3M™ Raised Pavement Markers Surface Preparation and Application Procedures

Information Folder 290
Revision A, August 2025
Supersedes August 2010

NOTE

This information folder consolidates and updates information from what was previously three separate information folders: 3M Information Folder 290, 3M Information Folder 290 Groove, and 3M Information Folder 290 PSA.

Description

This information folder contains pavement surface preparation and application procedures for 3M™ Raised Pavement Markers. This includes 3M™ Raised Pavement Markers Series 290 (“290”), 3M™ Raised Pavement Markers Series 290ILC (“290ILC”), and 3M™ Raised Pavement Markers Series 290 with Pressure Sensitive Adhesive (“290PSA”). 290 and 290ILC markers are designed for temporary or permanent application on asphalt and Portland cement concrete road surfaces and are compatible with commercially available bitumen and epoxy adhesives. 290PSA markers are also designed for temporary or permanent application on asphalt and Portland cement concrete road surfaces, and is fitted with a pressure sensitive adhesive (PSA) pad and liner for direct application to pavement surfaces.

Adhesive Types

The following are 3M’s adhesive recommendations for use with 290 and 290ILC markers. 290PSA comes pre-fitted with a pressure sensitive adhesive and does not require additional adhesives for application. Follow the adhesive manufacturer’s recommendations for application, marker compatibility, and road surface type. Use an adhesive product that meets the criteria of applicable state/local government qualified product lists.

- Two Part Epoxy Adhesive
  - Standard Set Epoxy or Fast Set Epoxy
  - Typically, 1 lb (0.5 kg) of adhesive is used for every seven markers applied.
- Bitumen Adhesives
  - Typically, 1 lb (0.5 kg) of adhesive is used for every three markers applied.

Surface Types

The following table describes common road surface types, and their compatibility with 290, 290ILC, and 290PSA markers. This includes specific guidelines for bitumen and/or epoxy adhesive use with the 290 and 290ILC markers.

NOTE

Only apply to surfaces conforming to the 3M™ Road Surface Guide.

<table>
<tr><th rowspan="2">Surface Type</th><th colspan="2">Raised Pavement Marker</th></tr>
<tr><th>290 and 290 ILC</th><th>290PSA</th></tr>
<tr><td>New Asphalt</td><td>Bitumen adhesive use: Review the manufacturer's recommendations to determine the required waiting period between paving operations and marker installation.
Epoxy adhesive use: On roads that have been open to traffic for less than six months, use of an epoxy-based adhesive is strictly on a user test-and-approve basis, as performances may vary.</td><td>Can be applied immediately after final compaction of the asphalt surface by the finishing roller.
Do NOT embed the marker into the fresh asphalt any more than the thickness of the PSA pad, as doing so may limit the visibility of the lens face.</td></tr>
<tr><td>Old Asphalt</td><td colspan="2">Can be placed on older asphalt surfaces depending on the pavement condition and provided proper surface preparation is completed.
Do NOT apply markers on asphalt showing signs of deterioration, cracking, or failure. See the 3M™ Road Surface Guide for details.</td></tr>
<tr><td>New Portland Cement Concrete (PCC)</td><td colspan="2">Remove the curing compound from PCC surfaces that have been open to traffic for less than 90 days prior to installing markers. This can be done by sandblasting, hydroblasting, shot blasting, or grinding.
NOTE: Allow the road surface to dry for 24 hours following hydro-blasting prior to installing markers.</td></tr>
<tr><td>Old Portland Cement Concrete</td><td colspan="2">Can be placed on older concrete surfaces depending on the pavement condition and provided proper surface preparation is completed. Old concrete surfaces that show evidence of scaling and/or smooth exposed aggregate must be textured through grinding or shotblasting prior to installing markers. See the 3M™ Road Surface Guide for details.</td></tr>
<tr><td rowspan="2">Chip Sealed</td><td colspan="2">Sweep the surface of excess aggregate and open the road to traffic for 30 days prior to installing markers. Allow adequate compaction and curing time before application of markers.
Do NOT install markers on chip sealed surfaces with large void spaces and/or loose aggregate with a weak bond to the underlying road surface. See the 3M™ Road Surface Guide for details.</td></tr>
<tr><td>Epoxy adhesive use: On coarse textured type pavements, epoxy adhesives may need to be placed in two steps to allow for proper leveling prior to marker installation.</td><td></td></tr>
</table>

Surface Type	Raised Pavement Marker	
	290 and 290 ILC	290PSA
Slurry Sealed or Fog Sealed	Allow the surface to completely cure and cool prior to installation. Sweep the surface clean of any excess sand applied to soak up surface emulsions prior to installing markers.	
	Installers must allow for adequate compaction time before applying markers. **Bitumen or epoxy adhesive use:** Allow the surface to be open to traffic for 30 days prior to installing markers. Sweep the surface clean of any excess aggregate immediately prior to installing markers.	
Open Grade Friction Course (OGFC)	Allow the surface to completely cool and the asphalt cement binder to harden prior to installing markers.	

