1.0 *GENERAL*

1.1 *Related Work and UBC Guidelines*

1. *Section 07 00 10 Building Envelope – General Requirements*
2. *Section 07 10 00 Damproofing and Waterproofing*
3. *Section 07 25 00 Weather Barriers*
4. *Section 07 50 00 Membrane Roofing*
5. *Section 07 55 63 Vegetated Protected Membrane Roofing*
6. *Section 07 40 00 Cladding*
7. *UBC Energy and Emissions Targets*
8. *UBC Energy Modelling Guidelines*
9. *Owner's Project Requirements*

1.2 *Related External Documents*

.1 *Latest edition of the British Columbia Building Code (BCBC).*

1.3 *Description*

.1 *Work includes thermal insulation used in wall, roof and below-grade assemblies.*

1.4 *Coordination*

.1 *The Guidelines apply to all work completed within buildings on both UBC Vancouver and UBC Okanagan campuses unless stated otherwise.*

.2 *In instances where conflicts are found between these guidelines and provincial regulations or codes, please notify the UBCV Technical Review Team Architect or UBCO Facilities Management.*

.3 *These guidelines are intended to be read by design consultants and their content integrated into construction drawings and specifications. Construction documents are not to reference the technical guidelines directly.*

.4 *The Registered Coordinating Professional is required to coordinate these requirements with other disciplines.*

1.5 *Product Data Submittals*

.1 *Submit required documents to consultants in accordance with Section 013300 Submittal Procedures*

.2 *O&M Submittals*

- .1 *Manufacturers Safety Data sheet (MSD) for all toxic or potentially toxic materials.*
- .2 *Environmental Product Declaration (EPD)*
- .3 *Where required, include verification product does not contain materials identified on the Living Building Challenge 4.0 Red List – April 2022*

.3 *Shop drawings (including all enclosure interface details) sealed and signed by a professional Engineer.*

.4 *Manufacturer test data to confirm performance criteria.*

1.6 *Quality Control and Assurance*

.1 *Quality Control*

- .1 *During construction, contractor to arrange for a third party review of spray polyurethane insulation installation. Cost of third party review to be paid by contractor.*
- .2 *Manufacturer's representative to undertake field reviews upon request by the Consultant or UBCV Technical Review Team Architect or UBCO Facilities Management. Reviews shall be accompanied with a written field report.*

.2 *Commissioning*

- .1 *Consultant and contractor to confirm installation of insulation being installed to meet project's assembly effective thermal performance requirement.*

2.0 *DESIGN AND PERFORMANCE REQUIREMENTS*

2.1 *Design Requirements*

.1 Buildings shall meet or exceed performance requirements of latest applicable version of the BCBC.

.2 Energy modelling shall conform to:
.1 The UBC Energy Modelling Guidelines, Version 3.1
.2 Energy and Emissions Requirements based on the Project Specific Requirements.

.3 Spray Polyurethane Insulation shall meet the requirements of CAN/ULC-S705.2-98, Spray Polyurethane Insulation.

.4 Wall assembly thermal insulation is typically located outside the air barrier and inside cladding materials, neither of which are intended to be disturbed for 75 years or more. The performance of the insulation must be sustained during this service life.

.5 Insulation and other thermal separations are to be located to prevent condensation on the interior surface of all building envelope assemblies.

.6 Thermal insulation shall be placed exterior of the moisture barrier. When specific conditions limit exterior insulation amounts, split insulated walls could be considered provided at a minimum 2/3rds of the insulation clear field performance is exterior of the vapour barrier.

.7 Expanded polystyrene insulation may not be used where in contact with ground, below-ground or wet locations.

.8 Provide sufficient thermal resistance to minimize condensation at intersecting building assemblies. Consider the use of interior Spray Polyurethane Insulation.

.9 For plastic foam insulations, CAN/ULC-S770 Standard shall apply for establishing the required "R" value (known as LTTR "Long Term Thermal Resistance" value in this standard).

2.2 *Performance Requirements*

.1 Energy targets for new projects and major renovations are developed to reduce UBC's energy use over time and support UBC's Climate Action Plan (CAP 2030). To meet these targets, energy modeling utilizes TEDI targets.

.2 Overall effective R-values for building assemblies shall at a minimum meet the prescriptive requirements of the latest BC Building Code version, except as described in 2.

.3 For UBCV projects only, projects meeting a TEDI target, projects will be asked to confirm by consultant memo that thermal bridging calculations have been completed and how the worst impacts have been mitigated.

