

# Tnemec Fluid Applied Thermal Break Long Form Specification

## PART 1 – GENERAL

### 1.01 DESCRIPTION

- A. This specification covers labor, materials, equipment, and application necessary for, and incidental to, the complete and proper installation of Fluid Applied Thermal Break for application to steel structures and supports in accordance with all applicable requirements of contract documents.
- B. For location and members requiring Fluid Applied Thermal Break.
- C. This specification shall be supplemented by the applicable requirements of building codes, insurance rating organizations and all other authorities having jurisdiction.

### 1.02 SECTION INCLUDES

- A. Corrosion protection primer material.
- B. Fluid Applied Thermal Break
- C. Topcoat for Fluid Applied Thermal Break

### 1.03 RELATED SECTIONS

- A. Section 05 5100 Structural Steel
- B. Section 05 05500 Miscellaneous Metals

### 1.04 REFERENCES

- A. American Institute of Steel Construction (AISC)
  - 1. AISC 303-05 Section 10 – Erection and storage of coated material during shipment and site handling shall be protected to minimize field touch up.
- B. American Society of Testing and Materials (ASTM)
  - 1. ASTM D5894- Standard Test Method for Prohesion
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics
  - 3. ASTM B117- Standard Test Method for Operating Salt Spray Apparatus
  - 4. ASTM D870- Standard Test Method for Water Resistance of Coatings
  - 5. ASTM D4585- Standard Test Method for Water Resistance of Coatings Using Controlled Condensation
  - 6. ASTM D4060- Standard Test Method for Abrasion Resistance of Organic Coatings
  - 7. ASTM D518- Standard Test Method for Steady State Thermal Transmission Properties
  - 8. ASTM C272- Standard Test Method for Water Absorption
  - 9. ASTM D903- Standard Test Method for Peel Strength of Adhesive Bonds
  - 10. ASTM E96- Standard Test Method for Water Vapor Transmission
- C. Association of the American Walls and Ceilings Industries (AWCI)
- D. The Society of Protective Coatings (SSPC)
  - 1. SSPC SP-6, SP-2, SP-3: Surface Preparation Methods
  - 2. SSPC PA-1: Shop, Field, and Maintenance coatings
  - 3. SSPC PA-2: Measurement of Dry Paint Thickness with Magnetic Gauges

### 1.05 SYSTEM DESCRIPTION

- A. The Fluid Applied Thermal Break Acrylic Microporous based material shall be applied at the required thickness to provide the required R - Value of R - 0.10 to R- 4.
- B. In no case, shall the thickness be less than the R value required and a K value **of no greater than 36mW/mK for the Tnemec Series 971 Aerolon Fluid Applied Thermal Break and 50mW/mK for 945 Thermal Tape Aerolon.**

## 1.06 SUBMITTALS

- A. Product Data: Submit product data including manufacturers technical data indicating product performance characteristics, performance, and limitation criteria.
- B. Design Data: Submit published design listings for insulation value ratings and product thickness. Include evidence that the thermal break testing was sponsored by the manufacturer and that the material tested was produced at the manufacturer's facility under the supervision of technical personnel.
- C. Manufacturer's Instructions: Submit manufacturer written installation instructions.
- D. Applicator Qualifications: Submit applicators current certification as a manufacturer trained applicator.
- E. Manufacturers Qualifications: Submit manufacturer documentation that the insulative product complies with the specific contract requirements.

## 1.07 QUALITY ASSURANCE

- A. Manufacturer:
  - 1. Company specializing in manufacturing product in this section with a minimum of 10 years documented experience in manufacturing microporous insulation technologies.
  - 2. Applicator: Company specializing in applying the work of this section with documented experience and trained by the manufacturer.
  - 3. Fluid Applied Thermal Break shall be the complete system from a sole source consisting of primer, acrylic coating thermal break material and topcoat. All materials shall be LEED compliant.
- B. Mock-up:
  - 1. Minimum thirty days prior to application in any area, provide mock-up Samples of thermal break materials in accordance with the following requirements:
    - a. Provide minimum two square feet on representative substrate, where directed by the Engineer, for each different desired R Values and finish of required for the work.
    - b. Provide mock-up areas that comply with thickness, density application, finish texture, and color.
    - c. Inspect mock-up areas within one hour of application for variance due to shrinkage, temperature, and humidity.
    - d. Where shrinkage and cracking are evident, adjust mixture and method of application as necessary to meet required installation, R Value, finish, and color requirements.
    - e. Continue to provide mock-up areas until acceptable areas are produced.
    - f. Acceptable areas shall constitute standard of acceptance for method of application, thickness, finish texture, and color requirements, for Fluid Applied Acrylic Thermal Break Insulative Coating material applications.

