



## Guide Specifications

**PROJECT ENGINEER RESPONSIBILITY:** This is a general specification guide, intended to be used by experienced construction professionals, in conjunction with good construction practice and professional judgment. This guide is to aid in the creation of a complete building specification that is to be fully reviewed and edited by the engineer. Sections of this guide should be included, edited, or omitted based on the requirements of a specific project. It is the responsibility of both the specifier and the purchaser to determine if a product or system is suitable for its intended use. Neither Owens Corning, nor any of its subsidiary or affiliated companies, assume any responsibility for the content of this specification guide relative to actual projects and specifically disclaim any and all liability for any errors or omissions in design, detail, structural capability, attachment details, shop drawings or other construction related details, whether based upon the information provided by Owens Corning or otherwise.

Owens Corning's EnergyComplete<sup>®</sup> with Flexible Seal Technology Whole Home Insulation and Air Sealing System is a system designed for use with residential construction. For more information, visit [www.ocenergycomplete.com](http://www.ocenergycomplete.com). For information on other Owens Corning residential products including insulation, roofing, masonry products and noise control solutions, visit [www.owenscorning.com](http://www.owenscorning.com).

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## SECTION 07 21 00 - THERMAL INSULATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes: Insulation and air sealing system, including insulation, foam sealant and accessories.

#### 1.2 SUBMITTALS

- A. Product Data: Submit data on product characteristics, performance criteria, and limitations, including the following:
  - 1. General installation/application instruction.
  - 2. Environmental conditions required for installation and installation techniques.
  - 3. Safety requirements for application of products.
- B. Installer's/Applicator's Qualifications: Submit copy of Installer's/Applicator's certification from manufacturer.
- C. Sustainable Design: Provide manufacturer's certificates prepared by an independent, third party certifying to the following:
  - 1. Recycled material content for products with recycled content.
  - 2. Volatile organic compound content for each interior adhesive and sealant and related primer.
- D. Warranty: Submit manufacturer's standard one-year warranty against defects in material or manufacturing.

#### 1.3 QUALITY ASSURANCE

- A. Installer's/Applicator's Qualifications: Company with a minimum of two years in performing work of this section and certified by manufacturer as an approved Installer/Applicator.
- B. Volatile Organic Compound (VOC) Emissions: Provide products complying with GREENGUARD Product Emission Standard for Children and Schools.
- C. Recycled Content: Fiberglass insulation shall contain minimum 50 percent recycled content.

#### 1.4 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's original packaging.
- B. Storage: Store and protect products in accordance with manufacturer's instructions. Store with seals and labels intact and legible. Store inside and in a dry location. Protect insulation materials from moisture and soiling. Provide ventilation to prevent condensation and degradation of products.
- C. Inspection: Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURER

- A. Insulation and Air Sealing System: EnergyComplete<sup>®</sup> with Flexible Seal Technology Whole Home Insulation and Air Sealing System by Owens Corning.

#### 2.2 SYSTEM DESCRIPTION



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- A. General: System consists of an air infiltration barrier applied to joints between materials of the exterior and interior wall framing to eliminate air infiltration into the building and the installation of insulation to reduce thermal transmission.

NOTE TO SPECIFIER: Delete materials and thicknesses not required from the following paragraphs. R values indicated below are for the insulation material alone. The expected performance of the whole wall assembly needs to be calculated taking the R value of all wall components into account. Building codes will dictate the R value performance requirements for the exterior walls. Depending on applicable building codes, climate zone where the project is located, and framing material used, additional continuous insulation on the exterior side of the framing may be required. This is particularly the case where metal studs are used for framing. Consult the applicable building codes for the project location, IECC, and ASHRAE 90.1 to determine the required thermal resistance for the exterior walls. Be sure that the desired R-values are indicated on the drawings and that insulation is not indicated by thickness alone.

