

Transportation Safety Division

3M™ Reflective Sheeting Sign Maintenance Management

Information Folder 1.11
March 2023

Replaces IF 1.11 Dated March 2022

1 Description

This information folder defines the 3M recommended procedures for storage, packaging, installation, positioning, cleaning, graffiti removal, and maintenance management of signs made with 3M reflective sheeting products. Per the terms and conditions described in the 3M Product Bulletin for the relevant sheeting product, the procedures described herein must be followed for finished sign faces to qualify for a 3M™ MCS™ Warranty.

2 Retroreflective Sheeting Storage

Unapplied 3M reflective sheeting products should be stored in a cool, dry area, preferably at a temperature of 65–75 °F (18–24 °C) and a relative humidity of 30–50%. Rolls of sheeting should be stored horizontally in their shipping cartons. Partially used rolls should be returned to their shipping cartons or suspended horizontally from rods or pipes through their cores. Unimaged cut sheets should be stored flat.

2.1 Shelf Life

Reflective sheeting must be applied to substrate within three years of date of reflective sheeting manufacture, except for 3M™ Engineer Grade Reflective Sheeting Series 3200 which is two years.

3 Sign Dating

Mark the date of sign manufacture (“**Fabrication Date**”) on all finished signs using a durable marking method. The Fabrication Date constitutes the start of any applicable warranty period. Please refer to the [3M Sign Warranty Bulletin](#) for warranty details. It is also recommended that signs be marked with their date of installation. When dating signs, position date markings so that they will not be covered by mounting posts. Metal stamping, permanent marking crayon, and durable stickers are all suitable marking methods.

4 Slipsheeting

All packages containing finished signs or imaged sign faces must be packaged using slipsheeting.

3M™ Slipsheeting is a coated paper packaging product that helps protect sign faces from blocking, scuffing, and scratching during storage and transport. Please refer to [3M Product Bulletin Slipsheeting](#) for details. Additionally, the glossy side of the release liner from any of the following 3M sheeting products may be used as slipsheeting:

- 3M™ Premium Protective Overlay Film Series 1160i
- 3M™ ElectroCut™ Film Series 1170
- 3M™ Engineer Grade Reflective Sheeting Series 3200
- 3M™ Engineer Grade Prismatic Reflective Sheeting Series 3430
- 3M™ High Intensity Prismatic Reflective Sheeting Series 3930
- 3M™ Diamond Grade™ Visual Impact Performance Reflective Sheeting Series 3990
- 3M™ Diamond Grade™ DG³ Reflective Sheeting Series 4000
- 3M™ Advanced Flexible Engineer Grade Reflective Sheeting Series 7300

When using one of the above listed liners and unsure of which side of the liner is the glossy side, use a Sharpie® marking pen to draw a two inch line on each side of the liner and allow to dry for five seconds. The marking pen line will be easily wiped off the glossy side that must be placed against the sign face.

Note: the Sharpie® test does not apply to primary or alternate 3M Slipsheeting.








































Screen-printed signs must be fully cured prior to packing with either primary or alternate 3M Slipsheeting and continue to be packaged per [3M Information Folder 1.8](#). Signs that have been screen-printed using Series 990 inks require the use of primary 3M Slipsheeting; alternate 3M Slipsheeting is not suitable for use with Series 990 screen-printed sign faces.

Note: screen-printed signs packaged with slipsheeting of any kind are known to be somewhat sensitive to high temperature and high humidity conditions. In some cases, screen-printed signs exposed to some or all these conditions may develop minor cosmetic blemishes which are detectable under close inspection. Minor cosmetic blemishes are those that do not affect a finished sign's ability to meet the performance specifications defined in the relevant 3M product bulletins. As such, minor cosmetic blemishes do not qualify for remedy under the 3M™ MCS™ Warranty.

Digitally imaged signs must be stored using slipsheeting to help minimize scuffing; however, unmounted digitally imaged sign faces may be stacked without the use of slipsheeting.

All 3M Slipsheeting materials, including the liners listed above, must be used with the glossy side of the slipsheeting against the screen-printed sign or sign face. Table 1 indicates slipsheeting compatibility for each 3M reflective sheeting product and imaging method.

Table 1. Slipsheeting compatibilities based on 3M sheeting product and imaging method.