Surface Preparation

Cleaning

- Road conditions must meet the acceptable criteria defined in the "Surface Types" section on page 1.
- All applications must be made on a clean and dry surfaces.
- The surface must be swept clean or blown clean with high-pressure air to remove loose material, dirt and dust.
  - A street sweeper or broom may be effective to remove larger or adhered debris, but will require a final pass with an air compressor to clean the road surface.
  - When using air to clean, use a high pressure, high velocity compressed air blower with a minimum 185 cfm (314 m^3/hr) and 120 psi (8 kgs/cm^2) at the air nozzle. There should be no more than 50 ft (15 m) of 0.75 in (1.9 cm) ID hose from the compressor to the air nozzle. The air nozzle should be no less than 0.5 in (1.3 cm) ID. The compressor should also be equipped with a moisture and oil trap. 3M recommends that the air nozzle be no more than 2 ft (0.6 m) from the ground.
- Remove any existing markings from the surface by sandblasting, hydroblasting, shot blasting, or grinding. Expose at least 90% of the road surface from under the existing marking prior to applying new markers.

NOTE

Allow the road surface to dry for 24 hours following hydro-blasting prior to installing markers.

- Road surface MUST be dry prior to application.
- Premark the road, if necessary.

Grooving (Snow Plow Regions or When Applicable)

- Follow the manufacturer's instructions when operating grooving equipment.
- **Pre-Groove Inspection:** Inspect surfaces for obvious damage before cutting grooves. Follow all bitumen, epoxy, and PSA adhesive application instructions and 3M grooving guidelines.
- **Asphalt Surfaces:** Surfaces should be at least 10 days old prior to grooving. Contact the asphalt manufacturer for specific wait-time requirements and traffic recommendations prior to grooving any new or unfamiliar asphalt mixes.
- **Cutting Head:** 3M requires using gang stacked, 0.25 in to 0.5 in (0.6 cm to 1.3 cm) wide, diamond tipped cutting blades to produce the best grooved surfaces. The spacers between each blade must be placed correctly so the rise in the finished groove between the blades is 10 mil (0.25 mm) or less. Grooving with a gang-stacked diamond cutting head helps produces a suitably textured groove and minimizes the risk of micro-fractures in the pavement surface.
- **Application Surface:** The marker application area of the groove must have a smooth/flat surface that is a minimum of 6 in (15.2 cm) long for one-way applications and a minimum of 7.5 in (19.1 cm) long for two-way applications (See Figure 1). When using a coarse tooth pattern, increase the number of blades and decrease the number of spacers on the cutting head.
- **Groove Width:** 4.5 in. (11.4 cm) +/- 0.125 in. (0.3 cm) tolerance. (See Figures 4 and 5.)
- **Groove Depth:** Tapered to a depth of 0.75 in (1.9 cm) minimum. Typically, the range of depth for the groove is 0.75 in. to 0.9 in. (1.9 cm to 2.3 cm). Ensure the height of the marker and the adhesive is NOT taller than the depth of the groove. The slope of the groove should be 1.0 degree and the length of the ramp to the application surface should be 42 in. (1.1 m). (See Figures 2 through 5.)
- **Grooving Speed:** Speed will vary based on the width of the groove, size of application, and equipment used.
- **Groove Position:** The groove must be positioned a minimum of 2 in. (5.1 cm) from the edge of a longitudinal seam or joint.
- **Groove Cleaning:** If cooling the blades with water is necessary, flush the groove with water immediately after grooving to clean the surface. The groove will require a final pass with the air compressor and must be free of dust, dirt, or any other contaminants that can adversely affect the adhesive's bond to the road surface. Allow the groove surface to dry completely (minimum 24 hours) before applying markers. See the "Cleaning" section on page 2 for details.

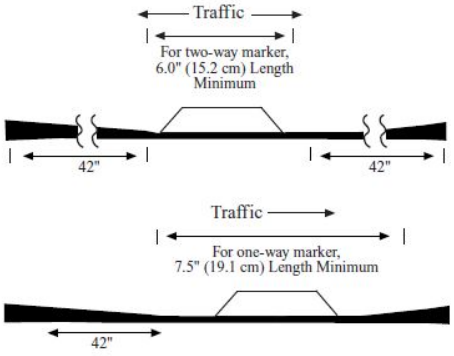

Figure 1. Flat surfaces at the bottom of marker application grooves.

