

.2 Vapour retarder.

.3 Accessories.

1.2 RELATED SECTIONS

.1 Section 07 27 10 - Air Barriers: Continuing air barrier materials to adjacent construction.

1.3 PERFORMANCE REQUIREMENTS

.1 Materials of this section shall provide continuity of thermal vapour retarder and air barrier at building enclosure elements in conjunction with materials specified in Sections 07 27 10.

1.4 SUBMITTALS

.1 Section 01 33 10: Submission procedures.

.2 Product Data: Provide product data on insulation products, adhesives, and accessories.

Part 2 Products

2.1 MATERIALS - INSULATION

.1 Polystyrene Insulation: CAN/ULC-S701, Type 4, extruded cellular polystyrene.

- .1 Edges: Ship lap.
- .2 Thickness:
  - .1 Insulation over metal roof deck: two (2) inch.
  - .2 Insulation strips to fit valleys between roof seams: one (1) inch.
- .3 Thermal Resistance: R-5/inch.
- .4 Maximum Vapour Permeance: 0.5 perms (29 ng/(s·m^2·Pa)).
- .5 Minimum Compressive Strength: 30 psi (207 kPa).
- .6 Maximum Water Absorption: 1.5%.
- .7 Dimensional Stability: Maximum 2% linear change.
- .8 Water Capillarity: None.
- .9 Water Affinity: Hydrophobic.

2.2 MATERIALS - ADHESIVES

.1 Adhesive: Type recommended by insulation manufacturer for application.

2.3 ACCESSORIES

.1 Tape: UV resistant polypropylene; translucent; 2 inch wide.

.2 Insulation Fasteners: Of type to be mechanically fastened to surface to receive rigid insulation; length to suit insulation thickness; capable of securely and rigidly fastening insulation in place.

.1 Product: Thermal-Grip ci Prong washers & Grip-Deck screws, manufactured by Rodenhouse.

.3 Screws: Corrosion resistant, length to suit.

Part 3 Execution

3.1 INSTALLATION – ROOF DECK

.1 Install to manufacturer's instructions.

.2 Install boards on roof deck surface to perimeter, vertically to minimize number of ship lap joints in direction of water travel.

.3 Press ship lap joints together for tight fit, no gaps.

.4 Mechanically fasten boards to roof deck with plastic washers and compatible, rust resistant metal screws, eight (8) screws for every 24" x 96" board.

.5 Cut insulation boards lengthwise for tight fit in valleys between metal roof seams. Ensure height of foam is level with top of metal roof profile.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Insulation.

.2 Thermoplastic-polyolefin roofing.

.3 Flashing and accessories.

1.2 RELATED SECTIONS

.1 Section 06 10 00 – Rough Carpentry: Wood nailers and cants.

.2 Section 07 22 16 – Roof Board Insulation: Supporting insulation strips.

.3 Section 07 62 10 - Sheet Metal Flashings: Weather protection to base flashings.

1.3 SYSTEM DESCRIPTION

.1 Fully adhered thermoplastic-polyolefin roofing assembly: 80-mil single-ply membrane.

1.4 SUBMITTALS

.1 Section 01 33 10: Submission procedures.

.2 Product Data: Provide product data for thermoplastic membrane, base flashing materials, insulation and protection board.

1.5 QUALITY ASSURANCE

.1 Perform Work to Roofing Contractors Association of British Columbia certification program and roofing manufacturer's instructions.

.2 Installer Qualifications:

.1 Company specializing in performing the work of this section with minimum ten (10) years documented experience and approved by the manufacturer.

.2 Minimum of three (3) projects of similar size and scope.

1.6 REGULATORY REQUIREMENTS

.1 FM: Roof Assembly Classification, Class 1 Construction, wind uplift requirement of 1-60, to FM 1-29 "Design Wind Loads".

1.7 WARRANTY

.1 Product Warranty: Provide comprehensive thirty (30) year warranty on roofing, dated from time of Substantial Performance.

Part 2 Products

2.1 MEMBRANE MATERIALS

.1 Sheet Membrane: Thermoplastic-polyolefin, 80-mil.

