

Transportation Safety Division

3M™ Raised Pavement Markers Series 290

Product Bulletin RPM Series 290

May 2020

1 Description

3M™ Raised Pavement Markers Series 290 are Retroreflective Road Studs, designed for application on asphalt and concrete road surfaces. The markers are designed to provide highly effective, long-term nighttime visibility in non-snow plow regions. The marker bodies are produced of an engineered thermoplastic that gives maximum impact resistance and weatherability. The retroreflective element that provides wet and dry reflectance and long-term nighttime visibility is available in white, yellow/amber, red, blue or green. Series 290 markers are designed for application directly to the pavement surfaces and are compatible with commercially available bitumen and epoxy adhesives. The use of any other type of adhesive should be thoroughly evaluated prior to any large-scale applications. In addition, 3M manufactures a Series 290 marker fitted with a pressure sensitive adhesive (PSA) pad. To use the marker with PSA, a liner is removed from the adhesive pad on the bottom of the marker before placing the marker on the road surface.

2 Product Features

- Durable
- Wet and dry retroreflective
- Impact resistant
- Abrasion resistant
- Molded-in body colors
- Rumble effect
- Lightweight
- Application finger grips
- Compatible with standard bitumen and epoxy adhesives



3 Application Guidelines

3M™ RPM Series 290 markers are designed for application to properly prepared asphalt or concrete surfaces using recommended bitumen or two-part epoxy adhesives. Adhesives other than those recommended must be evaluated by the user to determine suitability.

- Do not apply markers in the following situations:
 1. On longitudinal or transverse seams or joints in the pavement.
 2. Over existing pavement markings such as paint, thermoplastic or preformed tapes.
 3. During rainfall or within 24 hours after rainfall.
- Follow the recommendations of the adhesive manufacturer for application temperatures and ambient weather requirements.
- All applications must be made on a dry surface that has been swept clean or blown with high-pressure air to remove dirt and dust.

4 Classification

Following EN 1463-1:2009, 3M™ RPM Series 290 are classified as being Type P3A (Permanent, Plastic reflector with abrasion resistant lens, nondepressible). In terms of retroreflective performance, 3M™ RPM Series 290 are classified as being Class PRP1 Type 2 retroreflectors.

In terms of Road Test Performance as per EN1 463-2:2000, 3M™ RPM Series 290 are classified as being Class S1 (Road Presence) and Class R1 (night-time visibility) products.



Following EN 1463-1 : 2009, 3M™ RPM Series 290 are certified with CE mark as 'Retroreflecting Road Studs for circulation areas'. All provisions concerning the assessment and verification of constancy of performance were applied and the product fulfills all the prescribed requirements (see the Declaration of Performance '3M Retroreflecting Road Studs 290' at the end of this document for more details).

5 Retroreflectance

When measured in accordance with CIE publication No. 54.2 using a Standard Illuminant A, 3M™ RPM Series 290 have a minimum coefficient of Luminous Intensity R as given in Table 1.

Table 1: Minimum R Values

Colour	Entrance Angle	Observation Angle	Minimum R [mcd/lx]
White	±15°	2°	2.5
	±10°	1°	25
	±5°	0.3°	220
Amber	±15°	2°	1.25
	±10°	1°	12
	±5°	0.3°	110
Red	±15°	2°	0.5
	±10°	1°	5
	±5°	0.3°	44
Green	±15°	2°	0.5
	±10°	1°	5
	±5°	0.3°	44
Blue	±15°	2°	0.25
	±10°	1°	2.5
	±5°	0.3°	22

6 Retroreflected Color

The retroreflected colours of 3M™ RPM Series 290 lie within the colour boxes stipulated in Table 2, when tested in accordance with CIE Publication No. 54.2 using CIE Standard Illuminant A with an entrance angle of $\beta_V=0^\circ$, $\beta_H=5^\circ$ and an observation angle of $\alpha=0.30^\circ$. Colour functions and calculation methods must be made in accordance with ISO/CIE 10526 and ISO/CIE 10527, 1991.

