

PART 1 GENERAL

1. SUMMARY

1.1 - Section includes: This specification consists of labor, materials, accessories, and operations required for the correct installation of Pro-Shield and Chill-Shield Thermal Hanger Shields on insulated piping for systems operating from -225°F (-157°C) to 1200°F (650°C).

2. DEFINITIONS

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2.1 – MSS - Manufacturers Standardization Society

2.1 - ASHRAE - American Society of Heating, Refrigeration and Air Conditioning Engineers.

2.2 - ASTM - American Society of Testing and Materials

2.3 - IIC Code - International Code Council

2.4 - MICA - Midwest Insulation Contractors Association

2.7 - NRC - Nuclear Regulatory Commission. [1]
[SEP]

2.8 - OSHA - Occupational Safety and Health Act

2.10 – Made in America - Self certified

2.11 - ASJ+: All Service Jacket composed of aluminum foil reinforced with glass scrim bonded to a Kraft paper interleaving with an outer film layer leaving no paper exposed.

2.14 - SSL: Self-Sealing Lap.

3. REFERENCES

3.1 – ANSI/MSS SP-58 – “Pipe Hangers and Supports”

3.2 - ASHRAE - National Voluntary Consensus Standard 90.1 - “Energy Standards for Buildings Except Low-Rise Residential Buildings” [1]
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3.3 - ASTM C533 - “Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation”

3.4 – ASTM C534 – “Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form”

3.5 - ASTM C547 – “Standard Specification for Mineral Fiber Pipe Insulation”

3.6 - ASTM C552 – “Standard Specification for Cellular Glass Thermal

Insulation”

3.7 - ASTM C591 – “Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation”

3.8 - ASTM C610 – “Standard Specification for Molded Expanded Perlite Block and Pipe Thermal Insulation”

3.9 - C656-17 Standard Specification for Structural Insulating Board, Calcium Silicate

3.10 - ASTM C1136 – “Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation”

3.11 – ASTM A 653 – “Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process”

3.12 - ASTM C585 - “Standard Practice for Inner and Outer Diameter of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System)”

3.13 - ASTM E84 - “Test Method for Surface Burning Characteristics of Building Materials”

3.14 - ASTM E136 - “Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C”

3.15 - MICA - “National Commercial and Industrial Insulation Standards”

3.16 - Mil-I-24244 - “Military Specification for Insulation Material with Special Corrosion, Chloride and Fluoride Requirements”

3.16 - NRC 1.36 - “Nonmetallic Thermal Insulation for Austenitic Stainless Steel”

4. SYSTEM PERFORMANCE

^[L]_[SEP]4.1 - Thermal Hanger Shield shall meet the load bearing requirements as defined in ANSI-MSS SP-58 and as referenced in the MICA “National Commercial and Industrial Insulation Standards”.

4.2 - Thermal Hanger Shields shall meet the minimum insulation thickness requirements of the National Voluntary Consensus Standard 90.1 established by ASHRAE, and IIC Building Codes. However if other factors such as condensation control or personal protection are to be considered, the selection of thickness of insulation should satisfy the controlling factor.

4.3 – Thermal Hanger Shield Insulation shall meet the fire hazard requirements of: ^[L]_[SEP]ASTM E136 and/or, ASTM E84 depending upon application.

4.4 – Thermal Hanger Shield shall use a G-90 Galvanized Steel shield as

defined per ASTM A653.

4.5 - Thermal Hanger Shield shall be jacketed with a low permeance vapor retarder as defined in ASTM C1136. Commonly referred to as ASJ+, sealed using a self sealing lap (SSL) and matching ASJ+ tape.

5. SUBMITTALS^[L]_[SEP]

5.1 - Product Data

5.1.1 - Provide product description of Thermal Hanger Shield, manufacturer's installation instructions and thickness schedules for each service location and piece of equipment.

5.2 - Shop Drawings^[L]_[SEP]

5.2.1 - Submit a list of Thermal Hanger Shields to be used for each service location. Include installation details.

5.3 - Samples^[L]_[SEP]

5.3.1 - Submit samples of Thermal Hanger Shields to be used.

6. QUALITY ASSURANCE^[L]_[SEP]

6.1 - All work shall conform to accepted industry and trade standards for mechanical/plumbing and/or Commercial and Industrial Insulations and to manufacturer's recommendations.

6.2 - Thermal Hanger Shields, shall be installed by skilled and experienced installers who are frequently engaged in either mechanical/plumbing or commercial/industrial insulation installation.

6.3 - Damaged, wet or contaminated Thermal Hanger Shields shall not be installed.

7. DELIVERY, STORAGE AND HANDLING

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7.1 - Deliver all Thermal Hanger Shields to the job site in factory containers with manufacturer's label showing manufacturer, product name and fire hazard information.

^[L]_[SEP] 7.2 - Protect the Thermal Hanger Shields from dirt, water, chemical attack and mechanical damage before, during and after installation.

8. PROJECT AND SITE CONDITIONS

8.1 - Maintain job site temperature and conditions before, during and after installation as required by the manufacturer of the Thermal Hanger Shields.

