DMS - 8220
HOT APPLIED THERMOPLASTIC

EFFECTIVE DATE: JANUARY 2012

8220.1. Description. This Specification governs for the materials, composition, quality, sampling, and testing of thermoplastic and materials utilized in its application to the roadway surface.

8220.2. Units of Measurements. The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

8220.3. Material Producer List. The Materials and Pavements Section of the Construction Division (CST/M&P) maintains the Material Producer List (MPL) of all materials that have demonstrated the ability to conform to the requirements of this Specification. Materials appearing on the MPL, entitled **"**Thermoplastic Pavement Marking Materials**,"** require no further testing, unless deemed necessary by the Project Engineer or CST/M&P.

8220.4. Bidders' and Suppliers' Requirements. The Department will only purchase or allow on projects those products listed by manufacturer and product code or designation shown on the MPL.

8220.5. Pre-Qualification Procedure.

A. Pre-Qualification Request. Prospective producers interested in submitting their product for evaluation must submit a written request to the Texas Department of Transportation, Construction Division, Materials and Pavements Section (CP-51), 125 East 11th Street, Austin, Texas 78701-2483.

Include the following information in the request:

- Company name,
- Physical and mailing addresses,
- Type of material, and
- Contact person and telephone number.

B. Pre-Qualification Sample. Submit 50 lb. of each color made according to this Specification for laboratory testing and evaluation. Include Material Safety Data Sheets with the samples.

Submit all materials for pre-qualification tests at no cost to the Department.

C. Evaluation. The Department will notify prospective bidders and suppliers after completion of material evaluation.

1. **Qualification.** The Department will add to the MPL any material approved for use on Department projects.

   Report changes in the composition or in the manufacturing process of any material to CST/M&P. The Department will review significant changes reported, and the material may require a re-evaluation. The Department reserves the right to conduct whatever tests deemed necessary to identify a pre-qualified material and determine if there is a change in the composition, manufacturing process, or quality that may affect its durability or performance.

2. **Failure.** Producers not qualified under this Specification may not furnish materials for Department projects and must show evidence of correction of all deficiencies before reconsideration for qualification.

   Costs of sampling and testing are normally borne by the Department; however, the costs of sampling and testing of materials failing to conform to the requirements of this Specification are borne by the Contractor or supplier. Costs of sampling and testing of failing material will be assessed at the rate established by the Director of CST/M&P in effect at the time of testing.

D. Periodic Evaluation. The Department reserves the right conduct random sampling of pre-qualified materials for testing. Samples for periodic evaluation of performance will be selected at random from materials submitted to the Department on contracts. The Department will sample in accordance with Tex-862-B and will test in accordance with Tex-863-B. Failure of materials to comply with the requirements of this Specification as a result of periodic evaluation may be cause for removal of those materials from the MPL.

E. Disqualification. Disqualification and removal from the MPL may occur if any of the following infractions occur:

- Material fails to meet the requirements stated in this Specification,
- Material fails to exhibit the necessary performance requirements for a minimum of four years in service,
- The producer fails to report changes in the formulation or production process of the material to CST/M&P, or
- The producer has unpaid charges for failing samples.

F. Re-Qualification. If disqualification occurs, the Department will not allow the producer to supply material for 1 yr., or as determined by the Director of CST/M&P. After this period has expired, the producer must follow all requirements of Article 8220.5 to re-qualify for the MPL.

8220.6. Material Requirements. Provide thermoplastic pavement marking materals (TPMM) meeting the requirements of AASHTO M 249, with the following additions and exceptions:

- Clearly mark each bag to indicate color, weight, pigment type (for yellow only), and lot or batch number. (A lot or batch is each individual mix or blend that produces a finished product ready for use.)

- Each bag must contain 50 lb. of material.
- The bag must be composed of a compatible material to allow for the placement of the bag and its contents into the melter.
- Notify CST/M&P if production lots exceed 4,500 lb.

A. Pigments. When washed free of resins by solvent washing, prime and filler pigments must pass a U.S. Standard Sieve Number 200 (Tex-863-B) and must meet the following specific requirements for each pigment.

1. Prime.

- The white pigment must be a rutile titanium dioxide meeting the standards of ASTM D 476, Type II or V. A maximum of 17% of the total white pigment content may be ASTM D 476 Type I anatase titanium dioxide.
- The yellow pigment must be heat-resistant and weather-stable. The yellow pigment must be a lead and chromate free, organic yellow pigment (C.I. Pigment Yellow 83, opaque version). Do not mix pigment types within a batch. Alternate pigments other than those listed must be evaluated and approved prior to use in the formulation.

2. Filler. The filler pigment must be calcium carbonate of 95% purity.

B. Binder. The binder must consist of a mixture of resins, at least one of which is a solid at room temperature, and high boiling point plasticizers. At least 1/3 of the binder composition must be a maleic-modified glyceryl ester of rosin and must be no less than 8% by weight of the entire material formulation.

The infrared analysis of the resin extract must match the spectra on file at CST/M&P in accordance with Tex-888-B.

C. Silica. The total silica used in the formulation must be in the form of glass traffic beads.

D. Glass Traffic Beads. Provide glass traffic beads used in the formulation meeting the requirements for AASHTO M 247 Type I.

E. Color. The daytime CIE chromaticity coordinates of the material, when determined in accordance with Tex-839-B, must fall within an area having the following corner points:

Table 1

Daytime CIE Chromaticity Coordinate Corner Points

	1		2		3		4		Brightness
	x	y	x	y	x	y	x	y	Y
White	0.290	0.315	0.310	0.295	0.350	0.340	0.330	0.360	Min. 65
Yellow	0.435	0.429	0.510	0.489	0.460	0.400	0.560	0.440	30–60

The white and yellow material must meet the specified color requirements listed in Table 1 for each color before and after 70 hr. for white and 1,000 hr. for yellow of Weather-Ometer exposure. Weather-Ometer exposure will be in accordance with

ASTM G 155 using Exposure Cycle 1 with a quartz inner filter glass and Type "S" Borosilicate outer filter glass.

The nighttime CIE chromaticity coordinates for yellow thermoplastic, when determined utilizing a retroreflectometer capable of measuring night color of pavement markings in accordance with ASTM E 1710, must fall within an area having the following corner points during the life of the stripe:

Table 2

Nighttime CIE Chromaticity Coordinate Corner Points

	1		2		3		4		5	
	x	**y**	**x**	**y**	**x**	**y**	**x**	**y**	**x**	**y**
Yellow	0.53	0.47	0.49	0.44	0.50	0.42	0.51	0.40	0.57	0.43

Material found not to meet any of the color requirements during the life of the stripe may subject the manufacturer to removal from the MPL.

F. Uniformity. Manufacture material so that, when sampled in accordance with CST/M&P's testing procedures, any 100-g sample will be representative of the batch or lot of material.

G. Formula.

Table 3

TPMM

White	% by Weight	Yellow	% by Weight
Binder	20 min.	Binder	20 min.
Titanium Dioxide	12–15	C.I. Pigment Yellow 83	1.5 min
Calcium Carbonate	20–42	Calcium Carbonate	20–42
Glass Traffic Beads	30–45	Glass Traffic Beads	30–45
Total	**100**	**Total**	**100**

Note 1—The above requirements will be determined by testing in accordance with Tex-863-B.

Note 2—Alternate pigments and pigment loading for yellow formulations may be considered if CST/M&P evaluates and approves the alternate formulation prior to use.

8220.7. Archived Versions. Archived versions are available.