

## Guide Specification

Specifier Notes: This guide specification is written in Construction Specifications Institute (CSI) 3-Part Format in accordance with *The CSI Construction Specifications Practice Guide, MasterFormat, SectionFormat, and PageFormat*.

This Section must be carefully reviewed and edited by the Architect to meet the requirements of the Project and local building code. Coordinate this Section with Conditions of the Contract, Division 01, other specification sections, and the Drawings. Delete all Specifier Notes after editing this Section.

Section numbers and titles are based on *CSI MasterFormat 2018 Edition*.

## SECTION 23 07 16

### HVAC EQUIPMENT INSULATION

Specifier Notes: This Section covers Aeroflex USA, Inc. HVAC equipment insulation. Consult Aeroflex USA, Inc. for assistance in editing this Section as required for the Project.

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. HVAC equipment insulation.

##### 1.2 RELATED REQUIREMENTS

Specifier Notes: Edit the following list of related sections as required for the Project. Limit the list to sections with specific information that the reader might expect to find in this Section but is specified elsewhere.

- A. Section 22 07 16 – Plumbing Equipment Insulation.
  
- B. Section 22 07 19 – Plumbing Piping Insulation.

- C. Section 23 07 00 – HVAC Equipment.
- D. Section 23 07 19 - HVAC Piping Insulation.

### 1.3 REFERENCE STANDARDS

Specifier Notes: List reference standards used elsewhere in this Section, complete with designations and titles. Delete reference standards from the following list not used in the edited Section.

- A. ASTM International (ASTM) ([www.astm.org](http://www.astm.org)):
  1. ASTM C 177 – Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
  2. ASTM C 209 – Standard Test Methods for Cellulosic Fiber Insulating Board.
  3. ASTM C 356 – Standard Test Method for Linear Shrinkage of Preformed High-Temperature Thermal Insulation Subjected to Soaking Heat.
  4. ASTM C 411 – Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
  5. ASTM C 423 – Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  6. ASTM C 518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  7. ASTM C 534 / C 534M – Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
  8. ASTM C 665 – Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  9. ASTM C 692 – Standard Test Method for Evaluating the Influence of Thermal Insulations on External Stress Corrosion Cracking Tendency of Austenitic Stainless Steel.
  10. ASTM C 1071 – Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).
  11. ASTM C 1304 – Standard Test Method for Assessing the Odor Emission of Thermal Insulation Materials.
  12. ASTM C 1338 – Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
  13. ASTM C 1371 – Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emisimeters.
  14. ASTM D 256 – Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
  15. ASTM D 412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.
  16. ASTM D 635 – Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
  17. ASTM D 785 – Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.
  18. ASTM D 792 – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
  19. ASTM D 882 – Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
  20. ASTM D 1000 – Standard Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications.

21. ASTM D 1056 – Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.
22. ASTM D 1171 – Standard Test Method for Rubber Deterioration—Surface Ozone Cracking Outdoors (Triangular Specimens).
23. ASTM D 1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
24. ASTM D 1667 – Standard Specification for Flexible Cellular Materials—Poly (Vinyl Chloride) Foam (Closed-Cell).
25. ASTM D 3121 – Standard Test Method for Tack of Pressure-Sensitive Adhesives by Rolling Ball.
26. ASTM D 3330 / D 3330M – Standard Test Method for Peel Adhesion of Pressure-Sensitive Tape.
27. ASTM D 3611 – Standard Practice for Accelerated Aging of Pressure-Sensitive Tapes.
28. ASTM D 3654 / D 3654M – Standard Test Methods for Shear Adhesion of Pressure-Sensitive Tapes.
29. ASTM D 3816 / D 3816M – Standard Test Method for Water Penetration Rate of Pressure-Sensitive Tapes.
30. ASTM D 3960 – Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
31. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
32. ASTM E 96 – Standard Test Methods for Water Vapor Transmission of Materials.
33. ASTM G 7 / G 7M – Standard Practice for Atmospheric Environmental Exposure Testing of Nonmetallic Materials.
34. ASTM G 21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. British Standards Institution (BSI) ([www.bsigroup.com](http://www.bsigroup.com)):

1. BS EN 12868 – Child use and care articles — Method for determining the release of N-nitrosamines and N-nitrosatable substances from elastomer or rubber teats and soothers.