	Series 990 Inks	Series 880i and 880nInks	Direct Applied Copy	Colored Series 1170 Films	Digitally Printed Sheeting with 1170C or 1160i Film
Series 3430 Series 3830 Series 3930 Series 3940 Series 3990 Series 4000	 	  	  	  	  
Series 7300	 	 	 	 	  
Series 3200	 	 	 	 	  
 Primary Slipsheeting	 Alternate Slipsheeting		 Glossy side of release liner from Series 1160i, 1170, 3200, 3430, 3930, 3990, 4000, and 7300		

5 Sign Storage

3M recommends that all parties involved in signage projects coordinate fabrication, delivery, and installation activities based on the construction schedule. Proper planning and sequencing will help to reduce or eliminate the need for long term off-site sign storage. End users should inspect all sign shipments immediately upon receipt.

Store all packaged sign faces (sheeting not applied to a substrate), unimaged blanks, and finished signs inside where they are free from exposure to rain, snow, and extreme temperatures. Store finished signs and sheeted blanks vertically, on edge, in a dry indoor area, as shown in Figures 1, 2, and 3. 3M recommends that a sign inventory system be used to help ensure that older material stock is used first. It is also recommended that every sign shipment be accompanied by storage instructions.



Figure 1. Signs stored vertically on a pallet stand.



Figure 2. Signs stored vertically on shelving designed to accommodate larger signs.



Figure 3. Signs stored vertically on shelving designed to accommodate small signs.

WARNING: Keep packaged signs dry. Store sign packages indoors on edge. Do not allow packaged panels or finished signs to become wet in shipment or storage. If packaged signs do become wet, unpack immediately and allow to dry. Allowing packaged signs or faces to remain wet can result in unwarranted permanent damage.

When crating large signs, secure their ribs or back bracing to their crates so they are suspended within their crates while maintaining a gap of at least one inch between sign faces. See Figure 4.



Figure 4. Large sign storage. Each crate contains two signs of similar size that have been secured to maintain an air space between the two sign faces and eliminate the need for slipsheeting.

5.1 Guide Signs

Guide signs should be stored upright, in a vertical position, on edge, with sufficient space between them to allow air to freely circulate between and around them. Guide signs should also be stored off the ground in a manner that prevents contact with mud, water backsplash from the ground, and excessive exposure to air-borne contaminants. This will allow normal moisture evaporation from sign surfaces. If signs become contaminated, clean them according to the procedure described in Section 11.3, below. Prevent contact between sign faces and any packaging supplies or support structures. Figure 5 illustrates proper outdoor storage for large signs.



Figure 5. Extruded signs shown secured vertically for temporary outdoor storage.

5.2 Screen-Printed Faces

Unmounted screen-printed faces must be stored flat and interleaved with 3M™ Slipsheeting as described in Section 4. Package screen-printed faces in lots of 50 or fewer. If wooden boxes and corrugated crates are used to store sheeting, they must be of a design that prevents damage to the sheeting.

5.3 Cut-Out Letters and Emblems

Store cut-out letters and emblems in containers designed to prevent shifting and damage during shipment and storage. 3M recommends the common practice of packaging cut-out letters and emblems in lots of 25 of the same letter and size, in clean polyethylene bags, with a stiffening card in each bag to prevent bending and edge damage.

6 Packaging

Package finished signs in cardboard sleeves in lots of 10 or fewer and ship on pallets via common carrier, as shown in Figures 6 and 7, or band finished signs in lots of 10 or fewer and ship in custom crates, as shown in Figure 8.

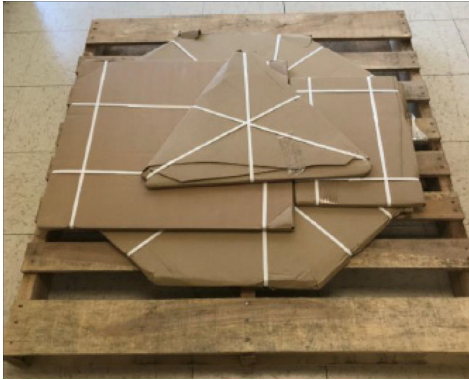


Figure 6. Signs packaged in cardboard sleeves.



Figure 7. Signs packaged in cardboard sleeves and stored on edge.



Figure 8. Signs packaged on edge in custom shipping crate.

