

## **SPECIFICATION FOR PREFORMED THERMOPLASTIC RUMBLE BARS FOR CENTER & EDGE LINE USE**

1. **USE:** A durable material that is preformed for use as a roadway rumble bar audible and vibratory warning device.
  - 1.1. The material must be a resilient thermoplastic product. The material must be resistant to the detrimental effects of motor fuels, lubricants, hydraulic fluids etc. The material must be capable of being affixed to bituminous and/or Portland cement concrete pavements by the use of the heat of a propane torch. The material shall be available in black, white, yellow, and orange.
  - 1.2. The material must be capable of conforming to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. The material shall have resealing characteristics, such that it is capable of fusing with itself when heated with a torch.
  - 1.3. The material must be able to be applied in temperatures down to 32°F (0°C) without any special storage, preheating or treatment of the material before application.
  - 1.4. The material must be able to be applied without any preheating of the pavement to a specific temperature.
2. **MANUFACTURING LOCATION, CONTROL AND ISO CERTIFICATION:** The material must be produced in the United States, and the manufacturer must be ISO 9001:2015 certified for design, development and manufacturing of preformed thermoplastic pavement markings, and provide proof of current certification.
3. **MATERIAL:** Must be composed of an ester-modified rosin resistant to degradation by motor fuels, lubricants etc. in conjunction with aggregates, pigments, and binders that have been factory produced as a finished product.
  - 3.1. Heating indicators: The top surface of the base material shall have regularly spaced indents. The closing of these indents during application, shall act as a visual cue that the material has reached a molten state allowing for satisfactory adhesion, and as a post-application visual cue that the application procedures have been followed.
  - 3.2. Thickness: The base layer materials must be supplied at a minimum thickness of 125 mil (3.2 mm). Two base layers shall be utilized for this specific application. The rumble bar material as provided by the manufacturer will provide a minimum pre-applied vertical height of 250 mil (6.4 mm). The combined pre-application height of the two base layers and the rumble bar shall be 500 mil (12.7 mm).
  - 3.3. Dimensions: The base material shall be provided in sections 4 inches (10 cm) in width and 12 inches (30.5 cm) in length. The rumble bar material shall be provided in sections 2 inches (5 cm) in width and 11 inches (28 cm) [ $\pm \frac{1}{2}$  in./1.3 cm] in length.
  - 3.4. Materials: The base material shall act as an adhesive layer for attaching the rumble bar to the road surface. Upon following the manufacturer's installation instructions, the rumble bar material must be able to fuse to the base material without the use of additional fasteners or adhesives. The rumble bar shall be of a sufficient height and width to perform as described above in section 1. The two material components shall be available from the manufacturer as needed.
  - 3.5. Environmental Resistance: The material must be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to oil and gasoline.
  - 3.6. Surface Treatment: The black rumble bar material shall have a surface treatment that minimizes retroreflectivity. Rumble bar materials in white, orange, and yellow shall be available with a surface treatment of glass beads to enhance nighttime visibility.

4. **APPLICATION:**

4.1. Asphalt: The materials shall be applied using the propane torch method recommended by the manufacturer. The material must be able to be applied at ambient and road temperatures down to 32°F (0°C) without any preheating of the pavement to a specific temperature. The material must be able to be applied without the use of a thermometer. The pavement shall be clean, dry and free of debris. Two base layers of material shall be used for this application. The first base layer shall be heated until molten, the second base layer is then placed on the molten layer, and heated until molten. The rumble bar shall immediately be positioned and pressed into the still molten base layers of preformed thermoplastic. Supplier must enclose application instructions with each box/package only pertaining to an application method that does not require preheating of the pavement to a specific temperature before base layer application.

4.2. Portland Concrete: The same application procedure shall be used as described under Section 4.1. However, a compatible primer sealer shall be applied before application to assure proper adhesion.

5. **PACKAGING:** The preformed thermoplastic material shall be placed in protective plastic film with cardboard stiffeners where necessary to prevent damage in transit. The cartons in which the materials are packed shall be non-returnable, shall contain a minimum of 35% post-consumer recycled materials, and be labeled for ease of identification. The base material cartons shall not exceed 25 inches (64 cm) in length and 25 inches (64 cm) in width, and the rumble bar cartons shall not exceed 16 inches (41 cm) in length and 12 inches (31 cm) in width. The weight of each individual carton must not exceed 60 lb. (28 kg). A protective film shall be applied around the cartons or pallet box to protect the material from rain or premature aging.

6. **TECHNICAL SERVICES:** The successful bidder shall provide technical services as required. Regionally-located manufacturer's representative, employed directly by the manufacturer, can provide no-cost on-site training for proper application.

7. **PERFORMANCE:** The preformed thermoplastic markings shall meet state specifications and be approved for use by the appropriate state agency.