C. California Department of Public Health (CDPH):

1. CDPH Standard Method (CA 01350) v1.2-2017 – Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.

D. German Institute for Standardisation (DIN):

1. DIN 1988 – Codes of practice for drinking water installations.

E. Health Product Declaration Collaborative (HPDC):

1. HPD (Health Product Declaration) Open Standard v2.3

F. International Standards Organization (ISO):

1. ISO 14025:2006 Environmental Labels and Declarations – Product-Specific Type III Environmental Product Declarations – Principles and Procedures.
2. ISO 14040:2006/Amd. 1:2020 Environmental Management – Life Cycle Assessment – Principles and Framework.
3. ISO 14044:2006/Amd. 1:2017/Amd. 2:2020 Environmental Management – Life Cycle Assessment – Requirements and Guidelines.

4. ISO 21930:2017 Sustainability in Buildings and Civil Engineering Works – Core Rules for Environmental Product Declarations of Construction Products and Services.
- G. Japanese Standards Association (JSA):
1. JIS K 6301 – Physical Testing Methods for Vulcanized Rubber.
- H. National Fire Protection Association (NFPA) ([www.nfpa.org](http://www.nfpa.org)):
1. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems.
  2. NFPA 90B – Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.
- I. New York City Department of Buildings, Materials and Equipment Acceptance (MEA) Division ([www1.nyc.gov](http://www1.nyc.gov)):
1. MEA 171-04-M.
- J. Pressure Sensitive Tape Council (PSTC) ([www.pstc.org](http://www.pstc.org)):
1. PSTC-5 – Quick Stick of Pressure Sensitive Tapes.
  2. PSTC-101 – International Standard for Peel Adhesion of Pressure Sensitive Tape.
  3. PSTC-107 – International Standard for Shear Adhesion of Pressure Sensitive Tape.
  4. PSTC-131 – International Breaking Strength and Elongation of Pressure Sensitive Tapes.
  5. PSTC-133 – International Thickness (Caliper) of Pressure Sensitive Tapes.
- K. RoHS Directive 2002/95/EC – Restriction of Hazardous Substances.
- L. South Coast Air Quality Management District (SCAQMD) ([www.aqmd.gov](http://www.aqmd.gov)):
1. SCAQMD Rule 1168 – Adhesive and Sealant Applications.
  2. SCAQMD Rule 1113 – Architectural Coating Applications.
- M. UL ([www.ul.com](http://www.ul.com)):
1. UL 94 – Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
  2. UL 181 – Standard for Factory-Made Air Ducts and Air Connectors.
  3. UL 723 – Standard for Test for Surface Burning Characteristics of Building Materials.
- N. US Environmental Protection Agency (US EPA) ([www.epa.gov](http://www.epa.gov)):
1. Method 3052 – Microwave Assisted Acid Digestion of Siliceous and Organically Based Matrices.
  2. Method 3060A – Alkaline Digestion for Hexavalent Chromium.
  3. Method 3540C – Soxhlet Extraction.
  4. Method 6010B – Inductively Coupled Plasma-Atomic Emission Spectrometry.
  5. Method 7196A – Chromium, Hexavalent (Colorimetric).
  6. Method 8270C – Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS).
- O. US Food and Drug Administration (US FDA) ([www.fda.gov](http://www.fda.gov)):
1. US FDA CPG 7117.11 – Compliance Policy Guide Sec. 500.450 Volatile N-Nitrosamines in Rubber Baby Bottle Nipples.

## 1.4 PREINSTALLATION MEETINGS

Specifier Notes: Edit the Preinstallation Meetings article as required for the Project. Delete this article if not required.

- A. Convene preinstallation meeting [1 week] [2 weeks] before start of installation of HVAC equipment insulation.
- B. Require attendance of parties directly affecting Work of this Section, including Contractor, Architect, installer, and manufacturer's representative.
- C. Review the Following:
  - 1. Materials.
  - 2. Examination of HVAC equipment.
  - 3. Surface preparation.
  - 4. Installation.
  - 5. Adjusting.
  - 6. Cleaning.
  - 7. Protection.
  - 8. HVAC equipment insulation schedule.
  - 9. Coordination with other Work.

## 1.5 SUBMITTALS

Specifier Notes: Edit the Submittals article as required for the Project. Delete submittals not required.