WARNING: Packaged faces, packaged unimaged blanks, and packaged finished signs must remain dry during storage and shipment. If packaged faces, blanks, or finished signs become wet, unpack immediately and allow to dry. Allowing packaged signs or faces to remain wet can result in unwarranted permanent damage.

All packages containing multiple stacked signs, whether imaged or not, must include slipsheeting as described in Section 4.

Note: 3M™ Advanced Flexible Engineer Grade Reflective Sheeting Series 7300 and 3M™ Engineer Grade and Utility Grade Reflective Sheeting Series 3200 screen printed with 3M™ Process Color Series 990 require 3M™ Slipsheeting. See Section 4 for details.

7 Sign Shipment

Do not scratch or mar sheeting surfaces. Signs and sign packages must be shipped in a manner that prevents abrasion or other damage to the sign faces. Signs that are shipped with contamination, burrs, or deformities in the aluminum may cause permanent damage to the sign sheeting.

7.1 Small Signs

Packaged signs or sign faces must be shipped in covered trucks or trailers to prevent water entry and exposure to extreme weather conditions. If packaged signs or sign faces become wet, unpack immediately and allow to dry.

Once packaged signs reach their final destination, they must be stored indoors where they are protected from rain, snow, and external environmental conditions. It is, therefore, recommended that every sign shipment be accompanied by storage instructions.

7.2 Guide Signs

Do not scratch or mar sheeting surfaces. Guide signs must be shipped unpackaged (no materials in contact with sign face), in open or closed trucks or trailers, and secured vertically in racks with sufficient space between them to prevent damage, as shown in Figures 9 and 10.



Figure 9. Extruded panel signs secured for transportation. Signs are shown secured vertically, in racks with sufficient space between them to prevent face damage through contact and to facilitate air flow.



Figure 10. Flat panel signs secured for transportation. Signs are shown secured vertically, in racks with sufficient space between them to prevent face damage through contact and to facilitate air flow.

8 Installation

Nylon washers are required whenever twist style fasteners are used to mount Signs. Tighten mounting bolts by holding the bolt head stationary on the face of the sign and tightening the nut from the back of the sign.

8.1 Large Signs

Use care to prevent cables, hooks, or chains from contacting the sign surface during erection of large signs. Such contact can cause permanent visible damage. Do not scuff or walk on signs. Vertical back stiffeners should be used to prevent buckling or rivet popping during handling of large sign panels.

9 Sign Positioning

To achieve maximum traffic sign retroreflection while minimizing specular glare, signs must be correctly positioned. Specular glare is the mirror type reflection characteristic of glossy surfaces. Severe specular glare can make sign legends unreadable. To maximize effectiveness and minimize or eliminate specular glare, employ the following guidelines when positioning signs.

9.1 Ground Installations

On a tangent section, position sign so that the vertical axis is plumb and the horizontal axis is at an angle of 93° relative to the traffic lane the sign serves, as shown in Figure 11. This is known as the standard A format.

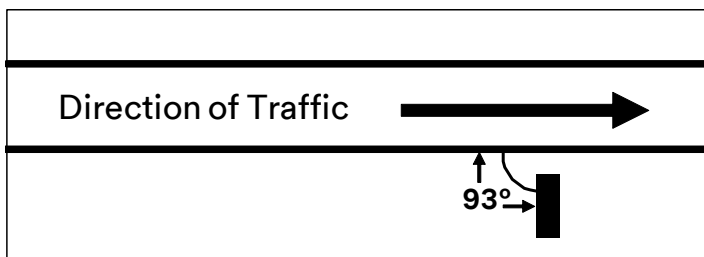


Figure 11. Standard A format.

On a horizontal curve section, position the sign so that its vertical axis is plumb and its horizontal axis is at an angle of 93° relative to a straight line extending from the sign to the point at which the sign is to be read (i.e. 40 feet per 1 inch of letter height), as shown in Figure 12.

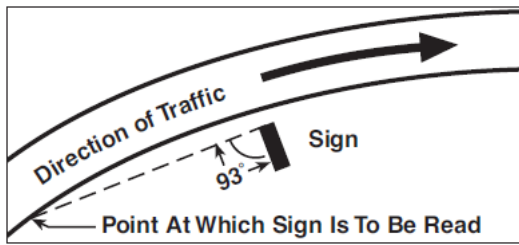


Figure 12. Horizontal curve format.

