

Transportation Safety Division

Best Practices for Installing 3M™ Connected Roads All Weather Elements

FAQ Connected Roads All Weather Elements
July 2018

Initial Issue

1 Description

3M Connected Roads All Weather Elements (“New Elements”) are the next generation of 3M's optical Elements for pavement marking. There are some important differences between New Elements and past Elements that may require some adjustments to be made to ensure quality installations.

2 Considerations for All Binder Types

New Elements are less dense and slightly larger than past Elements. The performance of past Elements can typically be matched using 20% fewer New Elements (by weight). For most New Elements installations, an application rate of 8 grams per 4" wide lineal foot (260 g/m^2) produces finished lines that consistently meet initial brightness and longevity expectations while overcoming drop rate and road surface variations over the lengths of installations. Roads with rougher surfaces, higher traffic levels, or higher levels of heavy vehicle traffic may require larger drop rates to meet performance expectations. Expert installations on smooth surfaces that experience moderate traffic levels and have less restrictive performance requirements may meet expectations when New Elements are dropped at rates of less than 8 grams per 4" wide lineal foot (260 g/m^2). It is best to test how New Elements perform in the local environment of a planned installation and develop installation criteria based on those tests.

New Elements should be sufficiently embedded into the binder to anchor them. However, over-embedding New Elements may cause their optics to be covered by the binder and reduce retroreflectivity. 40% embedment is ideal for very hard and durable binders. 50% embedment is ideal for thermoplastic binders.

- To decrease embedment:
 - Reduce binder thickness.
 - If the binder is heated, decrease temperature.
- To increase embedment:
 - Increase binder thickness.
 - If the binder is heated, increase temperature.
- Under rare circumstances, the use of a New Elements type with float characteristics different from those typically recommended may be required. Contact your local 3M Application Engineering representative for assistance. Series name suffixes indicate increasing levels of float as follows: None → M → E. None, i.e. no float treatment, provides maximum embedment and E provides the highest level of float.

3 Thermoplastic

- To target 50% New Elements embedment, adjust melt temperature to 20-30°F (10-20°C) hotter than that used for past Elements.
 - Typical US thermoplastic formulations achieve good New Elements embedment when the thermoplastic is heated to at least 420°F (216°C). Other thermoplastic formulations may require heating to higher or lower temperatures, depending on their melt viscosity and filler content.
 - Move the New Elements drop point closer to the thermoplastic drop point so that the thermoplastic is hotter when the New Elements reach it.
 - If second drop glass beads are being over-embedded, move the second drop glass bead dispenser further away from the thermoplastic drop point, switch to second drop beads that have a “float” treatment, or do both.

4 High Build Waterborne Paint

- For more durable installations:
 - Target a paint application rate that achieves a wet film thickness of 30 mils (760 microns). Minimum acceptable wet film thickness is 25 mils (640 microns).
- For temporary markings with lower durability expectations or those without prolonged in-use retroreflectivity requirements, thinner applications may suffice, however, this may result in New Elements losses occurring sooner.

5 Epoxy, Polyurea, MMA, and other 2Ks

The New Elements types recommended for most two-component (2K) systems (those with the “M” Series name suffix for use with MMA, “E” Series name suffix for most other 2Ks) have a new float surface treatment that typically wears away after 2-7 days exposure to traffic and weather. While present, the float surface treatment lowers the retroreflectivity of the New Elements.

To obtain accurate retroreflectivity readings after a marking has hardened and before the float surface treatment has worn away naturally, use one of the following methods:

- Use a high pressure compressed air gun and follow the procedure described in the [3M Connected Roads All Weather Elements Product Bulletin](#) to remove the surface treatment prior to retroreflectivity measurement.
- Use a pressure washer to remove the surface treatment in areas where retroreflectivity is to be measured and allow marking to dry prior to retroreflectivity measurement.

6 Health and Safety Information

Read all health hazard, precautionary, and first aid statements found in the Safety Data Sheets (SDS) and Article Information Sheets for important health, safety, and environmental information. To obtain SDSs and Article Information Sheets for 3M products, go to 3M.com/SDS, contact 3M by mail, or for urgent requests call 1-800-364-3577.

7 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.3M.com/roadsafety>.

8 Literature References

3M PB AWP	All Weather Paint
3M PB AWT	All Weather Thermoplastic
3M PB CR AWE	3M™ Connected Roads All Weather Elements
3M PB LPM 5000	3M™ Liquid Pavement Marking Series 5000
3M IF 5.22	All Weather Paint Application Guidelines for Elements and Glass Beads on a High-Build Waterborne Traffic Marking Paint
3M IF 5.23	Application Guidelines for 3M Connected Roads All Weather Elements
3M IF 5.24	3M™ All Weather Thermoplastic Pavement Markings Application Guidelines
3M IF 5.28	Liquid Pavement Marking Application Guidelines Series 5000

ASTM Test Methods are available from ASTM International, West Conshohocken, PA.

For Information or Assistance

Call: 1-800-553-1380

In Canada Call:

1-800-3M HELPS (1-800-364-3577)

Internet:

<http://www.3M.com/roadsafety>

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Transportation Safety Division

3M Center, Building 0225-04-N-14
St. Paul, MN 55144-1000 USA

Phone 1-800-553-1380

Web [3M.com/roadsafety](http://www.3M.com/roadsafety)

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