

This specification is offered as a guide to specifiers and should be employed at the discretion of the user. The ultimate design and installation are the responsibility of the engineer or architect.

PART 1.00 - GENERAL

1.01 SCOPE

- A. The work covered by this specification consists of furnishing all labor, equipment, materials and accessories, and performing all operations required, for the correct fabrication and installation of thermal insulation applied to the following commercial equipment systems, in accordance with applicable project specifications and drawings, subject to the terms and conditions of the contract:
1. Chilled water systems from 35F (2C) to 65F (18C)
 2. Heating systems (steam, steam condensate, hot water), ambient up to 450F (232C)
 3. Domestic and service hot water systems, ambient up to 180F (82C)

Note to Specifiers: The above temperature ranges are typical for these systems. However, if contract specifications call for service temperatures outside the above ranges, consult the manufacturer's published data to determine operating temperature limitations of the insulation product or products under consideration.

1.02 REFERENCES

- A. Thermal insulation materials shall meet the property requirements of one or more of the following specifications as applicable to the specific product or end use:
1. American Society for Testing of Materials Specifications:
 - a. ASTM C 553, "Standard Specification for Mineral Fiber Blanket Insulation for commercial and Industrial Applications"
 - b. ASTM C 612, "Standard Specification for Mineral Fiber Block and Board Thermal Insulation"
 - c. ASTM C 1393, "Specification for Perpendicularly Oriented Mineral Fiber Roll and Sheet Thermal Insulation for Pipes and Tanks"
 - d. ASTM C 1136, "Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation"

1.03 DEFINITIONS

- A. The term "mineral fiber" as defined by the above specifications includes fibers manufactured of glass, rock, or slag processed from a molten state, with or without binder.

1.04 SYSTEM PERFORMANCE

- A. Insulation materials furnished should meet the minimum thickness requirements of National Voluntary Consensus Standard 90.1 (1999), "Energy Efficient Design of New Buildings," of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE). However, if other factors such as condensation control or personnel protection are to be considered, the selection of the thickness of insulation should satisfy the controlling factor.

- B. Insulation materials furnished and installed hereunder shall meet the fire hazard requirements of applicable building codes when tested in composite form per one of the following nominally equivalent test methods:
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| 1. American Society for Testing of Materials | ASTM E 84 |
| 2. Underwriters' Laboratories, Inc. | UL 723, CAN/ULC-S102-M88 |
| 3. National Fire Protection Association | NFPA 255 |

1.05 QUALITY ASSURANCE

- A. Insulation materials and accessories furnished and installed hereunder shall, where required, be accompanied by manufacturers' current submittal or data sheets showing compliance with applicable specifications listed in Section 1.02 above.
- B. Insulation materials, including all weather and vapor barrier materials, closures, hangers, supports, fitting covers, and other accessories, shall be furnished and installed in strict accordance with project drawings, plans, and specifications.
- C. Insulation materials and accessories shall be installed in a workmanlike manner by skilled and experienced workers who are regularly engaged in commercial insulation work.

1.06 DELIVERY AND STORAGE OF MATERIALS

- A. All of the insulation materials and accessories covered by this specification shall be delivered to the job site and stored in a safe, dry place with appropriate labels and/or other product identification.
- B. The contractor shall use whatever means are necessary to protect the insulation materials and accessories before, during, and after installation. No insulation material shall be installed that has become damaged in any way. The contractor shall also use all means necessary to protect work and materials installed by other trades.
- C. If any insulation material has become wet because of transit or job site exposure to moisture or water, the contractor shall not install such material, and shall remove it from the job site. An exception may be allowed in cases where the contractor is able to demonstrate that wet insulation when fully dried out (either before installation or afterward following exposure to system operating temperatures) will provide installed performance that is equivalent in all respects to new, completely dry insulation. In such cases, consult the insulation manufacturer for technical assistance.

PART 2.00 - PRODUCTS

2.01 EQUIPMENT INSULATION

- A. Equipment insulation shall be manufactured to meet ASTM C 553, ASTM C 612, or ASTM C 1393 for sizes required in the particular system. It shall be of a type suitable for installation on equipment systems as defined in section 1.01 SCOPE above.

One of the following types shall be used:

1. For indoor systems operating at temperatures from 0°F (-18°C) to +450°F (230°C):
 - a. **Owens Corning Fiberglas® 700 Series Insulation**, in semi-rigid or rigid board form, unfaced or with ASJ or FRK facing.

2. For systems operating at temperatures to +650F (340C) where moderate abuse resistance is required.
 - a. **Owens Corning Fiberglas® Pipe and Tank Insulation** with end grain factory-applied ASJ all-service jacket.
 3. For systems operating at temperatures to +850F (450C) and always above the ambient temperature:
 - a. **Owens Corning Fiberglas® Insul-Quick Insulation** rated for maximum operating temperature of 850F (450C) may be installed using appropriate fastening systems and then covered with metal jacketing or otherwise jacketed and/or finished in accordance with details shown.
 4. For systems operating at temperatures up to +1000F (540C) and always above the ambient temperature.
 - a. **Owens Corning TIW Insulation's**, installed directly on heated flat and curved surfaces by attaching with welded pins or studs and finished with sheet metal or metal mesh and insulating cement, then canvassed and painted.
- B. Equipment located outdoors and exposed to the weather shall be insulated as indicated above except the thickness shall be determined according to the worst weather extremes expected. The insulation shall then be protected with one of the following weatherproof finishes as indicated on contract drawings:
1. Metal jacketing shall be 0.016" (0.4 mm) minimum aluminum or stainless steel with moisture barrier, secured in accordance with the jacket manufacturer's recommendations. Joints shall be applied so they will shed water and shall be sealed completely.
 2. If required, boards shall be scored to allow them to conform to curved and irregular surfaces.
 3. Mechanical fasteners shall be utilized to hold insulation to surfaces with bands as required to conform to curved or irregular surfaces.
 4. Support rings shall be provided to support the top head insulation where required.
 5. Outdoor installations require a weather resistant barrier for protection of the insulation material.