- A. Submittals: Comply with Division 01.
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Samples: Submit manufacturer's standard sample of each type of HVAC equipment insulation specified.
- D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- E. Test Reports: Submit manufacturer's test reports from testing performed by qualified, independent testing laboratories.
- F. Manufacturer's Project References: Submit manufacturer's list of 10 successfully completed HVAC equipment insulation projects of similar size and scope to this Project, including project name and location, name of architect, and type and quantity of HVAC equipment insulation furnished.
- G. Installer's Project References: Submit installer's list of 10 successfully completed HVAC equipment insulation projects of similar size and scope to this Project, including project name and location, name of architect, and type and quantity of HVAC equipment insulation installed.

H. Warranty Documentation: Submit manufacturer's standard warranty.

## 1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Manufacturer regularly engaged in the manufacturing of HVAC equipment insulation of similar type to that specified for a minimum of 10 years.
- B. Installer's Qualifications:
  - 1. Installer regularly engaged in installation of HVAC equipment insulation of similar type to that specified for a minimum of 5 years.
  - 2. Use persons trained for installation of HVAC equipment insulation.
- C. Inspection & Verification:
  - 1. The use of certified mechanical insulation inspectors who maintain current certification by the National Insulation Association, or other certified mechanical insulation certification association, is recommended throughout the project to inspect and verify the materials are and the total insulation system has been installed in accordance with the specifications.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
  - 1. Store and handle materials in accordance with manufacturer's instructions.
  - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
  - 3. Store materials in clean, dry area indoors.
  - 4. Do not store materials directly on floor or ground.
  - 5. Store materials out of direct sunlight.
  - 6. Keep materials from freezing.
  - 7. Protect materials during storage, handling, and installation to prevent damage.

## 1.8 AMBIENT CONDITIONS

- A. Do not install HVAC equipment insulation under ambient conditions outside manufacturer's limits.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturer: Aeroflex USA, Inc., 232 Industrial Park Road, Sweetwater, Tennessee 37874. 866-237-6235. [www.aeroflexusa.com](http://www.aeroflexusa.com).

Specifier Notes: Specify if substitutions will be permitted.
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- B. Substitutions: [Not permitted] [Comply with Division 01].

- C. Single Source: Provide materials from single manufacturer.

## 2.2 HVAC EQUIPMENT INSULATION

Specifier Notes: Specify HVAC equipment insulation required for the Project. Delete HVAC equipment insulation not required.

- A. Elastomeric Sheet and Roll Insulation: "AEROFLEX EPDM Sheet & Roll".
1. Description: Flexible, closed-cell, lightweight, EPDM-rubber-based, elastomeric sheet and roll insulation.

Specifier Notes: Thicknesses through 2 inches pass ASTM E 84/UL 723 - 25/50. Thicknesses greater than 2 inches do not pass ASTM E 84/UL 723 - 25/50.

2. Thicknesses: 1/8 inch, 1/4 inch, 3/8 inch, 1/2 inch, 5/8 inch, 3/4 inch, 1 inch, 1-1/4 inches, 1-1/2 inches, 2 inches, 2-1/2 inches, 3 inches sheet only.
3. Joint Closure: Apply "AEROFLEX Protape" over seams sealed with "AEROFLEX Aero seal", "AEROFLEX REF 1520", or "AEROFLEX Aero seal LVOC Black" adhesives.
4. Approval/Conformance:
  - a. ASTM C 534, Type II, Grade 1.
  - b. ASTM E 84/UL 723, 25/50.
  - c. CDPH Standard Method v1.2-2017, VOC Emissions.
  - d. HPDC, HPD Open Standard v2.3.
  - e. ISO 14025, Product-Specific Type III Environmental Product Declaration.
  - f. NFPA 90A.
  - g. NFPA 90B.
  - h. UL 181, Section 13 mold growth/humidity.
  - i. UL 181, Section 18 air erosion.
  - j. NY City MEA 171-04-M.
  - k. Energy code requirements of IECC and ASHRAE for R-4 refrigeration piping at 1-inch wall thickness.
5. Thermal Conductivity, ASTM C 177 and C 518:
  - a. Mean Temperature Minus 4 Degrees F (Minus 20 Degrees C): 0.22 BTU-in/hr-ft<sup>2</sup>-degree F.
  - b. Mean Temperature 32 Degrees F (0 Degrees C): 0.23 BTU-in/hr-ft<sup>2</sup>-degree F.
  - c. Mean Temperature 75 Degrees F (24 Degrees C): 0.245 BTU-in/hr-ft<sup>2</sup>-degree F.
  - d. Mean Temperature 90 Degrees F (32 Degrees C): 0.25 BTU-in/hr-ft<sup>2</sup>-degree F.
  - e. Mean Temperature 104 Degrees F (40 Degrees C): 0.265 BTU-in/hr-ft<sup>2</sup>-degree F.
6. Service Temperature, Continuous, ASTM C 411:
  - a. Upper: 257 degrees F (125 degrees C).
  - b. Lower: Minus 297 degrees F (Minus 183 degrees C).
7. VOC Emissions, CDPH v1.2-2017: less than or equal to 0.5 mg/m<sup>3</sup>.
8. UV Resistance, ASTM G 7: Minimal cracking.
9. Ozone Resistance, ASTM D 1171: No cracking.
10. Water Vapor Permeability, Maximum, ASTM E 96: 0.02 perm-inch.
11. Water Absorption, Maximum, ASTM C 209: 0.2 percent by volume.
12. Fire Safety Characteristics, Through 2-Inch Thickness:
  - a. UL 94: Class V-0.