2.2 DECK COVERING MATERIALS

.1 High density polyisocyanurate or extruded polystyrene, minimum 40 psi (275 kPa) compressive strength, glass mat facing, ½ inch thick.

2.2 INSULATION

.1 Insulation: CAN/ULC-S701, extruded polystyrene, Type 4, thickness 2 inch, ship lapped edges.

2.3 ACCESSORIES

.1 Extruded polystyrene profile strips as specified in Section 07 22 16. Custom cut to fit valleys between metal roof seams and support roof deck insulation boards above.

.2 Metal Flashing: Metal cap and counterflashing as specified in Section 07 62 10.

.3 Cant Strips: Pressure-treated wood, dry and true, or extruded polystyrene, sloped side as specified in drawings.

Part 3 Execution

3.1 PREPARATION

.1 Metal Roof Deck: Verify flatness and tight joints of existing metal roofing. Remove or flatten all deformities protruding more than ½ inch above roof plane.

3.2 FLASHINGS AND ACCESSORIES

.1 Stagger joints between deck covering material and insulation.

.2 Seal flashings and flanges of items penetrating membrane.

.3 Install metal base flashing and cap flashing to Section 07 62 10.

3.3 MEMBRANE APPLICATION

.1 Install roofing membranes and membrane flashings to manufacturer's written installation instructions for selected system.

.2 Apply membrane; lap and seal edges and ends permanently waterproof.

.3 Roll continuously to avoid wrinkles, air pockets or fish-mouths.

.4 Extend membrane up cant strips and minimum of 8 inches onto vertical surfaces.

.5 Extend membrane over vapour and air barrier of wall construction and seal.

.6 Seal membrane around roof protrusions and penetrations.

.7 Provide waterproof cut-off to membrane at end of day's operation. Remove cut-off before resuming roofing.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Metal flashings.

1.2 RELATED SECTIONS

.1 Section 06 10 00 – Rough Carpentry: Wood blocking, nailers, and grounds.

.2 Section 07 54 23 – Thermoplastic-Polyolefin: Roofing.

1.3 SUBMITTALS

.1 Section 01 33 10: Submission procedures.

1.4 QUALITY ASSURANCE

.1 Perform sheet metal Work to Roofing Contractors Association of British Columbia standard details and requirements and roofing manufacturer's instructions.

.2 Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years documented experience and approved by the manufacturer.

Part 2 Products

2.1 MATERIALS

.1 Pre-coated Galvanized Steel: ASTM A653/A653M, G90 zinc coating designation; 0.0217 inch (26 Ga) core steel, prefinished with coating; colour as selected by architect.

2.2 ACCESSORIES

.1 Fasteners: Same material and finish as flashing metal.

.2 Solder and Flux: [50/50] type.

2.3 FABRICATION

.1 Form sections true to shape, accurate in size, square, and free from distortion or defects.

.2 Fabricate cleats and starter strips of same material as sheet, minimum 1/2 inch wide, inter-lockable with sheet.

.3 Form pieces in longest practical lengths. Hem exposed edges on underside 1/2 inch; mitre and seam corners.

.4 Form material with flat lock seam.

.5 Fabricate corners from one piece with minimum 18 inches long legs; seal with sealant.

.6 Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

.7 Fabricate flashings to allow toe to extend 2 inches over roofing. Return and brake edges.

2.4 FINISHES

.1 Shop prepare and prime exposed ferrous metal surfaces.

.2 Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 0.015 inch.

Part 3 Execution

3.1 PREPARATION

.1 Install starter and edge strips, and cleats before starting installation.

.2 Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

3.2 INSTALLATION

.1 Conform to Drawing details included in architectural drawings and Roofing Contractors Association of British Columbia standard details.

.2 Insert flashings into reglets to form tight fit.

.3 Secure flashings in place using concealed fasteners.

.4 Seal flashings into reglets with sealant.

.5 Apply plastic cement compound between metal flashings and felt flashings.

.6 Seal metal joints watertight.

END OF SECTION