### 2.3 MATERIALS

- A. Glass-Fiber Loose-Fill Insulation: Maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84 and as follows:
1. ASTM C 764, Type I for pneumatic applications.
  2. ASTM C 764, Type II for poured applications.
  3. Minimum R-Value, Cavity Depth 3-1/2 Inches: R-14, (1.3 pcf density).
  4. Minimum R-Value, Cavity Depth 3-1/2 Inches: R-16, (2.5 pcf density).
  5. Minimum R-Value, Cavity Depth 5-1/2 Inches: R-22, (1.3 pcf density).
  6. Minimum R-Value, Cavity Depth 5-1/2 Inches: R-24, (2.3 pcf density).
  7. Minimum R-Value, Cavity Depth 7-1/4 Inches: R-30, (1.4 pcf density).
  8. Minimum R-Value, Cavity Depth 7-1/4 Inches: R-32, (2.4 pcf density).
  9. Minimum R-Value, Cavity Depth 9-1/4 Inches: R-38, (1.4 pcf density).
  10. Minimum R-Value, Cavity Depth 9-1/4 Inches: R-41, (2.4 pcf density).
  11. Minimum R-Value, Cavity Depth 11-1/4 Inches: R-46, (1.4 pcf density).
  12. Minimum R-Value, Cavity Depth 11-1/4 Inches: R-50, (2.4 pcf density).
- B. Batt Insulation:
1. Batt Insulation, Unfaced: ASTM C 665, Type I, preformed glass fiber batt type, unfaced.
  2. Batt Insulation, Kraft Faced: ASTM C 665, Type II, Class C preformed glass fiber batt type, Kraft paper faced one side.
  3. Batt Insulation, Foil Faced: ASTM C 665, Type II, Class B preformed glass fiber batt type, foil faced one side with maximum flame/smoke properties of 75/450 in accordance with ASTM E84.
  4. Minimum R-Value, Thickness 3-1/2 Inches: R-11.
  5. Minimum R-Value, Thickness 3-1/2 Inches: R-13.
  6. Minimum R-Value, Thickness 3-1/2 Inches: R-15.
  7. Minimum R-Value, Thickness 5-1/2 Inches: R-21.5.
  8. Minimum R-Value, Thickness 5-1/2 Inches: R-18, using R-19 6-1/4 inch batt compressed.
  9. Minimum R-Value, Thickness 7-1/4 Inches: R-24, using R-25 8 inch batt compressed.
  10. Minimum R-Value, Thickness, 7-1/4 Inches: R-28, using R-30C 8-1/2 inch batt compressed.
  11. Minimum R-Value, Thickness 9-1/4 Inches: R-29, using R-30 10 inch batt compressed.
  12. Minimum R-Value, Thickness 9-1/4 Inches: R-36, using R-38C 10 inch batt compressed.
  13. Minimum R-Value, Thickness 11-1/4 Inches: R-37, using R-38 12 inch batt compressed.
  14. Thermal Resistance: As indicated on the Drawings.
  15. Batt Size: Friction fit of sizes to fit stud spacing.
- C. Foam Sealant:
1. Material: High-efficiency foam sealant.
  2. Water Vapor Permeance:
    - a. ASTM E 96 (dry cup): Greater than 2 perm.
    - b. ASTM E 96 (wet cup): Greater than 30 perm



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3. Dimensional Stability: ASTM D 2126, maximum 1.0% linear change at -40°F, ambient RH after 2 weeks max 2.0% linear change at 100°F, 97% RH after 2 weeks.
  4. Durability: ASTM C 719, more than 10 cycles; no cohesive failure or cracking.
  5. Flame Spread: ASTM E 84, Less than 25.
  6. Smoke Developed: ASTM E 84, Less than 450.
  7. Tack-Free: Dry to the touch within 20 minutes.
  8. Pressure Build: AAMA 812, less than 0.1 psi.
  9. Leakage Rate: ASTM E 283, less than 0.01 cfm/ft.2 at 1.57 psf (75 Pa) and 6.24 psf (300 Pa) pressure.
  10. Fire Blocking performance: ASTM E814, pass
- D. Vapor Retarders: Comply with requirements of Section 07 26 00 "Vapor Retarders."
- E. Air Barriers: Comply with requirements of Section 07 27 00 "Air Barriers."

