Description

3M™ Connected Roads All Weather Elements Series S70 (“Elements”) are designed for use on roadways and highways primarily as long line pavement markings. They can be used in either new marking applications or as part of a maintenance marking application. The Elements, when used with compatible binders and a second drop of glass beads, form markings that are highly visible day and night under dry and/or wet weather conditions. S70E and S71E are treated Elements that are generally compatible with epoxy, polyurea, and MMA binders. Since formulations may vary, use of E treatment Elements is on a user test-and-approve basis.

Table A. 3M™ Connected Roads All Weather Elements Series S70 Product Family

Elements	Color	E Treatment
S70	White	No
S71	Yellow	No
S70E	White	Yes
S71E	Yellow	Yes

Composite Optic Construction

Elements consist of an outer layer of microcrystalline ceramic beads partially embedded into composite core to provide optimal performance in dry and/or wet conditions when properly applied.

Specifications

Retroreflectivity

Elements shall have the minimum wet and dry cup brightness values presented in Table B. See the Cup Reflectivity Tests for 3M™ Connected Roads All Weather Elements Technical Bulletin for test details.

Table B. Minimum Initial Coefficients of Retroreflection [cd/lx/m^2]

Property/Test Method	S70 and S70E (White)	S71 and S71E (Yellow)
Dry Cup Brightness R_A, cd/lx/m^2	1.8	1.1
Wet Cup Brightness R_A, cd/lx/m^2	3.7	1.8

Gradation

The gradation of Elements shall meet or be within the limits in Table C.

Table C. Element Gradation

US Mesh	Micron	Mass Percent of Elements Passing ASTM D1921
14	1,410	95% to 100%
18	1000	0% to 40%
25	707	0% to 5%

Typical Applied Properties

Typical average initial retroreflectance values when applied as described in 3M Information Folder 5.23 are shown in Table D. Some variance should be expected across applications, and all values represent initial properties unless otherwise noted.

Table D. Typical Average Initial Coefficients of Retroreflected Luminance [mcd/m^2/lx]

Property/Test Method	S70 and S70E (White)	S71 and S71E (Yellow)
Retroreflectivity, Dry Average ASTM E1710	500	350
Retroreflectivity, Wet Recovery Average ASTM E2177	250	175
Retroreflectivity, Wet Continuous Average ASTM E2832	125	90

Application

The Elements are designed for use with high build paints, thermoplastics, and fast curing two-component systems. Since formulations, dry times, and cure times may vary, users should test for ultimate compatibility and performance.

Select the Element type based on the marking binder type, according to the criteria described in Table E, ensuring the Elements are the same color as the binder. Always install the Elements as the first drop of a double-drop Element/bead delivery system. See 3M Information Folder 5.23 for detailed application instructions. Contact a 3M representative with any additional installation questions.

Follow binder and glass bead manufacturers' instructions for application and storage requirements.

Drop Rates

Table E. Elements Application Rates

Units	Standard Drop Rate	Enhanced Durability Drop Rate
Pounds per 4 in. wide lineal foot	0.0055	0.0088
Pounds per mile, 4 in. width	29.1	46.6
Grams per 4 in. wide lineal foot	2.5	4
Grams per square foot	7.5	12
Grams per square meter	80.7	129.2
Pounds per gallon - 20 mils ~240 ft/gal	1.33	2.12
Pounds per gallon - 25 mils ~190 ft/gal	1.06	1.7
Pounds/100 Sq ft	1.65	2.65
Element count per sq. in., rough average	18 to 20	25 to 30

Elements Use and Binder Compatibility

Use a marking binder of a quality and type as designated by the governing agency. Ensure it is thoroughly mixed, homogeneous, and applied to the road surface per the manufacturer's specifications. Table F presents the general compatibilities of the Elements with several common pavement marking binders, including applicable target binder thicknesses.

Table F. General Compatibilities of the Elements

Binder	Target Binder Thickness, final dry/cured (mils, 0.001 in.)	Elements
High build water-borne paint	15+	S70/S71
Thermoplastic	≥ 70	S70/S71
3M™ Liquid Pavement Marking Series 5000 (“LPM 5000”)	15+	S70/S71
Epoxy and Polyurea (excluding LPM 5000)	15+	S70E/S71E
Methyl Methacrylate (MMA)	15+	S70E/S71E

Storage and Shelf Life

Store Elements covered and off the ground in a dry area at a temperature of less than 120°F (49°C).

Use Elements within two years of the date of manufacture.

3M Related Literature

Always confirm you have the most current version of the applicable product bulletin, information folder, or other product information from 3M's website at www.mmm.com/roadsafety.

- 3M Information Folder 5.18 Application Guidelines for Pavement Markings in Grooved Pavement Surfaces
- 3M Information Folder 5.23 3M™ Connected Roads All Weather Elements Application Guidelines
- 3M Information Folder 5.28 Liquid Pavement Marking Application Guidelines Series 5000
- 3M Product Bulletin Series 5000 3M™ Liquid Pavement Marking Series 5000
- Cup Reflectivity Tests for 3M™ Connected Roads All Weather Elements Technical Bulletin

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

Health and Safety

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.

Tools and Equipment Usage

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

Warranty Information

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