9.2 Overhead Signs

For an overhead sign mounted to a roadway bridge that is not perpendicular to the roadway, shim the mounting frame to make it perpendicular to the road surface, as shown in Figure 13, to reduce the sign face entrance angle.

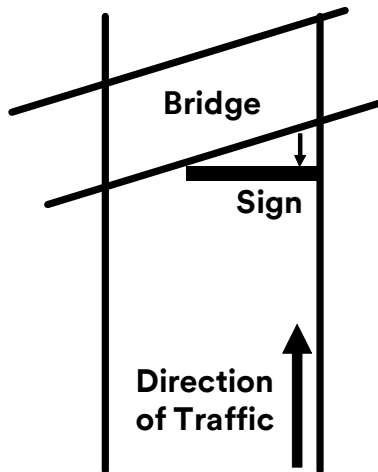


Figure 13. Mounting format for an overhead sign installed on a bridge that is not perpendicular to the roadway.

Rotate the top of the sign slightly forward (<math><5^\circ</math>) from vertical to maximize luminance from vehicle headlights on non-illuminated signs, as shown in Figure 14.

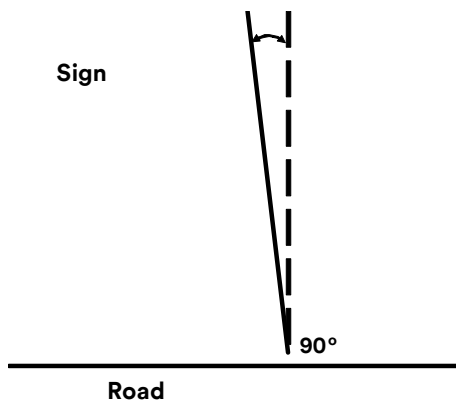


Figure 14. Vertical alignment of non-illuminated overhead sign.

A sign on a road with an uphill grade requires more vertical rotation than a sign on a flat road does. A sign on a downhill grade can usually be mounted plumb, as illustrated in Figure 15.

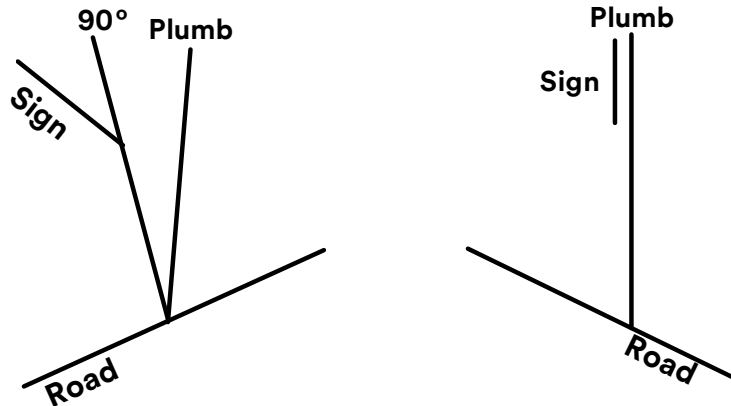


Figure 15. Vertical sign rotations for (left) uphill road grade, and (right) downhill road grade.

10 Temporary Sign Covering

Do not cover signs. Sign coverings can create an environment that can cause permanent damage that is not covered under a 3M warranty.

11 Cleaning

For maximum retroreflectivity and durability, and acceptability, signs should be kept clean and free from dirt, road tar, oil, and bituminous material. Treat retroreflective signs with the same care used when cleaning high gloss automotive finishes. Avoid scrubbing and brushes with stiff bristles that may damage sign faces and use gentle cleaners.

11.1 Cleaner

For maximum service life, do not use abrasives or harsh chemically concentrated cleaners. A liquid, non-abrasive detergent solution suitable for high quality painted surfaces is recommended. Cleaner must be non-abrasive, neither highly acidic nor highly alkaline (pH of 6 to 8 is recommended), and free of damaging solvents. If there is any doubt concerning the suitability of a cleaner, it should be tested on a separate piece of sheeting or small section of sign before being used in volume.

11.2 Pressure Sprayers

Avoid high pressure sprayers. Sheeting edges are especially susceptible to pressure spray damage.