Table 2: Colour Coordinates for nighttime colour (CIE 1931 / 2° observer)

Colour	Point	x	y
White	1	0.390	0.410
	2	0.440	0.440
	3	0.500	0.440
	4	0.500	0.390
	5	0.420	0.370
Amber	1	0.549	0.450
	2	0.543	0.450
	3	0.590	0.395
	4	0.605	0.395
Red	1	0.665	0.335
	2	0.645	0.335
	3	0.721	0.259
	4	0.735	0.265
Green	1	0.030	0.385
	2	0.228	0.351
	3	0.321	0.493
	4	0.302	0.692
Blue	1	0.039	0.320
	2	0.160	0.320
	3	0.160	0.240
	4	0.183	0.218
	5	0.088	0.142

7 Scratch Resistance

The marker meets ASTM D4383-96 scratch resistance test. The coefficient of retroreflected luminous intensity of the markers is measured after subjecting the lens surface to 100 rubs with a 25.4 mm diameter flat pad of No. 3 coarse steel wool conforming to Federal Specification FF-W1825A. A load of 22 ± 0.2 kg is applied to the steel wool pad during testing. The markers meet the minimum retroreflective values specified in Table 1 and the product of the values in Tables 2 and 3.

8 Abrasion Resistance

The coefficient of retroreflected luminous intensity of the markers is measured after subjecting the entire lens surface to 100 grams per square cm (approximately 1600 grams per lens surface) of falling silica carbide per ASTM D968. The markers meet the minimum retroreflective values specified in Table 1.

Note: The marker will require indexing across the test plate to ensure all areas of the lens are subjected to 100 grams per square cm of falling silica carbide.

9 Impact Resistance

The marker body displays no cracking or breakage when tested according to ASTM D2444 Tup A, using a 1000 gm weight from a height of 1 meter. The marker is positioned in such a way that the Tup strikes the top of the marker. The marker lens displays no cracking outside the impact area when tested according to ASTM D2444 Tup A, using a 1000 gm weight from a height of 1 meter. The marker is placed in a steel fixture designed to hold the marker lens horizontal and positioned such that the Tup strikes the center of the lens.

10 Temperature Resistance

The marker shall comply with the initial minimum brightness requirements as specified in Table 1 after conditioning for 12 hours at $63^{\circ}\text{C} \pm 2.5^{\circ}\text{C}$.

11 Resistance to Penetration of Water

The markers are conditioned for 10 minutes at $63^{\circ}\text{C} \pm 2.5^{\circ}\text{C}$ and then immediately submerged in a water bath at $21^{\circ}\text{C} \pm 2.5^{\circ}\text{C}$ for 10 minutes. The markers should then be removed from the water bath, wiped dry with a soft cloth, visually inspected for penetration of water behind the lens, and measured for reflectivity in accordance with clause 5.

The markers meet the initial minimum retroreflectance specified values in Table 1.

12 General Performance Considerations

Maximum durability of retroreflective raised pavement markers will be achieved when markers are properly applied according to the manufacturer's recommendations provided in product bulletins and information folders. Because reflective performance is reduced by wear, the lens of the raised pavement marker is coated with an abrasion-resistant material which provides acceptable reflective performance under normal traffic wear. Minimal marker loss may occur under normal traffic conditions when markers are applied with standard bitumen or epoxy adhesives designed for use with raised pavement markers and as recommended by the manufacturer.

Markers will only be warranted for performance parameters stated in this document or for defects from manufacture. 3M is not responsible for damage or losses due to application.

13 Health and Safety Information

Read all health hazard, precautionary and first aid statements found in the Material Safety Data Sheet (MSDS), and/or product label of chemicals prior to handling or use.

14 Disclaimer

THE 3M WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING OR OF PERFORMANCE, CUSTOM OR USAGE OF TRADE.

15 Limitation of Liability

Except for the limited remedy stated above, and except where prohibited by law, 3M will not be liable for any loss or damage arising from the Markers or any 3M product, whether direct, indirect, special, incidental or consequential damages (including but not limited to lost profits, business or revenue in any way), regardless of the legal theory asserted including warranty, contract, negligence or strict liability.

16 Other Product Information

Always confirm that you have the most current version of the applicable product bulletin, information folder or other product information from 3M's Website at <http://www.mmm.com/tss>.

18 Literature References

For additional information, refer to the following publications:

Information Folder 290: "Pavement Surface Preparation and Application Procedures"
 Information Folder 290 Groove: "Application Procedure for 3M™ Markers Series 290 in Grooved Pavement Surfaces"

Important Notice to Purchaser

All statements, technical information and recommendations herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed. Before using, user shall determine the suitability of the product for its intended use, and user assumes all risk and liability whatsoever in connection therewith. All questions of warranty and liability relating to this product are governed by the terms of the sale subject where applicable to the prevailing law. No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.

Responsible for these product information:

3M Deutschland GmbH
 Transportation Safety Division Laboratory
 Carl-Schurz-Str. 1
 41453 Neuss, Deutschland

3M™ and Stamark™ are registered trademarks of 3M Company. All other trademarks belong to their respective owners.
 The use of trademarks and brand names in this product information is subject to the regulations applicable in the USA. These may differ from those in other countries.



