



Reflective Sheeting Sign Maintenance Management

Information Folder 1.11

April 2011

Replaces IF 1.11 dated September 2010

Description

This information folder contains the recommended standard practices for storage and packaging, installation, sign positioning, cleaning, sign maintenance management, sign face replacement, and sheeting removal for 3M™ Reflective Sheeting. Procedures and materials that do not conform to these instructions are excluded.

Storage and Packaging

Unapplied 3M sheeting should be stored in a cool, dry area, preferably at 65-75°F (18-24°C) and 30-50% relative humidity, and should be applied within one year after purchase. Rolls should be stored horizontally in the shipping carton. Partially used rolls should be returned to the shipping carton or suspended horizontally from a rod or pipe through the core.

Unprocessed sheets should be stored flat. Finished signs and applied blanks should be stored on edge.

Screen processed signs must be protected with SCW 568 or the plastic release liner from prismatic sheeting. Place the glossy side of the slipsheet against the sign face. Double faced signs must have the glossy side of the slipsheet against each face of the sign.

Unmounted screened faces must be stored flat and interleaved with SCW 568 slipsheet, glossy side against the sign face. Packages of finished sign faces must include sufficient nylon washers for mounting.

Avoid banding, crating, or stacking signs. Package for shipment in accordance with commercially accepted standards to prevent movement and chafing. Store sign packages indoors on edges.

Panels or finished signs must remain dry during shipment and storage. If packaged signs become wet, unpack immediately and allow signs to dry. Screen processed signs must be protected with SCW 568 slipsheet and foam padding. Place the glossy side of the slipsheet against the sign face and pad the sign with closed cell packaging foam. (Packaging foam such as “Microfoam” manufactured by DuPont available from Tekra Corp., St. Paul, MN or “Jiffyfoam” manufactured by Jiffy Mfg. Co., 360 Florence Ave., Hillside, NJ 07205.) Double faced signs must have the glossy side of the slipsheet against each face of the sign.

Cut out letters and emblems should be packaged in convenient numbers in containers designed to prevent shifting and damage during shipment and storage. For example, cut out letters are commonly packaged 25 each of a given letter and size in clean polyethylene bags with a stiffening card to prevent bending and edge damage.

Packages of screened faces should be limited to quantities of 150 maximum for engineer grade sheeting, 75 maximum for encapsulated lens sheeting and 50 maximum for prismatic sheeting when using wooden crates. For corrugated shipping crates, packages should be limited to quantities of 100 maximum for engineer grade sheeting and 50 maximum for encapsulated lens and prismatic sheetings. Wood boxes and corrugated crates must be properly designed to avoid damage to the sheeting.

Short term storage of screened faces should be limited to 5 inches stack height or less.

All applied sheetings, processed or unprocessed should be stored and shipped on edge (see Figure 1).



Figure 1 - Flat Sign Storage

Mounted signs are normally packaged in quantities of 10 or less to facilitate ease in handling. Large signs may be crated by securing ribs or back bracing to crate, suspending sign within (Figure 2). Two signs of similar size are enclosed with air space between faces. Slipsheeting is not used.



Figure 2 - Large Sign Storage

Sign Shipments: Packaged signs must be shipped in covered truck or trailer to prevent water entry. Signs should be secured vertically in racks to prevent signs from rubbing against one another. Do not scratch or mar sheeting surface. Large signs may be shipped uncrated or unpacked in open or closed trucks or trailers provided the signs are secured vertically in racks to prevent damage (see Figure 3).



Figure 3

Warning: Keep dry. Store sign packages indoors on edge. Do not allow panels or finished signs to become wet in shipment or storage. Should packaged signs become wet, unpack immediately and permit signs to dry.

Outdoor storage is not recommended. If outdoor storage is required for a short period of time, remove all packaging materials (no packaging materials should touch sign face). Store signs upright on edge, on blocks or 2 inch x 4 inch pieces of wood. Keep signs off the ground, providing space between signs to allow free air circulation and normal moisture evaporation from the surface of each sign face. Avoid sign face contact with treated wood posts or storage where dirt and water may contact sign face. If signs or sign faces are not properly packaged or stored, warranty is void.

Installation

A. Sign Dating

It is recommended that all signs be dated preferably with both date of manufacture and date of sign installation. Metal stamping, permanent marking crayon, or durable colored stickers are suitable. Sticker color can be varied each year to encode date of installation. Position stickers so that they will not be covered by mounting posts.

B. Small Signs

Mounting with nylon washers is recommended unless the following installation procedures are followed: All sign support bolts must be tightened by holding the bolt head stationary, on the face of the sign, tightening the nut from the back.

Where signs have been damaged by vandalism or stolen, consideration should be given to increasing sign mounting height to 7 or 8 feet to the bottom edge of the sign. Signs knocked down by vehicles can frequently be reduced by increasing the lateral clearance to the sign.

C. Large Signs

Use care to prevent cables, hooks or chains from contacting sign surface during erection. This may 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. Mounting with nylon washers is recommended unless the following installation procedures are followed: All sign support bolts shall be tightened by holding the bolt head, on the face of the sign, stationary and tightening the nut from the back.

D. Sign Patching

Reference Information Folders 1.5 Hand Application Instructions and 1.7 Sign Base Surface Preparation.