11.3 Recommended Procedure

- 1 Flush the entire surface with clean water to remove loose dirt particles.
- 2 Wash the sign face with a soft brush, rag, or sponge, using detergent or suitable commercial cleaners. Wash thoroughly from the top down, avoiding abrasion. Once cleaner has been applied, keep a steady stream of water flowing on the surface to wash away dirt particles. A standard hand spray may be used under the following conditions:
 - o Minimum of 12 inches (30 cm) between cleaning jet(s) and sign face
 - o Cleaning wand or jets at an angle of no more than 45 degrees from perpendicular to the marking surface
- 3 Rinse the entire sign face with clean water. Allow to drain dry.

11.4 Tar, Oil, and Road Spray

If any tar, oil, or road spray material remains on the sign after following the procedure described above, moisten a soft cloth with 3M™ Industrial Cleaner Citrus Base (“Citrus Cleaner”) and wipe the remaining soiled areas lightly. Following the Citrus Cleaner, wash the sign with detergent and water, then rinse with clean water. Allow to drain dry.

Do not spray Citrus Cleaner or other cleaning solutions directly onto the sheeting surface. Avoid using Citrus Cleaner or other cleaning compounds at sheeting edges.

WARNING: Do not use strong solvents. Cleaning sign surfaces with solvents may cause damage to the sign faces.

11.5 Graffiti Removal

When graffiti must be removed from a reflective sign, restoration may be attempted. The type of graffiti marking material (type of paint, ink, etc.) and duration of exposure both influence how likely removal is to result in sign damage. When attempting to remove graffiti, the following escalation of cleaner strength is recommended:

- 1 Soap and water
- 2 Isopropyl alcohol
- 3 3M™ Industrial Cleaner Citrus Base
- 4 Mineral spirits
- 5 Commercially available graffiti removers

Each of the above-listed solvents has the potential to permanently damage sheeting surfaces if exposure time is too long. When attempting to remove graffiti from a sign using a solvent, it is strongly recommended that the solvent be tested on a small and inconspicuous portion of the sign, using a cloth moistened with the cleaning agent, to assess the potential for sheeting or process color damage before applying the cleaner to the entire sign.

NOTE: Some cleaners do not affect daytime appearance but do cause loss of retroreflectivity. View cleaned areas with a light source after cleaning to ensure that retroreflectivity has not been affected.

All purpose-specific graffiti removers have significant potential to damage reflective sheetings. The use of 3M™ Premium Protective Overlay Series 1160i Film facilitates graffiti removal properties. However, overexposure to graffiti removers can also damage Series 1160i overlay. See [3M Product Bulletin 1160i](#) for details and recommendations.

It may be possible to remove the graffiti before continued rubbing damages the sheeting or removes the process color. However, continued or repeated cleaning with these solvents will result in loss of reflectivity, removal of screened color, and reduced durability.

12 Health and Safety Information

Read all health hazard, precautionary, and first aid statements found in the Safety Data Sheets (“SDS”), Article Information Sheets, and product labels of any materials for important health, safety, and environmental information prior to handling or use. 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.

13 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>.

14 Literature References

3M IF 1.8	3M™ Process Colors Series 880 and 900 Instructions for Use
3M PB 990	3M™ Process Color Series 990
3M PB 1160i	3M™ Premium Protective Overlay Film 1160i
3M PB 1170	3M™ ElectroCut™ Film Series 1170
3M PB 3200	3M™ Engineer Grade Reflective Sheeting Series 3200
3M PB 3924SUDS	3M™ Diamond Grade™ Fluorescent Work Zone Digital Sheeting Series 3924SUDS
3M PB 3430	3M™ Engineer Grade Prismatic Reflective Sheeting Series 3430
3M PB 3930	3M™ High Intensity Prismatic Reflective Sheeting Series 3930
3M PB 3930UDS	3M™ High Intensity Prismatic Reflective Digital Sheeting Series 3930UDS
3M PB 3990	3M™ Diamond Grade™ VIP Reflective Sheeting Series 3990
3M PB 4000	3M™ Diamond Grade™ DG ³ Reflective Sheeting Series 4000
3M PB 4000UDS	3M™ Diamond Grade™ DG ³ Prismatic Reflective Digital Sheeting Series 4000UDS
3M PB 7300	3M™ Advanced Engineer Grade Reflective Sheeting Series 7300
3M PB Slipsheeting	3M™ Slipsheeting
3M Sign Warranty Bulletin	

For Information or Assistance

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

Internet:

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

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