3M Deutschland GmbH
Transportation Safety Division
 Carl-Schurz-Straße 1
 41453 Neuss
 Tel: 02131/14 2198
 Fax: 02131/14 3694
 E-Mail: Verkehrssicherheit@mmm.com
www.3M.de/verkehrssicherheit

3M Österreich GmbH
Transportation Safety Division
 Euro Plaza, Gebäude J
 Kranichberggasse 4
 1120 Wien
 Tel: +43(0)1/86686-0
 Fax: +43(0)1/86686-242
 E-Mail : verkehrssicherheit-at@mmm.com
www.3m.com/at



3M (Schweiz) GmbH
Transportation Safety Division
 Eggstrasse 93
 8803 Rüschlikon
 Tel : +41447249272
 Fax : +41447249450
 E-Mail: verkehrssicherheit-ch@mmm.com
www.3m.com/ch/verkehrssicherheit

Subject to modifications
 Product Bulletin 3M™ RPM Series 290
 05.2020

© 3M 2020. All rights reserved.

Declaration of Performance

3M Reflecting Road Studs 290

Construction product code														
Road Marking Materials - Retroreflecting Road Studs														
<table border="1"> <tr><td>One way yellow, white body 290-Y</td></tr> <tr><td>One way yellow, yellow body 291-Y</td></tr> <tr><td>Two-way yellow, yellow body 291-2Y</td></tr> <tr><td>Two-way yellow and red, yellow body 291-YR</td></tr> <tr><td>One-way red, white body 290-R</td></tr> <tr><td>One way white, white body 290-W</td></tr> <tr><td>Two-way white, white body 290-2W</td></tr> <tr><td>Two-way white and red, white body 290-WR</td></tr> <tr><td>Two-way white and yellow, white body 290-WY</td></tr> <tr><td>Two-way red, white body 290-2R</td></tr> <tr><td>Two-way blue, blue body 295-2B</td></tr> <tr><td>Two-way green, green body 297-2G</td></tr> </table>			One way yellow, white body 290-Y	One way yellow, yellow body 291-Y	Two-way yellow, yellow body 291-2Y	Two-way yellow and red, yellow body 291-YR	One-way red, white body 290-R	One way white, white body 290-W	Two-way white, white body 290-2W	Two-way white and red, white body 290-WR	Two-way white and yellow, white body 290-WY	Two-way red, white body 290-2R	Two-way blue, blue body 295-2B	Two-way green, green body 297-2G
One way yellow, white body 290-Y														
One way yellow, yellow body 291-Y														
Two-way yellow, yellow body 291-2Y														
Two-way yellow and red, yellow body 291-YR														
One-way red, white body 290-R														
One way white, white body 290-W														
Two-way white, white body 290-2W														
Two-way white and red, white body 290-WR														
Two-way white and yellow, white body 290-WY														
Two-way red, white body 290-2R														
Two-way blue, blue body 295-2B														
Two-way green, green body 297-2G														
Type of the construction product														
EN 1463-1 Clause 4: Type of Road Stud – P3A EN 1463-1 Clause 5.2: Dimensions – H1 and HD1														
Intended Use														
Retroreflecting Road Studs for circulation areas														
Authorised Representative	Manufacturer													
	3M USA, St Paul Minnesota, MN 55144-1000													
3M UK Plc Cain Road Bracknell RG12 8HT	Manufacturing plant: AMS Plastics, Centro de Negocios EX-XX1 21900 Mexicali, Baja, Mexico													
Assessment and Verification of Constancy of Performance														
System 1														
BSi Product Services, Hemel Hempstead, UK performed the initial type testing and initial inspection of the factory and the FPC, the continuous surveillance, assessment and evaluation of the factory production control under system 1 and issued the certificate of conformity 0086-CPD-498498														
Declared Performance														
Essential Characteristics / Wesentliche Merkmale	Performance / Leistung	Technical Specification / Technische Spezifikation												
Night Time Visibility Characteristics														
Colorimetric requirements	NCR 1	EN 1463-1:2009												
Chromaticity co-ordinates (x,y)														
Retroreflectivity	PRP 1 (for type 3)													
Durability														
Durability in use	S1, R1	EN 1463-2:2000												
The performance of the construction product identified above is in conformity with the declared performance. This declaration is issued under the sole responsibility of the manufacturer. 3M Centre, Bracknell UK June 2013														
 Suzanne Shea Technical Manager 3M Traffic Safety Security Division														