



BULLETIN 2-91

December 1991

EQUIVISCIOUS TEMPERATURE (EVT)

(Supersedes Bulletin #2 dated September 1988)

The National Roofing Contractors Association (NRCA) makes the following recommendations regarding bitumen application temperatures for built-up roof systems:

Equiviscous Temperature (EVT): The temperature at which a bitumen attains the proper viscosity for built-up membrane application.

EVT Range: The recommended bitumen application temperature range. The range is approximately 25°F above or below the EVT, thus giving a range of approximately 50°. The EVT range temperature is measured in the mop cart or mechanical spreader just prior to the application of bitumen to the substrate.

EVT for Asphalt: The recommended EVT for roofing asphalt (ASTM D 312, Type I, II, III or IV) is as follows:

- **Mop Application:** The temperature at which the asphalt's apparent viscosity¹ is 125 centipoise.

Note: If there are simultaneous mop and mechanical spreader applications, in order to avoid the use of two kettles, the EVT for mechanical spreader application may be used for both application techniques.

- **Mechanical Spreader Application:** The temperature at which the asphalt's apparent viscosity¹ is 75 centipoise.

EVT for Coal Tar: The recommended EVT for roofing coal tar (ASTM D 450, Type I or III) is the temperature at which the coal tar's apparent viscosity¹ is 25 centipoise.

Product Labeling: NRCA recommends the following information be marked on each bitumen carton label or, for bulk material, provided on the bill of lading:

- **Product Type:** Bitumen type and ASTM designation (e.g., Asphalt—ASTM D 312, Type III; or Coal Tar—ASTM D 450, Type III).
- **EVT:** For asphalt, the EVT for both mop application and mechanical spreader application should be given.
- **Flash Point** (as determined by ASTM D 92).

¹ Apparent viscosity is measured by ASTM D 4402. Viscosity is a measure of the resistance to flow of a liquid. Centipoise is a unit of a liquid's apparent viscosity.

Bitumen Application Temperature Range for Surfacing: The optimum bitumen application temperature range for surfacing is dependant upon the type and method of surfacing. For glaze coating, wherein a relatively thin coating is desired, bitumen application temperature in the EVT range is generally recommended. For aggregate surfacing, a lower bitumen application temperature is generally recommended for the pour coat.

Bitumen Application Temperature Range for Adhering Insulation: The optimum bitumen application temperature range for adhering insulation boards is dependant upon the type of insulation, type of substrate, ambient temperature and wind conditions. Bitumen application temperature within or lower than the EVT range is generally recommended.

Supplementary Recommendations Regarding Bitumen Heating: Excessive or prolonged bitumen heating may have a deleterious effect on the physical properties of the product. Accordingly, the following is recommended:

- Bitumen in kettles or tankers should be kept approximately 25°F or lower, below the bitumen's flash point.
- Bitumen should not be maintained above 500°F for more than four hours, unless bitumen is being added and drawn off periodically.
- If bitumen is held in a tanker or in storage for more than 48 hours, it should be kept at approximately 325°F or lower.

Commentary on Bulletin 2-91 Revisions

The major revision to this edition of the bulletin was the incorporation of separate EVTs for asphalt mop application and mechanical spreader application. Bitumen application temperature range information has also been added for surfacing and adhering insulation boards. Editorial changes have also been made.

Although the bulletin is intended for built-up membrane systems, portions of it are also applicable to certain aspects of hot-applied polymer modified bitumen roof systems. Bitumen used to adhere base and ply sheets, and bitumen used to adhere roof insulation, is generally recommended to be applied at the temperature range recommended in this bulletin. However, the appropriate bitumen temperature application range for adhering modified bitumen cap sheets may be hotter than the ranges recommended in this bulletin. For the recommended range when adhering modified bitumen cap sheets, consult the sheet manufacturer.

References

1. Cullen, W.C., "Equiviscous Temperature Concept Revisited," *International Journal of Roofing Technology*, 1990, p. 46.
2. NRCA and Trumbull Research Report, *Temperature and Viscosity Effects on the Application of Asphalt During the Construction of Built-Up Roofing Systems*, September 1988.
3. NRCA and Koppers Research Report, *Temperature and Viscosity Effects on the Application of Coal Tar Products During the Construction of Built-Up Roofing Systems*, December 1986.