- b. Flame Spread Index, ASTM E 84/UL 723: Less than 25.
- c. Smoke Developed Index, ASTM E 84/UL 723: Less than 50.
- d. ASTM D 635: Self-extinguishing.
- 13. Corrosion of Stainless Steel, ASTM C 692, DIN 1988: Non-corrosive.
- 14. Nitrosamine Content, US FDA CPG 7117.11, BS EN 12868: None detected.
- 15. Flexibility, ASTM C 534: Pass.
- 16. R-Value for Sheet Insulation:
  - a. 3/8-Inch Thickness: 1.7.
  - b. 1/2-Inch Thickness: 2.2.
  - c. 3/4-Inch Thickness: 3.3.
  - d. 1-Inch Thickness: 4.2.
  - e. 1-1/2-Inch Thickness: 6.4.
  - f. 2-Inch Thickness: 8.4.
  - g. 2-1/2-Inch Thickness: 10.5.
  - h. 3-Inch Thickness: 12.6.

B. Elastomeric Sheet and Roll Insulation with Pressure-Sensitive Adhesive (PSA): "AEROFLEX EPDM Sheet & Roll PSA".

- 1. Description: Flexible, closed-cell, lightweight, EPDM elastomeric sheet and roll insulation with PSA.

Specifier Notes: Thicknesses through 2 inches pass ASTM E 84/UL 723 - 25/50. Thicknesses greater than 2 inches do not pass ASTM E 84/UL 723 - 25/50.

- 2. Thicknesses: 1/4 inch, 3/8 inch, 1/2 inch, 5/8 inch, 3/4 inch, 1 inch, 1-1/4 inches, 1-1/2 inches, 2 inches, 2-1/2 inches.
- 3. Joint Closure: Apply "AEROFLEX Protape" over seams sealed with "AEROFLEX Aero seal", "AEROFLEX REF 1520", or "AEROFLEX Aero seal LVOC Black" adhesives.
- 4. Approval/Conformance:
  - a. ASTM C 534, Type II, Grade 1.
  - b. ASTM E 84/UL 723, 25/50.
  - c. CDPH Standard Method v1.2-2017, VOC Emissions.
  - d. HPDC, HPD Open Standard v2.3.
  - e. ISO 14025, Product-Specific Type III Environmental Product Declaration.
  - f. NFPA 90A.
  - g. NFPA 90B.
  - h. UL 181, Section 12 mold growth/humidity.
  - i. UL 181, Section 17 air erosion.
  - j. NY City MEA 171-04-M.
  - k. Energy savings requirements of IECC and ASHRAE of R-4 at 1-inch wall thickness.
- 5. Thermal Conductivity, Mean Temperature 75 Degrees F (24 Degrees C), ASTM C 177 and C 518: 0.245 BTU-in/hr-ft<sup>2</sup>-degree F.
- 6. Service Temperature, Continuous, Self-Adhering Insulation, ASTM C 411:
  - a. Upper: 248 degrees F (120 degrees C).
  - b. Lower: Minus 22 degrees F (Minus 30 degrees C).
- 7. VOC Emissions, CDPH v1.2-2017: less than or equal to 0.5 mg/m<sup>3</sup>.
- 8. Fire Safety Characteristics, Through 2-Inch Thickness:
  - a. UL 94: Class V-0.
  - b. Flame Spread Index, ASTM E 84/UL 723: Less than 25.