.4 Thermal bridging effects shall be accounted for, evaluated and provided identifying how thermal bridging will be mitigated to meet overall effective thermal performance requirements. When calculating the clear field value of assemblies (or equivalent minimum effective R-value) and the overall effective thermal performance of the opaque assemblies using the thermal transmittances between assemblies, use one of the following techniques:

.1 If the assembly matches one of those available in the online, "Building Envelope Thermal Bridging Guide: Analysis, Applications & Insights" document, then use calculated values in the document. This document is available at: https://thermalenvelope.ca/.
.2 Use two-dimensional heat transfer modeling performed by a qualified professional for thermal bridges that are continuous along one axis such as studs, exposed slab edges, balconies, z-girts, etc. or

.3 Use three-dimensional heat transfer modeling performed by a qualified professional for intermittent or point thermal bridges including repetitive penetrations such as cladding attachment screws or clips, beam penetrations, multiple canopy penetrations etc.
.4 One-off penetrations such as roof drains, louvers, scuppers or single canopy penetrations etc. need not be modeled.

3.0 *MATERIALS*

3.1 *Product Selection*

.1 Materials
.1 For plastic foam insulations, AN/ULC-S770 Standard shall apply for establishing the required "R" value (known as LTTR "Long Term Thermal Resistance" value in this standard).
.2 Expanded polystyrene insulation shall not be used where in contact with ground, below-ground or wet locations.
.3 The use of spray-in-place polyurethane (spray foam) insulation at intersecting building assemblies is accepted where deemed necessary (refer to the latest edition of BCBC, Part 5). It should be noted that spray foam insulation has very high global warming potential (GWP) and therefore only used where other insulation types cannot be used.
.4 Materials considered to have sufficient service life include:
.1 For rainscreen walls: semi rigid rock wool and fibreglass.
.2 For roofs: refer to RCABC's list of approved products.
.3 Spray foam insulation should only be used when protected by concrete, masonry or gypsum wall board such as in a precast or cast in place sandwich application.
.5 Fasteners (attachment of cladding, sub-girts, flashings, etc.) located in the exterior wall cavities shall be of stainless steel.

3.2 *Acceptable Products*

.1 Mineral Wool Insulation:
.1 Non-combustible, inorganic glass fiber with thermosetting resin binder formed into insulating boards. Semi-rigid or rigid, as required by the Project.
.2 Surface burning characteristics to CAN/ULC S102. Flame spread 0, smoke developed 0.
.3 Non-combustibility to CAN/ULC S114.

.2 Extruded Polystyrene (XPS):
.1 Closed- cell, rigid extruded polystyrene, no HFC 134a with low global warming potential of less than 10 kgCO2/m2 @RSI =1,R5.68.
.2 Meet CAN/ULC-S701.1, Type 4.

.3 Fibreglass Batt:
.1 Fibreglass batt preformed, unfaced, and flexible blanket insulation for friction-fit installation in wood or steel framed cavity.
.2 Non-combustible to CAN/ULC-S702
.3 Surface burning characteristics to CAN/ULC-S102. Flame spread 0, smoke developed 0.

.4 Rigid Cellular Polyisocyanurate:

.1 Closed cell, polyisocyanurate foam core insulation bonded on each side to fiberglass facers during the manufacture process.
.2 Meet CAN/ULC-S704, Type 3 and ASTM C1289 Type II, Class 2, Grade 2.

.5 Concrete Faced Insulation Panels:
.1 Concrete topped thermal insulation boards made of closed-cell rigid extruded polystyrene (XPS) topped with latex modified concrete mix. XPS to meet 3.2.2.1.
.2 Meet CAN/ULC S701.1, Type 4.

.6 Spray foam polyurethane:
.1 Insulation: spray applied closed cell, rigid polyurethane foam to CAN/ULC-S705.1 and ASTM C1029 Type 2, two component, Medium density. Zero ozone depletion blowing agent.
.2 Meet ULC 101, Standard Methods of Fire Endurance Tests of Building Construction and Materials. (CAN/ULC S101-140) and ULC 102, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies. (CAN/ULC S102).

.7 Expanded Polystyrene
.1 Type I and II EPS (expanded polystyrene) insulations are permitted however are intended to be used to provide slope to drain in combination with polyisocyanurate insulation. EPS insulation to be protected by at least 2" of mineral wool or XPS insulation.

******END OF SECTION******