8.2 – Thermal Hanger Shields must be weather protected before, during, and after installation.

PART 2 PRODUCTS

1. MANUFACTURERS

1.1 – VEP, Value Engineered Products

1.1.1 - Pro-Shield Thermal Hanger Shield

1.1.2 – Chill-Shield Thermal Hanger Shield

2. MATERIALS

2.1 - VEP Pro-Shield, Thermal Hanger Shield

2.1.1 - Complies with ASTM C533 Type 1 or 1A

2.1.2 - Color-coded to identify product as asbestos free.

2.1.3 - Conforms to the dimensional requirements of ASTM C585

2.1.4 - Rated service temperature range from 20°F (-7°C) to 1200°F (650°C).

2.1.5 – Insulation Maximum density of 15 lbs/ft³

2.1.6 - Compressive strength of 100 psi minimum when tested in accordance with ASTM C165.

2.1.7 – Structural insert (12” pipe and larger) minimum 450 PSI meeting ASTM C 656 Type II, Grade 5.

2.1.8 - Rated as 25 flame spread and 50 smoke developed when tested in accordance with ASTM E84.

2.1.9 – G-90 Galvanized steel shield per ASTM A 653.

2.1.10 – Factory applied jacket meeting ASTM C1136 Type I or II.

2.2 - VEP Chill-Shield, Thermal Hanger Shield

2.2.1 - Complies with ASTM C591 Grade 2, Type II or IV

2.2.2 - Conforms to the dimensional requirements of ASTM C585

2.2.3 - Rated service temperature range from -250°F (-157°C) to 225°F (107°C).

2.2.4 – Insulation density of 2 or 3 lbs/ft³ depending up pipe diameter

- 2.2.5 - Compressive strength of 25 or 40 (PSI minimum when tested in accordance with ASTM C165) depending upon pipe diameter.
- 2.2.6 – Structural insert (10” pipe up to 14”) of a minimum 80 PSI meeting ASTM C591 Grade 2 Type IV or 140 PSI Grade 2 Type VI.
- 2.2.6.1 – Structural insert (over 14”) complying with insulation requirements per ASTM C591 but at 10 PCF density with a minimum 280 PSI..
- 2.2.7 - Rated as 25 flame spread and 450 smoke developed when tested in accordance with ASTM E84.
- 2.2.8 – G-90 Galvanized steel shield per ASTM A 653.
- 2.2.9 – Factory applied jacket meeting ASTM C1136 Type I or II.

2.3 – Pipe Insulation Materials (*Note: Not necessarily used as part of VEP’s Thermal Hanger Shields but used to insulate the remainder of the pipe system*)

2.3.1 - General

- 2.3.1.1 – Insulation system shall not contain asbestos, lead, mercury, or mercury compounds.
- 2.3.1.2 – Insulation system is not known to utilize flame retardant substances containing penta, octa, or deca-brominated diphenyl such as deca-bromine (deca-BDE).
- 2.3.1.3 – Insulation system for use on Austenitic stainless steel shall be qualified as acceptable according to ASTM C795.

2.3.2 Preformed Calcium Silicate Pipe Insulation with XOX Corrosion Inhibitor.

2.3.2.1 - Complies with ASTM C533 Type 1

2.3.3 - Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form

2.3.3.1 - Complies with ASTM C534 Type I Grade 1

2.3.4 – Preformed Mineral Fiber pipe Insulation

2.3.4.1 – Complies with ASTM C547 Type I, II, III, IV, & V

2.3.5 – Cellular Glass Thermal Pipe Insulation

2.3.5.1 Complies with ASTM C552 Type II, Grade 6

2.3.6 – Preformed Rigid Cellular Polyisocyanurate Thermal Pipe Insulation

2.3.6.1 Complies with ASTM C591 Grade 2 Type I, II, III, IV, V, VI

2.3.7 – Preformed Expanded Perlite Pipe Thermal Insulation

2.3.7.1 - Complies with ASTM C610

3. ACCESSORIES

3.1 – Provide accessories per insulating materials manufacturers recommendations.

3.1.1 - Closure materials would include low perm jackets as defined per ASTM C1136 Type I or II, compatible butt strips, bands, wires, staples, vapor retarding mastics, adhesives, and pressure-sensitive tape.

PART 3 EXECUTION

EXAMINATION

1.1 – Verify all surfaces are clean, dry and free from dirt, scale, moisture, oil and grease prior to installing Thermal Hanger Shields.

1.2 – Thermal Hanger Shields may be installed prior to final pipe pressure testing. All Clamps around the Thermal Hanger Shield should be adjusted to final tightness.

1.3 – If Thermal Hanger Shields are not installed prior to final system test verify that it is physically possible to install Thermal Hanger Shields in accordance with project drawings, operation performance parameters and the limitations of this specification.

1.4 – Verify Thermal Hanger Shields product labeling and/or submittal data complies with project requirements.

2. INSTALLATION

2.1 - All work activities shall be conducted in accordance with all applicable codes and laws.

2.2 - All Thermal Hanger Shields and insulation shall be installed by a skilled and experienced applicator.