- **Post-Groove Inspection:** Always inspect grooves for signs of channel or groove wall weakness before installing markers. Lightly scratching a channel or groove wall with a pointed object can help determine the integrity of a cut. The structural integrity of a groove bottom should be also checked after grooving and prior to pavement marking installation.

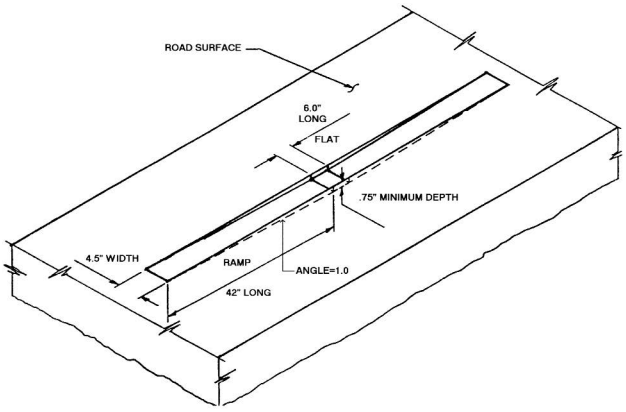

Figure 2. Two Way Marker Application

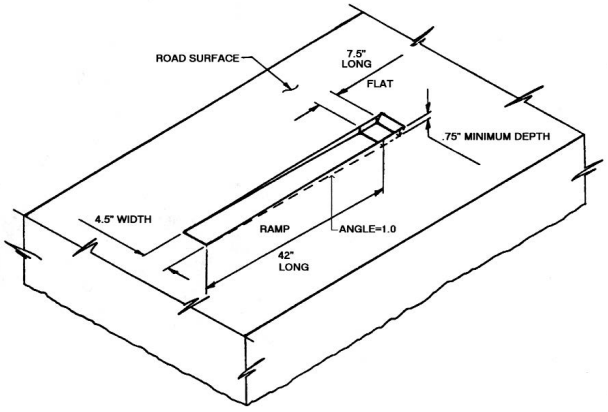

Figure 3. One Way Marker Application

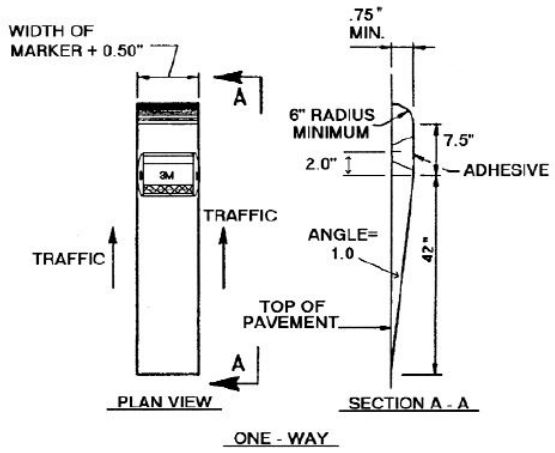

Figure 4. One Way Groove Details

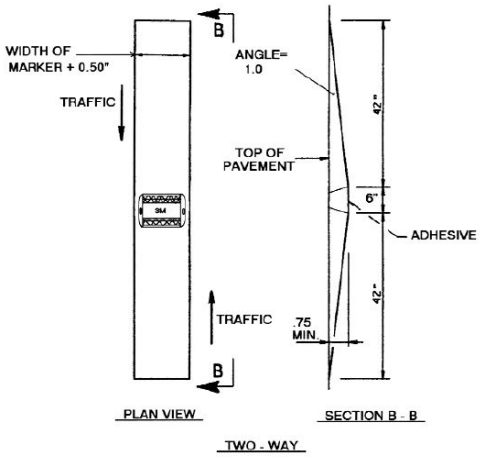

Figure 5. Two Way Groove Details

Using a Surface Preparation Adhesive (When Applicable)

Installers may use 3M™ Stamark™ Surface Preparation SPA60 or 3M™ Stamark™ Surface Preparation Adhesive P-50 to improve initial and long-term adhesion when applying 290PSA markers under marginal weather conditions. See 3M IF 5.17 and 3M IF 5.21 for detailed surface preparation adhesive application instructions.

Marginal weather conditions include circumstances where:

- Air and pavement temperatures have NOT exceeded 50°F (10°C) for the majority of the 24 hours preceding application.
- Prolonged or heavy rainfall is predicted for the 24 hours preceding marker application.
- Applications occurring in the early spring or late fall, outside of the typical road construction season.

NOTE

Asphalt surfaces must be at least three days old prior to applying surface preparation adhesive.

NOTE

Remove the curing compound from concrete surfaces that have been open to traffic for less than 90 days prior to applying surface preparation adhesive.

