OWENS CORNING® THERMAFIBER® INDUSTRIAL PRO SECTION WR–



# General Specification Guide SECTION 22 07 00

**23 07 00**

**40 42 00**

Thermafiber® Pro Section WR, made with Paroc® technology, is a water repellent mineral wool pipe insulation engineered to meet the toughest industrial specifications and conditions. It is capable of withstanding high temperatures, conserving energy, and reducing noise. Thermafiber® Pro Section WR is designed for use on high temperature pipework in process industries and fire-resistant applications.

**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 shall be included, edited, or omitted based on the requirements of a specific project.

**SECTION 22 07 18 - INDUSTRIAL MINERAL WOOL PIPE INSULATION**

**PART 1 — GENERAL**

* 1. **SUMMARY**

1. Section Includes: Industrial mineral wool pipe insulation for piping, fittings, valves, controls and other necessary items connected into the system operating up to 1200 degrees F (650 degrees C).
   1. **REFERENCES**
2. ASHRAE – National Voluntary Consensus Standard 90.1 (2019) – "Energy Standard for Buildings Except Low-Rise Residential Buildings."
3. ASTM C450 – "Standard Practice for Fabrication of Thermal Insulating Fitting Covers for NPS Piping and Vessel Lagging."
4. ASTM C356 – "Standard Test Method for Linear Shrinkage of Preformed High Temperature Thermal Insulation Subjected to Soaking Heat."
5. ASTM C547 – "Standard Specification for Mineral Fiber Pipe Insulation."
6. ASTM C585 – "Standard Practice for Inner and Outer Diameters Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System)."
7. ASTM C665 – "Standard Specification for Mineral-Fiber Blanket Insulation for Light Frame Construction and Manufactured Housing"
8. ASTM C795 – "Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel."
9. ASTM C1104 – "Standard Test Method for Determining the Water Vapor Sorption of Unfaced Mineral Fiber Insulation."
10. ASTM C1335 – "Standard Test Method for Measuring Non-Fibrous Content of Man-Made Rock and Slag Mineral Fiber Insulation."
11. ASTM C1338 – "Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings."
12. ASTM C1617 – "Standard Practice for Quantitative Accelerated Laboratory Evaluation of Extraction Solutions Containing Ions Leached from Thermal Insulation on Aqueous Corrosion of Metals."
13. ASTM C1729 – "Standard Specification for Aluminum Jacketing for Insulation."
14. ASTM E84 – "Test Method for Surface Burning Characteristics of Building Materials."
15. ASTM E136 – "Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750˚C."
16. CAN/CGSB-51.9 – "Mineral Fibre Thermal Insulation for Piping and Round Ducting."
17. CAN4-S114 – "Standard Method of Test For Determination of Non-Combustibility In Building Materials."
18. CAN/ULC-S102 – "Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies."
19. ISO 15665 Acoustics – “Acoustic insulation for pipes, valves and flanges.”
20. MICA – "National Commercial and Industrial Insulation Standards Manual."
21. MIL-DTL-24244D – "Military Specification for Insulation Material with Special Corrosion, Chloride and Fluoride Requirements."
22. NRC 1.36 – "Nonmetallic Thermal Insulation for Austenitic Stainless Steel."
23. PIP – "Process Industry Practice."
24. UL 723 – "Standard Test for Surface Burning Characteristics of Building Materials."
    1. **SYSTEM PERFORMANCE**
25. Insulation material shall meet the minimum thickness requirements of the National Voluntary Consensus Standard 90.1 (2019) established by ASHRAE. However, if other factors such as condensation control or personal protection are to be considered, the selection of thickness of insulation shall satisfy the controlling factor.
26. Insulation materials shall meet the fire hazard requirements of applicable building codes per one of the following nominally equivalent test methods:
    1. ASTM E84
    2. UL 723
    3. CAN/ULC-S102
    4. **SUBMITTALS**
27. Product Data: Provide product description, list of materials, thickness schedules for each service location and piece of equipment.
28. Shop Drawings: Submit a list of insulation to be used for each service location.
29. Samples: Submit samples of each insulation material to be used.
    1. **QUALITY ASSURANCE**
30. Work shall conform to accepted industry and trade standards for commercial and industrial insulations and to manufacturer’s recommendations. Where available, it is recommended to use a National Insulation Association (NIA) certified (or other similarly certified) mechanical insulation inspector throughout the project to inspect and verify the materials and total insulation system have been installed correctly in accordance with the Owens Corning guide specifications.
31. Insulation shall be installed by skilled and experienced applicators who are regularly engaged in commercial or industrial insulation work.
    1. **DELIVERY, STORAGE AND HANDLING**
32. Deliver materials to the job site in factory containers with manufacturer’s label showing manufacturer, product name and fire hazard information.
33. Protect insulation from dirt, water, chemical attack and mechanical damage before, during and after installation.
34. Do not install insulation that has been damaged, wet or contaminated. Remove it from jobsite.
    1. 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 respects to new, completely dry insulation. In such cases, consult the insulation manufacturer for technical assistance.
    2. **PROJECTS AND SITE CONDITIONS**
35. Maintain job site temperature and conditions before, during and after installation as required by the product manufacturer.
36. Installed insulation that has not been weatherproofed and is not protected by a roof and walls shall be protected from precipitation by weatherproof sheeting.