2.3 - All work shall conform to accepted industry and trade standards for commercial and industrial insulations.

2.4 - All insulated piping shall be supported with appropriate Thermal Hanger Shields so that the insulation and vapor barrier system are not compromised by the support.

2.5 - Thermal Hanger Shields shall be used on all horizontal insulated pipe systems at each point of support. Manufactured units shall comply with MSS SP-58 standards and be tested per MSS guidelines. Each assembly shall fit the various pipe diameters and match the outside diameter of the adjoining pipe insulation. [SEP]

2.6 - Thermal Hanger Shields shall be selected based upon operating temperature and insulation requirements.

2.6.1 - Pro-Shield Thermal Hanger Shields shall be used for operating

temperatures ranging from 20°F (-7°C) to 1200°F (650°C)

2.6.1.1 – Pro-Shield Thermal Hanger Shields use calcium silicate insulation with a minimum compressive strength of 100 PSI.

2.6.2 - Chill-Shield Thermal Hanger Shields shall be used for operating temperatures ranging from -250°F (-157°C) to 225°F (107°C).

2.6.2.1 – Chill-Shield Thermal Hanger Shield use Polyisocyanurate insulation with a minimum compressive strength 25 or 40 PSI through 8" pipe size depending pipe material and diameter.

2.6.3 - For both types of Thermal Hanger Shields the insert shall be jacketed with industry standard, non-reactive, all service meeting ASTM E 96A (maximum 0.02 perm).

2.7 - A rolled shield of G-90 galvanized steel shall be an integral part of the unit and shall be of a gauge and length appropriate for the compressive strength of the insert material and type of hanger. [L] [SEP]

2.8 - Insulation and jacket shall extend a minimum of one inch (1") beyond each end of the galvanized steel shield to provide a complete, neat and vapor-tight seal with the adjoining insulation. [L] [SEP]

2.9 - Hanger type and span between hangers shall govern the type of thermal hanger shield used and shall be as follows: [L] [SEP]

2.9.1 - Band-type hangers to 10 foot maximums (clevis, teardrop) – Value Engineered Products' (V.E.P.) Pro-Shield, Chill-Shield , Quik-Shield or equal [L] [SEP]

2.9.2 - Roller-type hangers, regardless of hanger spans - V.E.P.'s MaxSpan R.H. or equal.

2.9.3 - Band-type hangers with spans greater than 10 feet- V.E.P.'s MaxSpan units or equal. [L] [SEP]

2.9.4 - Trapeze style and other clamping-type supports to 10-foot maximums - V.E.P.'s Pro-Shield, Chill-Shield, or equal.

2.9.4.1 - Trapeze style and other clamping-type supports exceeding 10 feet - V.E.P.'s MaxSpan units or equal. [L] [SEP]

2.10 - Safety Ratio shall be a minimum of 3.5:1 - (support capabilities to anticipated pipe load). [L] [SEP]

2.11 - Independent test results documenting the compliance of 'or equal' products shall be available upon request of the Architect, Engineer or Owner. [L] [SEP]

2.12 – Maintain a vapor barrier in all applications by properly sealing all joints, penetrations, and other openings.

2.12.1 -. Mastic may be used (i.e. Childers CP-30 or MEI 55- 10 or equal), providing the longitudinal seam is field-sealed during installation. [L] [SEP]

2.12.2 - 'Water-resistant coatings', which do not provide a sealable vapor barrier, shall not be allowed.

2.13 – Typical insulation specified for insulating pipe are; calcium silicate, mineral fibrous insulation, cellular glass, polyisocyanurate insulation, expanded perlite, and flexible elastomeric.

2.13.1 - Follow the insulation manufacturers installation guides for properly sealing insulation to Thermal Hanger Shields.

2.13.2 - Depending upon the type of insulation, manufacturers installation guides provide information on installing insulation for use over hot pipe, chilled water pipe, refrigerated pipe, liquefied natural gas (LNG) and severe service environments.

3. FIELD QUALITY CONTROL

3.1 – Upon completion of installation of the Thermal Hanger Shields and before start-up, visually inspect and verify that the Hanger shields have been installed correctly.

3.2 – If building is exposed to an outdoor environment make sure Thermal Hanger Shields are covered/protected to exposure of moisture or water.

3.3 - Upon completion of the insulation system visually inspect the Thermal Hanger Supports and insulation and verify that the system has been installed correctly. Refer to the installation guide for the installed insulation for verification.

4. PROTECTION

4.1 - Replace damaged Thermal Hanger Shields and Insulation, which can not be satisfactorily repaired, including vapor barrier damage and moisture-saturated insulation.

4.2 – The installer shall advise the general contractor as to the requirements for protecting the insulation from damage and deterioration for the duration of the construction period

5. SAFETY PRECAUTIONS

5.1 – The contractor shall conduct all job site operations in compliance with applicable provisions given by OSHA as well as with all states and local safety and health codes and regulations that may apply.

6. ADDITIONAL INFORMATION AND SDS

6.1 – Visit VEP website at www.valueng.com