NOTE

Using surface preparation adhesive increases the PSA adhesion, which can make removal more difficult. The PSA pad may break more often during removal and additional force may be required to remove the marker.

Marker Installation

NOTE

The following procedures are for standard road surfaces in good condition. Contact an appropriate 3M sales representative or application engineer with any questions about a specific application.

- Follow the application criteria in the "Surface Preparation" section on page 2.
- Road marker installations must be completed within the seasonal start and end dates as defined on a regional basis in the 3M™ Stamark™ Pavement Marking Tapes Climate Guide.
- Do NOT apply on longitudinal or transverse seams or joints in the pavement.
- Do NOT apply over existing pavement markings such as paint, thermoplastic, or tape.
- Do NOT apply during rainfall or within 24 hours after rainfall.

290 and 290ILC Installation

NOTE

Installers should use sufficient pressure and adhesive during installation to ensure there is a visible bead of adhesive around the perimeter of the marker after installation.

1. Follow the adhesive manufacturer's recommendations regarding the adhesive's preparation, surface type compatibility, application temperatures, and ambient weather requirements.
2. Apply the adhesive to the road surface per the manufacturer's instructions.
3. Face the reflective part of the road marker in the proper direction.
4. Press the marker firmly into the adhesive.
5. Test to ensure the marker is adhered to the road surface.
6. Scrape aside any adhesive in front of the reflector.

NOTE

Adhesive may directly obstruct the lens, and/or may also collect debris. Failure to remove the excess adhesive may reduce the markers' visibility and effectiveness.

7. Roads may be opened to traffic as soon as the markers have been installed.

290PSA Installation

Only install 290PSA in environments meeting the following temperature restrictions:

- **Air Temperature:** Minimum 60°F (16°C) and rising.
- **Surface Temperature:** Minimum 70°F (21°C) and rising.
- **Overnight Air Temperature:** Minimum 40°F (4°C) the night before application.

1. Determine if surface preparation adhesive is required. If YES, follow the instructions in the "" section on page 4.
2. Peel the liner off of the 290PSA marker.
3. Face the reflective part of the marker in the proper direction.
4. Press the marker firmly onto the road surface.
5. Manually tamp the marker onto the ground with your boot.
6. Manually check to ensure the marker is adhered to the road surface.
7. Tamp the marker to the road with a vehicle tire.
   a. Maintain a speed of 3 to 4 mph (4.8 to 6.4 kph).
   b. Do NOT twist or turn the vehicle tire while on the marker.
   c. Make one pass back and forth over the top of the marker.
8. Roads may be opened to traffic as soon as the markers have been properly tamped.

Removal

1. Always wear gloves and eye protection when removing markers.
2. Pry up the marker using a chisel-like tool (manual or pneumatic). Take care to avoid damaging the road surface.
3. Clean the road surface to remove any residual adhesive or debris.

3M Related Literature

Read the most current 3M product and instruction bulletins before starting any job. The information in 3M product and instruction bulletins is subject to change. Current bulletins are available at www.mmm.com/roadsafety. The techniques described in these bulletins are required when maintaining a 3M warranted product, but are also practical recommendations when using promotional materials for non-warranted graphics. Additional bulletins may be needed as indicated in the 3M Related Literature sections of the product bulletins of all 3M components used.

For situations not specifically covered in this folder, it is the responsibility of the installer to contact the appropriate 3M sales representative or 3M technical service representative for guidance. Instructions contained in this folder must be followed for proper application and performance. Users should be completely knowledgeable of all application requirements and procedures prior to product application.

- 3M Information Folder 5.17 3M™ Stamark™ Surface Preparation Adhesive P-50
- 3M Information Folder 5.21 3M™ Stamark™ Low VOC Surface Preparation Adhesive SPA-60
- 3M Product Bulletin 290 3M™ Raised Pavement Marker Series 290
- 3M™ Road Surface Guide
- 3M™ Stamark™ Pavement Marking Tapes Climate Guide

Health and Safety

Tools and Equipment Usage

When using any equipment, always follow the manufacturer's instructions for safe operation.

Chemicals

When handling any chemical products, read the manufacturers' container labels and the safety data sheets (SDS) for important health, safety, and environmental information.

Follow this link to obtain SDS sheets for 3M products.

Follow this link to obtain information about substances of very high concern (SVHC) for EU products.

Warranty Information

Technical Information

Technical information, guidance, and other statements provided by 3M are based upon records, tests, or experience that 3M believes to be reliable, but the accuracy, completeness, and representative nature of such information is not guaranteed. Such information is intended for people with knowledge and technical skills sufficient to assess and apply their own informed judgment to the information. No license to any intellectual property rights is granted or implied with respect to this technical information.

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