**PART 2 — PRODUCTS**

* 1. **MATERIALS**

1. Basis-of-Design: Thermafiber® Pro Section WR Type I, II, and IV, molded, for use up to 1200 degrees F (650 degrees C) by Owens Corning Insulating Systems, LLC, Toledo, OH 43659; www.owenscorning.com with the following characteristics:
   1. Complies with ASTM C547 Types I, II, and IV and Grade A and B.
   2. Furnished in standard lengths of 48 inches (1.22m) with square cut ends.
   3. Conforms to the dimensional requirements of ASTM C585.
   4. Rated maximum service temperature of up to 1200 degrees F (650 degrees C)
   5. Does not exceed 25 Flame Spread and 50 Smoke Developed when tested in accordance with ASTM E84, UL 723,   
      CAN/ULC-S102.
   6. Certified to meet the requirements of ASTM C795 for use over stainless steel.
   7. Rated as noncombustible when tested in accordance with ASTM E136.
   8. **FIELD APPLIED JACKETS**
2. Aluminum Jacketing
   1. Material: Type T-3003 H-14 sheet with either a smooth or embossed finish and a factory applied protective inner layer.
   2. Minimum Jacket Thickness: Insulation less than or equal to 8 inches outer diameter, 0.016 inches.
   3. Minimum Jacket Thickness: Insulation over 8 inches through 11 inches outer diameter, 0.020 inches.
   4. Minimum Jacket Thickness: Insulation over 11 inches through 24 inches outer diameter, 0.024 inches.
   5. Minimum Jacket Thickness: Insulation over 24 inches through 36 inches outer diameter, 0.032 inches.
   6. Minimum Jacket Thickness: Insulation over 36 inches outer diameter, 0.040 inches.
3. Stainless Steel Jacketing
   1. Material and Thickness: 0.010 inches (0.025mm) Type 304 stainless sheet with a smooth finish with or without a factory applied inner layer.
4. UV Resistant Jacketing
   1. May be applied in lieu of metal jacketing provided the jacketing manufacturers limitations with regard to pipe size, surface temperature and thermal expansion and contraction are followed.
   2. **ACCESSORIES**
5. Tie Wire: 16 gauge (1.6mm) or 18 gauge (1.8mm) Type 304 stainless steel.
6. Bands:
   1. 0.5 inches x 0.020 inches (13 x 0.5mm) type 304 stainless steel.
   2. 0.5 inches x 0.020 inches (13 x 0.5mm) T-3003 H-14 aluminum.
7. Screws: Galvanized or stainless steel sheet metal screws #6, #8 or #10 by 3/8 inches (10mm) long. Hex or pan head.
8. Adhesives: Compatible with mineral fiber insulation.
9. Weatherproofing: Compatible mastic.