2.02 ACCESSORY MATERIALS

- A. Accessory materials installed as part of insulation work under this section shall include (but not be limited to):
1. Closure Materials - Butt strips, bands, wires, staples, mastics, adhesives; pressure-sensitive tapes
 2. Field-applied jacketing materials - Sheet metal, plastic, canvas, fiber glass cloth, insulating cement, PVC fitting covers
 3. Support Materials - Hanger straps, hanger rods, saddles, support rings
- B. All accessory materials shall be installed in accordance with project drawings and specifications, manufacturer's instructions, and/or in conformance with the current edition of the Midwest Insulation Contractors Association (MICA) "Commercial & Industrial Insulation Standards."

PART 3.00 - EXECUTION**3.01 SITE INSPECTION**

- A. Before starting work under this section, carefully inspect the site and installed work of other trades and verify that such work is complete to the point where installation of materials and accessories under this section can begin.
- B. Verify that all materials and accessories can be installed in accordance with project drawings and specifications and material manufacturers' recommendations.
- C. Verify, by inspecting product labeling, submittal data, and/or certifications which may accompany the shipments, that all materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.

3.02 PREPARATION

- A. Ensure that all surfaces over which insulation is to be installed are clean and dry.
- B. Ensure that insulation is clean, dry, and in good mechanical condition with all factory-applied vapor or weather barriers intact and undamaged. Wet, dirty, or damaged insulation shall not be acceptable for installation.
- C. Ensure that pressure testing of piping and fittings has been completed prior to installing insulation.

3.03 INSTALLATION**A. General**

- 1. Install all insulation materials and accessories in accordance with manufacturer's published instructions and recognized industry practices to ensure that it will serve its intended purpose.
- 2. Install insulation on piping subsequent to installation of heat tracing, painting, and acceptance tests.
- 3. Install insulation materials with smooth and even surfaces. Do not use cut pieces or scraps abutting each other. Butt insulation joints firmly to ensure complete, tight fit over all surfaces. Apply insulation using staggered joint method for both single and double layer installations, applying each layer of insulation separately.
- 4. Maintain the integrity of factory-applied vapor barrier jacketing on all insulation, protecting it against puncture, tears or other damage. All staples used on cold insulation shall be coated with suitable sealant to maintain vapor barrier integrity.
- 5. Where specified on contract drawings, coat insulated surfaces with layer of insulating cement, troweled in a workmanlike manner, leaving a smooth and continuous surface. Fill in seams, broken edges, and depressions. Cover over wire mesh and joints with cement sufficiently thick to remove surface irregularities.

B. Removable insulation:

- 1. Provide removable insulation sections to cover parts of equipment which must be opened periodically or maintenance, such as vessel covers, fasteners, flanges, frames and accessories.

C. Areas left uninsulated

1. Items such as boiler manholes, handholds, clean-outs, ASME stamp, and manufacturers' nameplates, may be left uninsulated unless omitting insulation would cause a condensation problem. When such is the case, appropriate tagging shall be provided to identify the presence of these items. Provide neatly beveled edges at interruptions of insulation.

3.04 FIELD QUALITY ASSURANCE

- A. Upon completion of all insulation work covered by this specification, visually inspect the work and verify that it has been correctly installed. This may be done while work is in progress, to assure compliance with requirements herein to cover and protect insulation materials during installation.

3.05 PROTECTION

- A. Replace damaged insulation, which cannot be satisfactorily repaired, including insulation with vapor barrier damage and moisture-saturated insulation.
- B. The insulation contractor shall advise the general and/or the mechanical contractor as to requirements for protection of the insulation work during the remainder of the construction period, to avoid damage and deterioration of the finished insulation work.

3.06 SAFETY PRECAUTIONS

- A. Insulation contractor's employees shall be properly protected during installation of all insulation. Protection shall include proper attire when handling and applying insulation materials, and shall include (but not be limited to) disposable dust respirators, gloves, hard hats, and eye protection.
- B. The insulation contractor shall conduct all job site operations in compliance with applicable provisions of the Occupational Safety and Health Act, as well as with all state and/or local safety and health codes and regulations that may apply to the work.

APPENDIX

Refer to the publications listed below for product information, including uses, descriptions, physical properties, performance, specification compliance and application recommendations:

DATA SHEETS

Owens Corning Fiberglas® 700 Series Insulations	5-IN-14775
Owens Corning Insul-Quick Insulation	5-IN-14776
Owens Corning TIW Types I & II Insulations	5-IN-14729
Owens Corning Fiberglas® Pipe and Tank Insulation	5-IN-14728

CATALOGS

Catalog, Owens Corning Mechanical Insulation Systems	1-IN-14210
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