- c. Smoke Developed Index, ASTM E 84/UL 723: Less than 50.
- d. ASTM D 635: Self-extinguishing.
- 9. Water Absorption, Maximum, ASTM C 209: 0.2 percent by volume.
- 10. Water Vapor Permeability, Maximum, ASTM E 96: 0.02 perm-inch.
- 11. Dimensional Stability, Maximum, ASTM C 356: 7 percent.
- 12. Odor Emission, ASTM C 1304: Pass.
- 13. Corrosiveness, ASTM C 665 and C 692, DIN 1988: Pass.
- 14. Fungi/Mold Resistance, ASTM C 1338 and G 21, UL 181: No growth.
- 15. Erosion Resistance, ASTM C 1071, UL 181: Pass.
- 16. UV Resistance, ASTM G 7: Minimal cracking.
- 17. Ozone Resistance, ASTM D 1171: No cracking.
- 18. Nitrosamine Content, US FDA CPG 7117.11, BS EN 12868: None detected.
- 19. R-Value for Sheet Insulation:
  - a. 3/8-Inch Thickness: 1.7.
  - b. 1/2-Inch Thickness: 2.2.
  - c. 3/4-Inch Thickness: 3.3.
  - d. 1-Inch Thickness: 4.2.
  - e. 1-1/2-Inch Thickness: 6.4.
  - f. 2-Inch Thickness: 8.4.
- 20. Pressure-Sensitive Adhesive (PSA):
  - a. Adhesive: Scrim-reinforced, acrylic, pressure-sensitive adhesive.
  - b. Adhesive Thickness, PSTC-133: 3.0 mils.
  - c. Peel Adhesion, PSTC-101: 116 oz/inch.
  - d. Shear Strength, PSTC-107: Greater than 6 hours.
  - e. Application Temperature, Minimum: Minus 15 degrees F (Minus 26 degrees C).
  - f. Service Temperature, Maximum, Continuous: 248 degrees F (120 degrees C).

## 2.3 ACCESSORIES

Specifier Notes: Specify HVAC equipment insulation accessories required for the Project. Delete accessories not required.

- A. Rubber Tape: "AEROFLEX Protape".
  - 1. Description: Self-adhering, zero-perm, EPDM-based, rubber tape for covering glued seams of elastomeric insulation tubes and sheets.
  - 2. Approval/Conformance:
    - a. ASTM E 84/UL 723, 25/50.
    - b. CDPH Standard Method v1.2-2017, VOC Emissions.
    - c. HPDC, HPD Open Standard v2.3.
    - d. ISO 14025, Product-Specific Type III Environmental Product Declaration.
  - 3. Material: EPDM rubber.
  - 4. Color: Black and White/Gray.
  - 5. Thickness: 24 mils, plus or minus 4 mils (0.024 inch, plus or minus 0.004 inch).
  - 6. Width: 1 inch, 2 inches, 3 inches, 4 inches, 5 inches.
  - 7. Adhesive: Pressure-sensitive acrylic.
  - 8. Adhesion Peel Strength, Minimum, ASTM D 3330, Peeling Speed 20 mm (3/4 inch)/min: 1.20 kg/25 mm.
  - 9. Tensile Strength, Minimum, JIS K 6301, Pulling Speed 50 mm (2 inches)/min: 2.5 N/mm<sup>2</sup>.
  - 10. Elongation, Minimum, JIS K 6301, Pulling Speed 50 mm (2 inches)/min: 50 percent.

