Recommended Design Considerations

and

Guide Specifications For

Commercial Building Insulation

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This guide specification document is provided by Insulation Contractors Association of America for use by design professionals in preparing project specifications for various types of building insulation systems. Contact the ICAA Commercial Building Insulation Committee c/o ICAA for more information on this or other products at telephone: (703) 739-0356, fax: (703) 739-0412, or e-mail: icaa@insulate.org. Website: www.insulate.org.

Under CSI's MasterFormat™, this section would typically be classified as Section 07210 - Building Insulation. Change section name or number as desired.

Specifier Notes: Comment text is shown in blue like this. Optional text [**is shown bold in brackets like this**]. Requirements for project-specific language to be inserted are indicated like this: <**Insert language**>. Remove specifier notes and unused optional text in final version of the specification document. Retain, edit or delete language below to suit project requirements and specifier practice.

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SECTION 07210

(COMMERCIAL) BUILDING INSULATION

PART 1 GENERAL

1.1 SUMMARY

Specifier Note: Always retain this Article. Edit to suit project requirements and specifier practice. The insulation types in paragraph and sub-paragraphs below are provided for informational purposes. Alternatively it may be desirable under this Article to describe specific building insulation applications such as perimeter insulation under slabs-on-grade, perimeter wall insulation (supporting backfill), cavity-wall insulation, concealed building insulation, exposed building insulation, loose-fill building insulation, and spray-applied cellulose insulation.

A. This Section includes the following:

1. Rigid building insulation.
2. Semi-rigid building insulation.
3. Thermal batt and blanket insulation.
4. Loose-fill building insulation.
5. Spray-applied fibrous insulation.
6. Spray-applied polyurethane.
7. Sound attenuation insulation.
8. Vapor retarders used in conjunction with insulation.
9. Attachment devices and related accessories.

Specifier Note: List below only products, construction, and equipment that a reader might expect to find in this Section but are specified elsewhere.

B. Related Sections include the following:

1. Division 2 Section "Subdrainage" for insulated drainage panels.
2. Division 4 Section "Unit Masonry" for insulation installed in cavity walls and masonry cells.
3. Division 6 Section "Rough Carpentry" for foam-plastic board sheathing over wood framing.
4. Division 7 Section "Subgrade Waterproofing" for insulation installed with waterproofing.
5. Division 7 Section "Exterior Insulation and Finish System" for insulation specified as part of these systems.
6. Division 7 Section "Roofing" for insulation specified as part of roofing construction.

7. Division 7 Section "Thermal Barriers" for coverings installed with plastic foam insulation.
8. Division 7 Section "Perimeter Fire Containment and Smoke Stop Systems" for insulation installed as part of a perimeter fire-resistive joint system.
9. Division 9 Section "Gypsum Drywall" for insulation of metal-framed assemblies specified by reference to this Section.
10. Division 15 Section "Mechanical Insulation" for insulation around ductwork and piping.

1.2 SUBMITTALS

A. Product Data and Manufacturer's Installation Recommendations: For each product specified.

Specifier Note: Retain paragraph below if shop drawings of complex insulation work will be required.

B. Shop Drawings: Include [**plans, elevations, sections, details of installation and attachments to other Work**].

C. Samples: For each type of insulation required.

D. Product Certificates: Signed by manufacturer certifying that products furnished comply with requirements.

E. Research and Evaluation Reports: Evidence of compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or per ASTM methodology for insulation products.

Specifier Note: Retain paragraph and sub-paragraph below if specific installer qualifications will be required.

G. Evidence of installer qualifications.

1. Provide information concerning installer experience which is similar in scope and scale to requirements of the Project, including location of work and persons to be contracted as references.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of building insulation through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Surface-Burning Characteristics: ASTM E 84.
2. Fire-Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

C. Installer Qualifications: Qualified [**, authorized, and trained**] by manufacturer to install manufacturer's products, and who has completed installations similar in design, scope and scale to those indicated for this Project. Certified by Insulation Contractors Association of America as a Commercial Building Insulation Contractor in good standing.

Specifier Note: Retain paragraph below if SPI/SPFD Accreditation for foam applicators will be required.

1. Contractor/Supplier level accreditation by SPI/SPFD Accreditation Program, approved or certified by the foam manufacturer as qualified to install the specified system.