## 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturers' original, sealed, undamaged container with identification label intact. Packaged materials shall bear the appropriate labels, seals.
- B. Storage: Materials shall be stored in strict accordance with manufacturers documented instructions.
- C. Documentation: All batch number, product identification and quantities shall be recorded on appropriate QC documents. A copy of the transport document and manufacturers conformance certificate shall be attached to the material delivery on site.

## 1.09 PROJECT/SITE CONDITIONS

- A. Project Environmental Requirements: Substrate and air temperature shall be in accordance with the manufacturers' requirements.
  - 1. Protect work area from windblown dust and rain. Protect adjacent areas from over spray of material.
  - 2. Provide ventilation in areas to receive work of this section during application and minimum 24 hours after application.

- B. Temperature and Humidity Requirements: Maintain air temperature and relative humidity in areas where products will be applied for a period before during and after application as recommended by manufacturer.
  - 1. Do not apply Fluid Applied Thermal Break when temperature of substrate and/or surrounding ambient air temperature is below 45°F. Temporary protection and heat shall be maintained at this minimum temperature for 24 hours before, during and 24 hours after material application.
  - 2. Steel substrate temperature shall be a minimum of 5°F (3°C) above the dew point of the surrounding air for a period of 24 hours prior, during the application of the material and 24-hour cure period.
  - 3. If necessary, for job schedule, the General Contractor shall provide enclosures and heat to maintain proper temperatures and humidity levels in the application areas.
  - 4. The relative humidity of the application area shall not exceed a maximum of 75% 24 hours prior, during and 24 hours after the application of the material. The relative humidity shall not exceed 75% throughout the application and curing of the decorative top coat finish.

## 1.10 WARRANTY

- A. Provide a manufacturer's warranty and applicators workmanship warranty under the provisions detailed in AIA Masterspec®, current edition.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

- A. Tnemec Company – Tnemec Series 971 Aerolon Fluid Applied Thermal Break and Series 945 Aerolon Thermal Tape by Tnemec Company of Kansas City, MO
- B. Primer Shop applied or field applied (Note to specifier coordinate with section (05 05100 or 05 05500) coating shall be Tnemec Series 90-97 Tneme-Zinc, Series 394 PerimePrime, Series V530 Omnithane or Series 1224 Epoxoline WB manufactured by Tnemec Company; Topcoat shall be Tnemec Series 1029 Enduratone or Series 1071 Fluoronar and shall be applied in accordance with the manufacturer's documented instructions. Tnemec Series 971 Aerolon Fluid Applied Thermal Break shall be applied at an R Value of (R-0.1-R4) and shall be applied in accordance with the manufacturer's documented instructions.
- C. Primer coating: For Steel or Concrete Thermal break requirements Tnemec Series 90-97 Tneme-Zinc, Series 394 PerimePrime, Series V530 Omnithane or Series 1224 Epoxoline WB, VOC surface tolerant inorganic epoxy conforming to the following requirements:
  - 1. Bond strength: ASTM D4541 1320 psi
  - 2. Abrasion Resistance ASTM 4060 181 mg
  - 3. Cathodic Disbondment ASTM DG8- No disbondment 3000 Hrs.
  - 4. Water Vapor Transmission ASTM D1653 4.68 g/m<sup>2</sup> /24hrs/<0.22 prms
- D. Tnemec Series 971 Aerolon Fluid Applied Thermal Break, 76% SBV, conforming to the following requirements:
  - 1. Solids by Volume 76% Water Based Thermal acrylic spray applied
  - 2. Recommended Film thickness 40-300 mils applied in multiple applications
  - 3. VOC Content 0.01 lbs./Gallon (1.0 grams /liter)
  - 4. Thinned .01 lbs./ gallon (1.0 grams /liter)
  - 5. HAPS- 0 lbs. per gallon solids
  - 6. Curing time at 75°F, 4 hours to touch, 16 hours to recoat
  - 7. Must meet ASTM C 518- No more than 36 mW/ mK @ 77°F
  - 8. Net weight per gallon- 4.66 lbs. per gallon
  - 9. Storage Temperature Minimum 40° F Maximum 110° F
  - 10. Number of components – one component
  - 11. Primer required – as recommended by manufacturer
  - 12. Topcoat required – Required See Section 09 97 13.00 40 Section 2.0 and 3.0
  - 13. Pot Life – 2 hours
  - 14. Spray life – 2 hours