11. Holding Power, ASTM D 3654, Applied Load 1 kg: 3 hours.
12. Initial Tack, ASTM D 3121, #15: 5/16 inch.
13. Service Temperature, ASTM C 411:
  - a. Upper: 257 degrees F (125 degrees C).
  - b. Lower: Minus 70 degrees F (Minus 57 degrees C).
14. VOC Emissions: less than or equal to 0.5 mg/m<sup>3</sup>.
15. UV Resistance, ASTM G 7: Pass.
16. Ozone Resistance, ASTM D 1171: No cracking.
17. Water Vapor Permeability, ASTM E 96: 0.00 perm-inch.
18. Water Absorption, ASTM C 209: 0.2 percent by weight.
19. Fire Safety Characteristics:
  - a. UL 94: Class V-0.
  - b. Flame Spread Index, ASTM E 84/UL 723: Less than 25.
  - c. Smoke Developed Index, ASTM E 84/UL 723: Less than 50.
  - d. ASTM D 635: Self-extinguishing.
20. Corrosion of Copper and Stainless Steel, ASTM C 692, DIN 1988: Non-corrosive, pass.
21. Nitrosamine Content, US FDA CPG 7117.11, BS EN 12868: None detected.

B. Contact Adhesive: "AEROFLEX Aero Seal".

1. Description: Modified-neoprene contact adhesive for bonding "AEROFLEX" EPDM elastomeric insulating materials.
2. Composition: Synthetic-rubber base with synthetic resins and fillers added.
3. VOC Content: 417 g/L.
4. Tack Time: 1 to 3 minutes, under ideal conditions.
5. Weight: 6.9 lbs. per gallon.
6. Solids Content: Approximately 25 percent by weight.
7. Service Temperature: Minus 20 degrees F to 257 degrees F (Minus 28 degrees C to 125 degrees C) for tubes, Minus 20 degrees F to 200 degrees F (Minus 28 degrees C to 93 degrees C) for sheets & rolls.
8. Fire Safety Characteristics, ASTM E 84/UL 723:
  - a. Flame Spread Index: Less than 25.
  - b. Smoke Developed Index: Less than 50.
9. Coverage: Up to 200 ft<sup>2</sup> per gallon.
10. Shelf Life: 1 year (store at room temperature, avoid freezing).

C. Contact Adhesive: "AEROFLEX REF 1520".

1. Description: Modified-neoprene contact adhesive for bonding "AEROFLEX" EPDM elastomeric insulating materials.
2. Composition: Synthetic-rubber base with synthetic resins and fillers added.
3. VOC Content: 615 g/L.
4. Tack Time: 1 to 3 minutes, under ideal conditions.
5. Weight: 6.9 lbs. per gallon.
6. Solids Content: Approximately 25 percent by weight.
7. Service Temperature: Minus 20 degrees F to 257 degrees F (Minus 28 degrees C to 125 degrees C) for tubes, Minus 20 degrees F to 200 degrees F (Minus 28 degrees C to 93 degrees C) for sheets & rolls.
8. Fire Safety Characteristics, ASTM E 84/UL 723:
  - a. Flame Spread Index: Less than 25.
  - b. Smoke Developed Index: Less than 50.
9. Coverage: Up to 200 ft<sup>2</sup> per gallon.

10. Shelf Life: 1 year (store at room temperature, avoid freezing).

D. Contact Adhesive: "AEROFLEX Aeroseal LVOC Black".

1. Description: Low-VOC content and emissions, synthetic-rubber-base contact adhesive for bonding "AEROFLEX" EPDM elastomeric insulating materials.
2. Approval/Conformance:
  - a. ASTM E 84/UL 723, 25/50.
  - b. CDPH Standard Method v1.2-2017, VOC Emissions.
  - c. ISO 14025, Product-Specific Type III Environmental Product Declaration.
  - d. SCAQMD, Rule 1168, VOC Content.
3. Composition: Synthetic-rubber base with synthetic resins and fillers added.
4. VOC Content: 0.4 g/L or less.
5. VOC Emissions: 0.5 mg/m<sup>3</sup> or less.
6. LBC Red List Chemicals: Zero.
7. Tack Time: 3 to 5 minutes, under ideal conditions.
8. Weight: 7.0 lbs. per gallon.
9. Solids Content: Approximately 26 percent by weight.
10. Service Temperature: Minus 20 degrees F to 257 degrees F (Minus 28 degrees C to 125 degrees C) for tubes, Minus 20 degrees F to 200 degrees F (Minus 28 degrees C to 93 degrees C) for sheets & rolls.
11. Fire Safety Characteristics, ASTM E 84/UL 723:
  - a. Flame Spread Index: Less than 25.
  - b. Smoke Developed Index: Less than 50.
12. Coverage: Up to 200 ft<sup>2</sup> per gallon.
13. Shelf Life: 1 year (store at room temperature, avoid freezing).