D. Manufacturer Qualifications: <**Insert manufacturer qualifications.**>

E. Regulatory Requirements: Comply with the requirements of the following:

1. <**Insert regulatory requirements.**>

Specifier Note: Retain paragraph below if a pre-installation conference will be required.

F. Pre-installation Conference: Conduct conference at Project site to comply with Division 1 Section **["Project Meetings."]** <**insert title.**>

1.4 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Handling: Use care when unloading and moving materials around the installation area so as to avoid damage.

D. Storage: Protect from exposure to harmful environmental conditions at temperature and humidity conditions recommended by manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. [**Available**] Manufacturers: Subject to compliance with requirements, provide products by [**one of**] the following:

1. Company Name: <**Insert company name(s).**>
2. Contact Information: <**Insert contact information.**>

2.2 RIGID CELLULAR PLASTIC INSULATION

A. Provide rigid expanded polystyrene board insulation, Type I, conforming to ASTM C 578 with an R-value of not less than <**Insert R-value**> per inch and a thickness of <**Insert thickness**>.

B. Provide rigid extruded polystyrene board insulation, Type IV, conforming to ASTM C 578 with an R-value of not less than <**Insert R-value**> per inch and a thickness of <**Insert thickness**>.

C. Provide rigid polyisocyanurate board insulation, Type I, Class I, with foil facers both sides, conforming to ASTM C 1289 with a minimum LTTR (Long Term Thermal Rating) of <**Insert LTTR value**> and a thickness of <**Insert thickness**>.

2.3 UNFACED RIGID AND SEMI-RIGID FIBROUS BOARD INSULATION

Specifier Note: Glass fiber insulation with a density of 6 lbs/cu. ft. or more is considered rigid. Lower densities are considered are semi-rigid.

A. Provide resin bonded mineral fiber, [**rock wool**] [**slag wool**] [**or**] [**glass fiber**] insulation conforming to ASTM C 612, Type I-A.

B. Fire Performance: Maximum flame spread index 25 and smoke developed index 450.

C. R-value: Not less than <**Insert R-value**> with a nominal actual density of <**Insert density**> lbs./cu. ft.

D. Thickness: <**Insert thickness**> inches thick unless otherwise indicated on Drawings.

2.4 FACED, RIGID AND SEMI-RIGID FIBROUS BOARD INSULATION

A. Provide semi-rigid resin-bonded mineral fiber [**rock wool**] [**slag wool**] [**or**] [**glass fiber**] conforming to ASTM C 612, Type I-A or Type I-B, faced on one side with foil scrim kraft or foil scrim polyethylene.

B. R-value: Not less than <**Insert R-value**>.

C. Thickness: <**Insert thickness**> inches thick unless otherwise noted on Drawings.

2.5 UNFACED BLANKET INSULATION

A. Provide flexible resin bonded mineral fiber [**rock wool**] [**slag wool**] [**or**] [**glass fiber**] batt or blanket insulation conforming to ASTM C 665, Type I (blanket without membrane covering), unfaced.

B. R-value: Not less than <**Insert R-value**>.

C. Thickness: <**Insert thickness**> inches thick unless otherwise noted on Drawings.

2.6 FACED BLANKET INSULATION

Specifier Note: For exposed applications, insulation including facing should have a flame spread index of 25 or less and a smoke developed index of 450 or less when tested according to ASTM E 84 or UL 723. Standard foil-faced and kraft-faced batts do not conform to the requirements of any model code for exposed applications. A flame spread rated facing installed over kraft, standard foil, or other non-rated facing does not comply with code. Consult ICAA Technical Bulletin Numbers 27 and 28 for more information.

A. Provide flexible resin bonded mineral fiber [**rock wool**] [**slag wool**] [**or**] [**glass fiber**] batt or blanket insulation conforming to ASTM C 665, Type II (non-reflective facing), Class A or C, or Type III (reflective facing), Class A or B, as shown on drawings.

B. Where facings are not in direct contact with code approved building materials such as drywall, plywood, acoustic ceiling tile, or similar material, or where required by authority having jurisdiction, provide a product with facing having a flame spread index of 25 or less (Class A) and smoke development index of not more than 450.