### 2.4 ACCESSORIES

- A. Accessories: Provide accessories per insulating system manufacturer's recommendations, including the following:
1. Tape: Polyethylene self-adhering type for Kraft faced insulation and bright aluminum self-adhering type for foil faced insulation.
  2. Insulation Fasteners: Impale clip of galvanized steel; type recommended by insulation manufacturer for particular use intended.
  3. Mechanical Insulation Fasteners: FM approved, corrosion resistant, size required to suit application.
  4. Wire Mesh: Galvanized steel, hexagonal wire mesh.
  5. Spindle Fasteners: Corrosion-resistant wire spindles.
  6. Ventilation Baffles: Formed plastic, metal, or cardboard sized to fit full width of rafter spaces.

## PART 3 - EXECUTION

NOTE TO SPECIFIER: Delete installation of materials not required from the following paragraphs. Delete paragraphs on installation of vapor retarders and air barriers if not the work of this Section.

### 3.1 EXAMINATION

- A. Examine substrates, flashing conditions, penetrations, adjoining construction and the conditions under which work is to be installed. Verify that surfaces are dry and free of oil, grease, dust, rust, or other contaminant.
- B. Report unacceptable conditions in writing. Do not proceed with the Work until unsatisfactory conditions have been corrected and surfaces are acceptable.
- D. Verify that fire stopping is in place before beginning to apply the air infiltration barrier with flexible seal technology.
- E. Verify the following conditions have been sealed with the air infiltration barrier before installing insulation and before closing in framing cavities:
1. Gaps between window units and framing.
  2. Gaps between door heads, jambs, and sills and wall framing.
  3. Interface of foundation or slab and sill plate.
  4. Interface of band joists or rim joists and plates and subfloor.
  5. Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space.
- F. Verify the following work is complete before installing insulation and before closing in framing cavities:
1. Vapor retarder or air barrier is installed at fireplace walls.
  2. Air sealing is provided between the garage and conditioned spaces.
  3. Vapor retarder or air barrier is installed in common walls between dwelling units.
  4. Recessed light fixtures are air tight, IC rated, and sealed to gypsum board.
    - a. Exception: Light fixtures in locations with conditioned spaces on both sides do not need to be air tight and do not need to be sealed unless required by another Section in the Project Manual.

### 3.2 PREPARATION

- A. Before beginning work, protect windows, plumbing fixtures, finish materials, and finish surfaces within work area by covering them with a plastic film. Secure edges of film to assure air infiltration barrier with flexible seal technology does not get behind the film.
- B. Sweep area to receive air infiltration barrier application to remove dust and other contaminants that will interfere with providing a thorough seal.
- C. Fill medium-sized gaps (gaps between 3/8 inch and 3 inches) between surfaces to be sealed with fiberglass insulation. Cover gaps greater than 3 inches with rigid, nonporous material such as gypsum board, extruded polystyrene insulation, sheathing, OSB, particle board, agrifiber particle board, or plywood secured to framing and apply sealant at the perimeter.
- D. To protect and prevent materials from sticking to eyes and skin when applying foam sealant materials wear, goggles or a face shield, a long sleeved shirt, chemical gloves and, if the installation site is dusty, a dust mask.
- E. If using products other than EnergyComplete® Air Infiltration Barrier with Flexible Seal Technology that may contain isocyanates, comply fully with OSHA regulations regarding protective clothing, breathing apparatus, ventilation, and restricting access to areas of application.



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### 3.3 INSTALLATION OF FOAM SEALANT

- A. Foam sealant in accordance with manufacturer's instruction, including compliance with instructions for safety, preparation, and application of products. Apply continuously and evenly to joints in the following conditions:
  - 1. At penetrations between conditioned and unconditioned spaces.
  - 2. At interface between the sheathing and stud where a sheathing seam is known to exist.
  - 3. At the interface between windows/doors and the framed opening.
  - 4. On the face of all top plates of exterior walls.
  - 5. On the face of all top plates of interior walls adjacent to the unconditioned attic space.
  - 6. At interface between the sill plate and foundation.
  - 7. At interface between the bottom plate and the sheathing.
  - 8. At interface between the top plate and the sheathing.
  - 9. At interface between the bottom plate and the subfloor or slab for first floor of slab-on-grade construction.
  - 10. At any horizontal, mid-cavity sheathing seams.
  - 11. At garage-to-house common wall.
  - 12. At wall behind fireplace (block and seal).
  - 13. At joist bays connecting exterior to conditioned space, such as at garage, porch, or overhang (block and seal).
  - 14. At attic knee-walls (block and seal).
  - 15. At insulated floor of room above unconditioned space.
  - 16. At interface between the band joist and the plate below it.
  - 17. At interface between the band joist and the subfloor above it.
  - 18. At joist bays beneath cantilevered floors, such as for bay windows.
- C. Sealant is recognized in ICC-ES report ESR-3110 as an alternative to the methods prescribed by the code for maintaining the integrity of penetrations of fireblocking when used to fill cracks and voids in construction and the annular space created by the penetration of wood fireblocking by pipes and conduits.
- D. Seal those gaps and penetrations filled with loose fill insulation during preparation and thoroughly cover them with foam sealant.
- E. Do not install foam sealant within 3 inches of a heat source with exception of recessed light fixtures, which may be sealed at the interface with the drywall.