**PART 3 — INSTALLATION**

* 1. **EXAMINATION**

1. Verify that materials and accessories can be installed in accordance with Contract Documents and material manufacturers’ recommendations.
2. Verify, by inspecting product labeling, submittal data, and certifications which may accompany the shipments, that materials and accessories to be installed on the project comply with applicable specifications and standards and meet specified thermal and physical properties.
3. 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.
4. Verify that testing of piping or tank has been completed and that the piping, tank and flat surfaces are ready for the insulation to be installed.
5. Verify that surfaces are clean, dry and free from dirt, scale, moisture, oil and grease prior to the insulation.
   1. **INSTALLATION**
6. Install products in accordance with manufacturer's recommendations, approved submittals and in proper relationship with adjacent construction. Accessory materials shall also be installed in accordance with the current edition of the MICA “Commercial and Industrial Insulation Standards”, of the Process Industry Practices.
7. Piping shall be supported in such a manner that the insulation is not compromised by the hanger or the effects of the hanger.
   1. Hanger spacing shall be such that the circumferential joint shall be outside the hanger.
8. Where pipe shoes and roller supports are required, insulation shall be inserted in the pipe shoe to minimize heat loss.
   1. Where possible the pipe shoe shall be sized to be flush with the outer diameter of the pipe insulation.
9. Piping systems between 1.5 inches (38mm) and 3 inches (75mm) in diameter may be supported by placing saddles of the proper length and spacing under the insulation.
10. For piping systems larger than 3 inches (75mm) in diameter that operate at temperatures above 200 degrees F (93 degrees C), high density inserts shall be used underneath supports.
11. On vertical applications, insulation support rings shall be used with no more than 8 feet (2.44m) spacing between them or as indicated on contract drawings. The support ring shall be wide enough to support one half of the thickness of the outermost insulation layer.
    1. Locate insulation and jacket seams out of sight where possible.
12. For piping and equipment operating at or above 600 degrees F (315 degrees C) or insulation thicknesses above 3 inches (75mm), use double layer insulation.
    1. Stagger both longitudinal and circumferential joints to reduce the impact of the thermal expansion and contraction.
13. For single layer applications, circumferential joints shall be staggered.
    1. Where long unbroken stretches of insulation are encountered, expansion joints may be required as noted on the contract drawings.
14. Insulation shall be firmly fastened in place with joints (longitudinal and circumferential) butted tightly and mechanically held in place using one, or a combination of the following materials:
    1. 16 gauge (1.6mm) stainless steel wire. If the insulation is less than 12 inches (300mm) in diameter, 18 gauge (1.8mm) wire can be used.
    2. 0.5 inches x 0.020 inches (13 x 0.5mm) stainless steel bands and clips.
    3. Wire and bands shall be placed on maximum 12 inches (300mm) centers.
15. For piping systems placed 10 feet (3m) or more above the floor in mechanical equipment rooms or in finished spaces, metal jacket and fitting covers or approved equivalent is required.
    1. Place jacket seams on the underside of the pipe.
16. Exterior applications and corrosive environments require metal jacketing.
    1. When using metal jacketing in exterior applications: Butt joints and longitudinal overlaps shall be wide enough to provide weatherproofing.
    2. Jacketing shall be secured using 0.5 inches (13mm) stainless steel bands on 12 inches (300mm) centers or using sheet metal screws on 4 inches (100mm) centers.
    3. Place jacket seams such that water incursion cannot occur.
17. Maintain a vapor barrier by properly sealing joints, penetrations and other openings.
18. Seal valve stems with caulking to allow free movement of the stem but still provide a seal against moisture incursion.
19. Apply equipment insulation as smooth as possible by grooving, scoring and beveling insulation as necessary.
20. Bevel and seal the ends of insulation to equipment, flanges and piping.
21. Flanges, couplings and valve bonnets shall be covered with an oversized pipe insulation section sized to provide the same insulation thickness as the surrounding pipe sections.
    1. Jacketing shall match that used on adjacent pipe.
22. Rough cut ends shall be coated with a suitable weather or vapor resistant mastic as dictated by the system location and service.
23. On hot systems where fittings are to be left exposed, insulation ends shall be beveled away from bolts for easy access.
24. Fill joints, cracks and seams with mineral fiber or approved alternate.
25. Neatly finish insulation at supports, protrusions and interruptions.
26. Do not insulate over nameplates or ASME stamps. Form a tight insulation seal around them.
27. When equipment with insulation requires periodic opening for maintenance, repair or routine inspection, install the insulation in such a way that it can be easily removed and put back in place without damage.
    1. **FIELD QUALITY CONTROL**
28. Upon completion of insulation work, 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.
29. Work shall conform to accepted industry standards and to manufacturers recommendations. Owens Corning recommends the use of certified mechanical insulation inspectors who maintain current certification by the National Insulation Association (NIA) or the British Columbia Insulation Contractors Association (BCICA) Quality Assurance Certificate Program throughout the project. They will inspect and verify that the materials and the total insulation systems have been installed correctly in accordance with the specifications.
    1. **INSULATION PROTECTION**
30. Replace damaged insulation which cannot be satisfactorily repaired.
    1. **SAFETY PRECAUTIONS**
31. The insulation installers shall be properly protected during installation of the insulation. Protection when handling and applying insulation materials shall include but not be limited to: Disposable dust respirators, gloves, hard hats, and eye protection.
32. The insulation contractor shall conduct job site operations in compliance with applicable provisions given by OSHA as well as with state and local safety and health codes and regulations that may apply.

**End of Section**

**DISCLAIMER:** 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.

**ADDITIONAL INFORMATION AND SDS**

Please visit our website at [www.owenscorning.com/mechanical](http://www.owenscorning.com/mechanical)