C. R-value: Not less than <**Insert R-value**>.

D. Thickness: <**Insert thickness**> inches thick unless otherwise noted on Drawings.

2.7 LOOSE-FILL INSULATION

A. Provide mineral fiber [**rock wool**] [**slag wool**] [**or**] [**glass fiber**] or cellulose loose-fill insulation conforming to ASTM C 764, Type 1 (pneumatic application) or ASTM C 739.

B. R-value: Not less than <**Insert R-value**>.

2.8 SPRAY-APPLIED FIBROUS INSULATION

A. Provide mineral fiber [**rock wool**] [**slag wool**] [**or**] [**glass fiber**], or cellulose spray-applied insulation, conforming to ASTM C 1014 or ASTM C 1149.

B. R-value: Not less than <**Insert R-value**>.

C. Density: Applied nominal density of <**Insert density**> lbs./cu.ft. as determined in accordance with ASTM E 605.

D. Thickness: <**Insert thickness**> inches thick unless otherwise indicated on the Drawings.

E. Standard manufacturers' color unless specified otherwise.

2.9 SPRAY-APPLIED POLYURETHANE

A. Provide spray applied polyurethane having a flame spread index of not more than 75 and a smoke development index of not more than 450 when tested in the maximum thickness intended for use in accordance with ASTM E 84, unless otherwise required by authority having jurisdiction.

B. Provide separation of foam insulation from interior of the building with a 15-minute thermal barrier, unless otherwise required by authority having jurisdiction.

2.10 SOUND ATTENUATION INSULATION

A. Provide sound-attenuating materials with a flame spread index of <**Insert flame spread index**> and smoke developed index of <**Insert smoke developed index**> when tested in accordance with ASTM E 84.

B. When airborne sound attenuation ratings are required for wall and floor/ceiling assemblies that separate dwelling units or guest rooms from each other and from public spaces such as interior corridors and service areas, provide Sound Transmission Class (STC) ratings of not be less than 50 (45 if field tested) when tested in accordance with ASTM E 90(ASTM E 1332)/ASTM E 413.

C. When structure-borne sound isolation ratings are required for floor/ceiling assemblies, provide assemblies with Impact Isolation Criteria (IIC) of not less than 50 (45 if field tested) when tested in accordance with ASTM E 492(ASTM E 1007)/ASTM E 989.

2.11 ATTACHMENT DEVICES AND RELATED ACCESSORIES

A. Mechanical Fasteners: Type recommended by insulation manufacturer.

Specifier Note: Retain sub-paragraph below for installations requiring use of impaling pin fasteners.

1. Impaling Pins and Clips: Corrosion-resistant spindle anchor and self-locking washer type consisting of perforated metal plates with spindle welded to center and self-locking washers.

B. Adhesive for Adhesive Attachment of Insulation: Comply with type, application method, and fire-performance requirements of insulation manufacturer and authority having jurisdiction.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions where building insulation is to be installed and identify any conditions detrimental to the proper and timely completion of the work.

1. Do not proceed with the work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulation or vapor retarders, including removing projections capable of puncturing vapor retarders or of interfering with insulation attachment.

Specifier Note: Retain paragraph below where adhesive application is required.

B. Clean all surfaces on which adhesives are used to install insulation so they are free of dirt, grime, grease, oil or other substances which would be detrimental to proper bond of adhesive.

3.3 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions and recommendation applicable to products and application indicated.

B. Coordinate and schedule work of this section with the work of other sections so as not to delay the Project.

C. Install insulation in as large a component as practical and to cover entire areas indicated on the Drawings, closely butted together at sides, ends, and against walls, and structural members.

D. Extend insulation to the full thickness shown over entire area to be insulated. Neatly cut and fit insulation tightly around obstructions, projections such as pipes, conduits, hangers and other elements, and fill voids with insulation. Remove debris in conflict with insulation installation.

E. Do not install any insulation that becomes damaged during the course of installation or is no longer in a physical condition to function for the use intended and replace with new material.

F. Exercise care to avoid damage and soiling of faces on insulation units which will remain exposed to view. Abut joints accurately with adjoining surfaces set flush.

G. Install vapor-retarder faced units with vapor retarder to the side of construction indicated. Do not obstruct ventilation spaces. Seal all joints and ruptures in vapor retarders with joint tape to ensure vapor-tight installation prevent vapor migration.