E. Acrylic Emulsion Coating: "AEROFLEX Aerocoat".

1. Description: Premium acrylic-emulsion, water-based, latex coating for application as a UV-protective or decorative coating for "AEROFLEX" EPDM elastomeric insulating materials.

Specifier Notes: Diluting or adding color tint is not recommended, as it will negatively affect product performance.

2. Approval/Conformance:
  - a. CDPH Standard Method v1.2-2017, VOC Emissions.
  - b. ISO 14025, Product-Specific Type III Environmental Product Declaration.
3. Color: [White].
4. VOC Content: 116 g/L.
5. VOC Emissions: 0.5 mg/m<sup>3</sup> or less.
6. Dry Time: up to 4 hours between coats.
7. Weight: Approximately 10 lbs. per gallon.
8. Solids Content: Approximately 50 percent by weight.
9. Elongation: Over 400 percent.
10. Coverage: Up to 400 ft<sup>2</sup> per gallon.
11. Reapply: Approximately every 3-5 years.
12. Shelf Life: 1 year (store at room temperature, avoid freezing).

F. Low-VOC Coating: "AEROFLEX Aerocoat LVOC".

1. Description: Low-VOC content and emissions, water-based, latex coating for application as a UV-protective or decorative coating for "AEROFLEX" EPDM elastomeric insulating materials.

Specifier Notes: Diluting or adding color tint is not recommended, as it will negatively affect product performance.

2. Approval/Conformance:
  - a. CDPH Standard Method v1.2-2017, VOC Emissions.
  - b. SCAQMD, Rule 1168, VOC Content.
3. Color: [White].
4. VOC Content: 0.1 g/L or less.
5. VOC Emissions: 0.5 mg/m<sup>3</sup> or less.
6. LBC Red List Chemicals: Zero.
7. Dry Time: up to 4 hours between coats.
8. Weight: Approximately 11 lbs. per gallon.
9. Solids Content: Approximately 55 percent by weight.
10. Coverage: Up to 300 ft<sup>2</sup> per gallon.
11. Reapply: Approximately every 3-5 years.
12. Shelf Life: 1 year (store at room temperature, avoid freezing)

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Examine HVAC equipment to receive insulation.
- B. Verify HVAC equipment has been inspected, tested, and approved.
- C. Do not begin surface preparation or installation to HVAC equipment with leaks.
- D. Notify Architect of conditions that would adversely affect installation or subsequent use.
- E. Do not begin surface preparation or installation until unacceptable conditions are corrected.

### **3.2 SURFACE PREPARATION**

- A. Prepare HVAC equipment surfaces in accordance with manufacturer's instructions.
- B. Remove moisture, condensation, dirt, dust, debris, oil, grease, coatings, and other surface contaminants which could adversely affect installation of HVAC equipment insulation.

### **3.3 INSTALLATION**

- A. Install HVAC equipment insulation in accordance with manufacturer's instructions.
- B. Install HVAC equipment insulation to HVAC equipment specified in Division 23 sections and as indicated on the Drawings.

- C. Install HVAC equipment insulation at thicknesses specified for each item of HVAC equipment.
- D. Install HVAC equipment insulation to clean dry surfaces.
- E. Install HVAC equipment insulation with least number of joints practical.
- F. Seal insulation butt joints and seams in accordance with manufacturer's instructions.

### **3.4 ADJUSTING**

- A. Repair minor damages to HVAC equipment insulation in accordance with manufacturer's instructions and as approved by Architect.
- B. Remove and replace with new material, damaged HVAC equipment insulation that cannot be successfully repaired, as determined by Architect.

### **3.5 CLEANING**

- A. Clean HVAC equipment insulation promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage insulation.

### **3.6 PROTECTION**

- A. Protect Work of this Section from damage until Substantial Completion.

Specifier Notes: Delete the Schedules article if not required for the Project or if the HVAC Equipment Insulation Schedule is on the Drawings.

Coordinate the HVAC Equipment Insulation Schedule with the products specified in Part 2 – Products of this Section.

### **3.7 SCHEDULES**

- A. HVAC Equipment Insulation Schedule:

**END OF SECTION**