## 2.02 THERMAL RESISTANCE

- A. In no case shall the thickness be less than the required R value using a K value for **Series 971 Aerolon Fluid Applied Thermal Break no greater than 36mW/mK, and for Series 945 Aerolon Thermal Tape no greater than 50mW/mK. No "R" equivalent data is acceptable.**

### **Series 971 Aerolon Fluid Applied Thermal Break ASTM Testing - Third-Party Results**

- ASTM D5894 – 5,000 hrs. Prohesion
- ASTM E84 – Class A
- ASTM B117 – 5,000 hrs. Salt Spray
- ASTM D870 – 18 months continuous tap water immersion
- ASTM D4585 – 2,000 hrs humidity with no effect
- ASTM D870 Method B – 2,000 hrs. 140°F DI Water Immersion
- ASTM D4060 (CS-17 Wheel, 1,000g load) – No more than 50.2 mg loss after 1,000 cycles
- ASTM C518 – 0.0356 W/m<sup>2</sup>K @77 °F
- ASTM C272 – Less than 1% weight gain after 24-hour cure
- NORSOK M501/ISO 20340 - 25 cycles (each cycle consists of 72hrs weathering, 72hrs of salt spray, and 24hrs of cold temperature exposure)
- 3 Year (12 months) Roof Exposure No Affect
- Immersion – No blistering, cracking, rusting, or delamination of film after 6 months of continuous immersion in 104°F seawater.
- Compatible with WR Grace Mk6, 106 and Z146 and Isolatak equal densities
- Compatible with DOW 790 Sealant

### **Series 945 Aerolon Thermal Tape - ASTM Testing**

- ASTM D903 - 180° peel strength
- ASTM C177 - 0.0497 W/m<sup>2</sup>K @79 °F
- ASTM E96 – WVT of 21.518g/m<sup>2</sup>/hr
- ASTM E84 – Class A
- ASTM D4585 – 5,000 hours humidity with no effect

- Note 1-** Tnemec Series 971 Aerolon Fluid Applied Thermal Break is to be applied to steel members 18” from the exterior of the building facade and continuously back the width of wall section, 18" to the warm side of the wall section to the interior of the building past the AVB to the inside face of the wall cavity. For Tnemec Series 971 Aerolon Fluid Applied Thermal Break on W sections thickness is 60-80 mils DFT, for HSS tubes 120 mils. If space has less than 36” overall, call Tnemec Representative for recommendation of thickness for non-standard design.
- Note 2 -** Field erection/handling of coated steel member shall be in accordance with AISC for handling and erecting a finished product. Off set Aerolon coated steel on dunnage to minimize damage.
- Note 3 –** Tnemec Series 945 Aerolon Thermal Tape is incorporated into many details, alone or with Series 971 Aerolon Fluid Applied Thermal Break.
- Note 4 –** Tnemec Aerolon products are compatible with many intumescent fireproofing, roof membranes, and air/ice barriers. Please refer to guide for approved products.
- Topcoats-** If required, apply Tnemec Series 1029 Enduratone, Series 750 Endura-Shield, or Series 1071 Fluoronar as topcoat for non-immersion services. Apply Tnemec Series 22 Epoxoline for areas where immersion is required.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. All surfaces to receive the specified Tnemec Series 971 Aerolon Fluid Applied Thermal Break or Series 945 Aerolon Thermal Tape per manufacturers printed instructions and be clean, dry, and free of oil, grease, loose mill scale, dirt, dust, or other foreign substances which would impair bond of the material to the substrate.
- B. Other corrections of the surfaces to receive the Fluid Applied Thermal Break material shall be the responsibility of the Contractor at no additional cost to the Owner.
- C. Application of the primer, Tnemec Series 971 Aerolon Fluid Applied Thermal Break, Series 945 Aerolon Thermal Tape and topcoat shall not commence until the contractor, applicator and inspector have examined the surfaces to receive the primer and determined the surfaces are acceptable to receive the primer and Aerolon. Commencement of application means acceptance of substrate.
- D. Verify that substrate and workspace temperature and humidity conditions are in accordance with manufacturers recommendations.

