



BULLETIN #2
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EQUIVISCIOUS TEMPERATURE (EVT)

In the January 1977 issue of *Roofing Spec*, we discussed the sticky subject of EVT. This bulletin will review what was reported in the *Spec* article, expand on that information, and provide you with the most up-to-date information on mopping asphalt temperatures.

Basically, in constructing a roof membrane, you and your field crews are dealing with two materials, felts and bitumen, which are described in terms of material specifications and which must be applied in accordance with a separate set of specifications.

The material and/or application specifications do not necessarily have any relationship with requirements for the construction of a good roof. This has certainly been true in the case of mopping asphalts. Within very broad limits, the material specifications have not related to the end use of mopping asphalts, and the handling requirements have evolved around a set of arbitrary temperatures which are unrelated to application temperatures.

NRCA's EVT program began with a simple question: "Under what conditions of use can we expect to get a good mopping job?" The criterion for a "good mopping job" is good adhesion. A desirable mopping weight to obtain good adhesion is 20 pounds of asphalt, plus or minus 5 pounds (except with glass fiber felts, which may require thicker applications of asphalt).

In a series of experiments beginning in 1973, we determined the key factors involved in a good mopping job. The results of the experiments revealed that the critical property of mopping asphalt is the flow of the asphalt at the point of application. Without going into unnecessary detail, the experiments proved that the ideal flow/adhesion/mopping weight of asphalt is achieved when a viscosity of approximately 125 centiStokes (cS) in the mop bucket or felt layer is attained.

There is no particular reason to discuss the theoretical nature of viscosity or why this is the proper way to measure asphalt flow. Let us just say that any time you apply material at this viscosity level (approximately 125cS), you should have every expectation of getting a good mopping job (good adhesion/proper weight).

This data, originating with NRCA, has been confirmed by other investigators listed below.

- National Bureau of Standards
- The Asphalt Institute
- The Manville Corporation
- Other major suppliers

Having established this viscosity as a critical factor in the mopping of hot asphalt, we have also established a "specification" value. However, while viscosity is the key factor, it is also a laboratory number, which cannot be easily measured in the field, and which doesn't mean much to the average roofing crew on the job.

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For this reason, we have adopted the Equiviscous Temperature concept. For every asphalt a temperature exists (and it will vary from asphalt to asphalt) at which the asphalt material will have a given viscosity. Temperature, unlike viscosity, is easily understood and easily measured. Therefore, NRCA has concentrated its efforts on obtaining acceptance of a temperature property, specifically that temperature at which a material will exhibit the optimum flow/adhesion properties. This temperature is the EVT. THE EVT IS, THEREFORE, THE IDEAL TEMPERATURE OF ASPHALT AT THE POINT OF APPLICATION TO ENSURE A GOOD JOB.

The EVT is not a magic temperature, where one degree (plus or minus) is fatal. It should be considered as a target temperature, with variation of plus or minus 10 percent certainly satisfactory.

In addition, job conditions vary. On a cold, windy day, the ideal temperature will be higher than on a hot summer day, due to the rate of chill of the asphalt. However, under either condition, the EVT is still an ideal target temperature.

Obviously, to obtain the EVT at the point of application, it is necessary to heat the asphalt in the kettle or tanker to a higher temperature than the EVT since the material will cool as it is transported from the kettle or tanker to the roof.

Every reasonable step should be taken to reduce the cooling of asphalt as much as possible, particularly considering the cost of fuel. (BTU's lost in route from the kettle or tanker to the roof constitute wasted fuel. **DO** insulate hot asphalt transport lines; **DO** circulate material. **DO NOT** allow hot material to stand for long periods in luggers.

Most major suppliers have agreed to remove arbitrary 425F to 450F limits and to call for a maximum heating temperature relative to the EVT.

WE RECOMMEND THAT YOU DO NOT HEAT MATERIAL HOTTER THAN IS NECESSARY, AND, IN NO CASE, MORE THAN 100F ABOVE THE EVT.

One more precaution is necessary in the interest of safety. Overheated asphalts may flash or catch fire, and heating procedures must take this problem into account. (See the November 1975 issue of *Roofing Spec.*) While the Flash Point (FP) is not a precise temperature, as a matter of practice, ASPHALT SHOULD NOT BE HEATED ABOVE ITS FLASH POINT TEMPERATURE.

In conclusion, EVT represents the ideal APPLICATION temperature. Asphalt should not be heated more than 100F above that EVT and never above the Flash Point temperature.

After four years of work, EVT is no longer a laboratory curiosity of interest to scientists only. Within six months, bills of lading and cartons received from most suppliers will contain information on EVT and Flash Point temperatures to give your crews the best information available as to the proper heating and application temperatures. These values have been determined and confirmed by many people to give you a material description that relates to proper end-use. Use this information and make sure that your crews understand it.

The manufacturers who have stated their intention of supplying EVT and Flash Point information are:

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|----------------|-------------|
| Celotex | CertainTeed |
| Evans Products | GAF |
| Manville | Koppers |
| Nical | OCF |
| Tamko | U.S. Gypsum |

A word of thanks is due to Trumbull Asphalt, a major asphalt producer, for its cooperation in the experimental period and in implementing the experimental findings into actual practice.