### 3.4 INSTALLATION OF INSULATION, GENERAL

- A. Install insulation system according to manufacturer's instructions, including compliance with instructions for safety, preparation, and application of products.
- B. Comply with local code requirements, and 2009 IECC requirements indicated on Table 402.4.2 Air Barrier and Insulation Inspection Component Criteria.
- C. Do not install insulation on top of or within 3 inches of recessed light fixtures unless the fixtures are approved for such use.
- D. Install exterior thermal envelope insulation for framed walls in substantial contact and in continuous alignment with building envelope vapor retarder or air barrier.
- E. Install vapor retarder air barrier in dropped ceilings and soffits in substantial alignment with insulation.
- F. Install insulation at band joists or rim joists.
- G. In crawl spaces and where the underside of floors are exposed to unconditioned space, insulation should fill the cavity or be installed in contact with the underside of the decking. If vapor retarder is required by local code, a Kraft vapor retarder must be in contact with a 15 minute thermal barrier. Placement of vapor retarder to be determined by local jurisdiction.
- H. Within exterior wall framing, install insulation between pipes and backside of sheathing. Cut insulation material as required to fit around wiring and plumbing.
- I. Where showers and bath tubs are located on exterior walls, install insulation and vapor retarder air barrier between units and exterior.

### 3.5 INSTALLATION OF LOOSE FILL INSULATION

- A. Install loose fill insulation in accordance with ASTM C 1015.
- B. Install to uniform, level thickness. Do not compact.

### 3.6 INSTALLATION OF BATT INSULATION

- A. Install batt insulation in accordance with ASTM C 1320.
- B. If eave ventilation baffles are required, install ventilation baffles at eaves to hold insulation down from roof sheathing and provide positive ventilation from eave to attic space.
- C. Install in exterior walls, roof and ceiling spaces without gaps or voids. Fluff insulation to full thickness for specified R-value before installation. Do not compress insulation.
- D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- E. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation.
- F. For unfaced batt insulation, install with friction fit or retain in place with manufacturer's recommended fasteners or mesh.



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- G. For batt insulation with factory-applied facing, install with vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over or between framing members. Tape seal butt ends, lapped flanges, and tears or cuts in membrane. Secure insulation in place using one of the following methods:
1. Friction fit.
  2. Staple or nail facing flanges in place as needed.
  3. Tape in place.
  4. Retain in place with spindle fasteners.
  5. Retain in place with wire mesh secured to framing members.

### 3.7 INSTALLATION OF SEPARATE VAPOR RETARDER

- A. Vapor Retarder Installation:
1. For wood framing, place vapor retarder on warm side of insulation by stapling or nailing 6 inches on center. Lap and seal joints over member face.
  2. For metal framing, place vapor retarder on warm side of insulation; lap and seal joints over member face.
  3. Place fasteners at manufacturer's recommended spacing. Tape seal tears or cuts.
  4. Extend tight to full perimeter of adjacent window and door frames and other items interrupting the plane of membrane. Tape seal in place.
- B. Vapor Retarder Installation: Comply with requirements of Section 07 26 00 "Vapor Retarders."

### 3.7 CLEANING

- A. Remove protective plastic film coverings from adjacent materials.
- B. Clean unintended sealant materials, equipment, and fixtures.
- C. Remove damaged materials, equipment, and fixtures if sealant cannot be cleaned without blemish and install new materials, equipment, and fixtures identical to item before damage occurred.
- D. Remove waste materials and recycle empty containers and packaging.