### 3.02 PREPARATION

- A. Provide masking, drop cloths or other suitable coverings to prevent overspray onto surfaces not intended to be coated with thermal break coating.
- B. Clean substrate (Steel or Concrete) free from dust, dirt, grease, paint, or other foreign substances that would impair with the bond of the primer and Tnemec Series 971 Aerolon Fluid Applied Thermal Break.
- C. Abrasive blast-clean the steel substrate in accordance with SSPC SP-6 Standard in the shop prime with Tnemec Series 90-97 Tneme-Zinc, Series 394 PerimePrime or Series 1224 Epoxoline WB. Surface profile shall be 2-3 mils if used for exposed steel; for steel buried in wall section or covered and not exposed SSPC-SP 2 or 3 may be used with Tnemec Series 394 PerimePrime. For Concrete surfaces where thermal break is needed grind all surfaces to receive primer and use Tnemec Series 1224 Epoxoline WB or Series V530 Omnithane.
- D. Weld spatter and defect shall be ground smooth prior to commencement of primer and fluid applied thermal break material.
- E. Primer shall not be applied to prepared substrate until the area has been adequately vented to remove all airborne dust. Prior to the application of any coating material, the blast products, dust, and debris, shall be removed by vacuuming.

### 3.03 APPLICATION

- A. Equipment and application procedures shall conform to the manufacturer's application instructions. The Tnemec Series 971 Aerolon Fluid Applied Thermal Break material shall be applied at the required dry film thickness (DFT)
- B. Apply Tnemec Series 971 Aerolon Fluid Applied Thermal Break at maximum 40-70 mils per wet film thickness (WFT) per lift, 30-50 mils DFT. Subsequent coats are applied until final DFT is achieved. When using Tnemec Series 971 Aerolon Fluid Applied Thermal Break apply in two different color lifts (Yellow & White) to maximum thickness of 50 mils DFT per lift. Final DFT is measured with a dry film thickness gauge. More material is required for the exterior of tube steel to account for two heated perimeters (inside and outside).
- C. The steel deck is to be sprayed unless otherwise indicated. All other Insulative Coating locations, such as concrete balconies and relieving angle components, shall be coated to the R value indicated on the contract documents.

### 3.04 FIELD QUALITY CONTROL

- A. The engineer shall select, and the owner will pay for an independent testing laboratory to inspect and verify the application of material in accordance with the provisions of Tnemec Company.
- B. The Aerolon Fluid Applied Thermal Break material inspection and testing shall be performed 24 hours after completion of final application coat.
- C. The results of the above tests shall be made available to all parties at the completion of each pre-designated area and approval.
- D. In-place material not in compliance with desired R Values in the specification requirements shall be corrected prior to final approval.
- E. The dry film thickness (DFT) of the applied material shall be measured with a nondestructive coating thickness gage after material has completely cured. All measurements shall be documented in writing and furnished to the Owner.

### 3.05 CLEAN UP AND REPAIR

- A. Upon completion of installation, all excess material, overspray, and debris shall be cleared and removed from the job site.
- B. Remove overspray materials from surfaces not required to be thermally protected.
- C. All patching and repair to material, due to damage by other trades, shall be performed under this section and paid for by the trade responsible for the damage. Patching shall be performed by applicators, certified by the manufacturer, and applied in accordance with the manufacturer application instructions.

#### END OF SECTION

Specifier Notes: This product selection guide is written according to the Construction Specifications Institute (CSI) Format, including *Master Format*, *Section Format*, and *Page Format*, contained in the *CSI Manual of Practice*.

The 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 other specification sections and the drawings.

Delete all "Specifier Notes" when editing this section.

Specifier Notes: This section covers Tnemec high-performance coating systems for commercial facilities.

This specification is only a guide listing various coating system options for various environments and should not be used as a final specification. Additional coating systems not listed in this specification are available and may be more appropriate for your coating application. To finalize this specification, please contact [www.rightergroup.com](http://www.rightergroup.com)

Many coatings contain organic solvents. Consult Righter Group, Inc. for compliance to local VOC regulations.

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