H. Where insulation is impaled on spindle-type insulation hangers, provide fasteners at openings for the particular application not less than 2 inches from corners or edges and not more than 12 inches on centers. Attach insulation in a manner to ensure stability and eliminate sagging.

I. Apply a single layer of insulation to the required thickness, unless a double layer is required, to make up the total thickness shown. Concealed layers of material must not have a vapor retarder facing.

3.4 INSTALLATION OF RIGID CELLULAR PLASTIC BUILDING INSULATION

A. Install rigid cellular plastic building insulation with adhesives or fasteners recommended by manufacturer.

B. Cut with sharp instrument to avoid rough edges. Install with edges butted tightly. Do not leave voids.

C. Caulk all edges and butt joints with a compatible material.

3.5 INSTALLATION OF RIGID AND SEMI-RIGID FIBROUS BOARD INSULATION

A. Install insulation on substrates as follows:

1. Fasten insulation anchors to substrates according to anchor manufacturer's written instructions. Space anchors according to insulation manufacturer's written instructions for insulation type, thickness, and application indicated.

2. Where applicable, apply insulation to create cavity width indicated between substrate and insulation, if necessary.

3. Where insulation is not covered by other building materials, apply capped washers to tips of spindles, where required by code.

B. Seal joints between faced insulation, between faced insulation and intersecting or penetrating surfaces, and between faced insulation and perimeter surfaces with vapor retarder sealing tape applied on the vapor retarder side.

3.6 INSTALLATION OF BATT AND BLANKET INSULATION

A. Install insulation in accordance with ASTM C 1320 "Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction."

B. Install blankets in cavities formed by framing members as follows:

1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.

2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

3. For wood or metal-framed wall cavities where cavity heights exceed 96 inches, provide mechanical support to unfaced and faced blankets.

4. Position the vapor retarder towards the "warm-in-winter" side, except as indicated otherwise, and tape joints with 4 inch wide vapor retarder sealing tape applied over vapor retarder.

C. For wood-framed construction, install mineral-fiber blankets as follows:

1. With faced blankets having stapling flanges, secure insulation by stapling flanges to sides of framing members or face stapling flanges to framing members.

2. With unfaced blankets, cover with vapor retarder. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket after concealing finish material is in place.

3. Position the vapor retarder towards the "warm-in-winter" side, except as indicated otherwise, and tape joints with vapor retarder sealing tape.

3.7 INSTALLATION OF LOOSE-FILL INSULATION

A. Install loose-fill insulation in accordance with manufacturers' instructions.

3.8 INSTALLATION OF SPRAY-APPLIED POLYURETHANE

A. Comply with SPI bulletin AX-119, "MDI-based polyurethane foam systems: Guidelines for safe handling and disposal."

B. Install primer, foam and coatings in compliance with manufacturer's guidelines for temperature, humidity, and other project conditions.

C. Apply spray-on system to thickness required to achieve specified or code required R-value. Do not exceed the maximum thickness per pass recommended by manufacturer.

3.9 INSTALLATION OF VAPOR RETARDERS

A. General: Install vapor retarder over full extent of areas to be protected from vapor migration. Secure with adhesives or other anchorage system indicated.

Specifier Note: Paragraph below applies to frame construction.

B. Seal vertical joints in vapor retarders over framing by overlapping at least two wall studs. Fasten vapor retarders to wood framing. Attach vapor retarders to metal framing and solid substrates with vapor-retarder fasteners recommended by vapor-retarder manufacturer.

C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create a seal between penetrations and vapor retarder.

D. Repair damage, punctures or tears in vapor retarders by covering with vapor-retarder tape or an additional layer of vapor retarder material.

3.10 INSULATION SCHEDULE

Specifier Note: Retain this Article or a schedule on Drawings if multiple types of insulation are required for Project and the method of noting which types of insulation are required in specific locations uses numbered insulation types rather than descriptions of insulation products.

A. Insulation Type <**Insert number**>: <**Insert Type**>.

B. Insulation Type <**Insert number**>: <**Insert Type**>.

C. Insulation Type <**Insert number**>: <**Insert Type**>.

END OF SECTION