1. All surfaces must be considered contaminated and must be cleaned prior to sheeting application. Clean with a soft cloth dampened with isopropyl alcohol. Wipe surface clean before solvent evaporates using a second clean lint-free cloth.
2. Check color match between the background sheeting and the patch sheeting. Daytime color should be sufficient.
3. Round the corners of the patch. Minimum width should be 3/4 inch.
4. Size the patch to overlap the damage area by 1/2 inch minimum.
5. The minimum application temperature for standard pressure sensitive adhesive is 65°F (18°C). If the ambient air temperature is below 55°F (13°C), the surface should be warmed slightly with a heat gun or hair dryer prior to application.
CAUTION: The sheeting can burn if the heating unit is too close or touching the sheeting, or if the temperature setting is too high.
6. Remove the entire liner from the adhesive. Align the patch and press one edge to the surface with a finger. Squeegee or roll the remaining unapplied portion to the background surface with firm, overlapping strokes.
7. For applications conforming to the above recommendations the published warranty applies.

Sign Positioning

To obtain maximum retroreflection from traffic signs, yet eliminate specular glare, signs should be correctly positioned. Specular glare is the mirror type reflection which is a characteristic of any glossy surface. Under severe circumstances specular glare can make sign legends unreadable. For maximum effectiveness and to eliminate or minimize specular glare, position signs as follows:

A. Ground Installations

1. On tangent sections position sign so that the vertical axis is plumb and the horizontal axis is at an angle of 93° with the traffic lane which the sign serves.

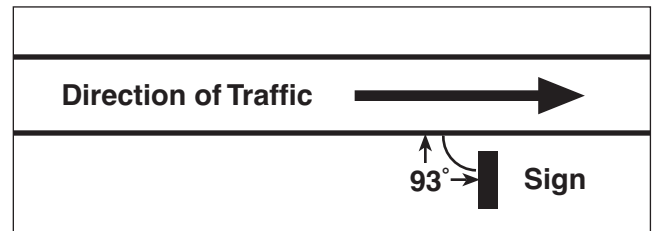


Figure 4 - Standard A Format

2. On horizontal curve sections position the sign so that vertical axis is plumb and the horizontal axis is at an angle of 93° with a straight line between the sign and the point at which the sign is to be read (i.e. 40 feet/1 inch of letter height).

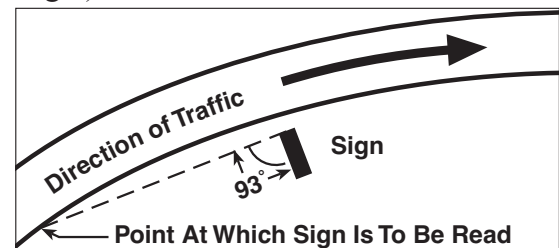


Figure 5

B. Overhead Signs

1. For overhead signs mounted to a roadway bridge which is not perpendicular to the roadway, shim the mounting frame to be perpendicular to the road to reduce the entrance angle to the sign face.

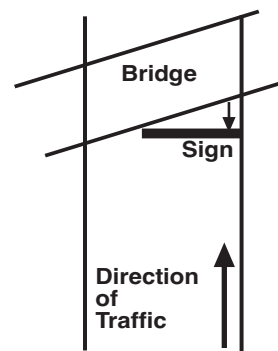


Figure 6

2. Rotate the top of the sign slightly forward ($<5^\circ$) from the vertical axis to maximize luminance from vehicle headlights on non-illuminated signs.

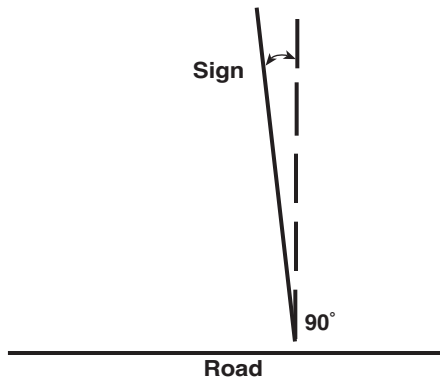


Figure 7

3. An uphill grade requires more rotation than a flat road and a downhill grade can usually be mounted plumb.

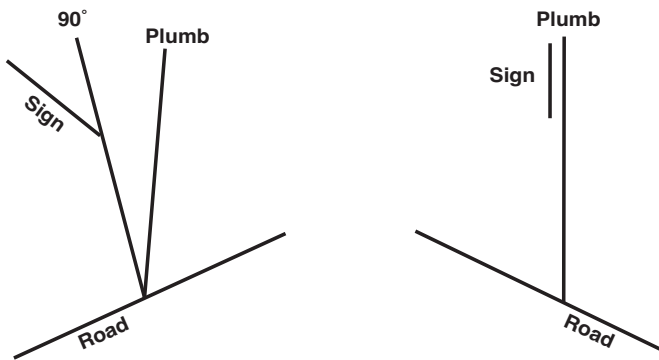


Figure 8

Temporary Sign Covering

Sign covering is not recommended.

Cleaning

For maximum retroreflectivity, performance and acceptability, signs should be kept clean and free from dirt, road tar, oil and bituminous material.

Cleaning Procedure

A. Cleaner - A wet, non-abrasive cleaner suitable for high quality painted surfaces is recommended. The cleaner must be non-abrasive, neither highly acidic or alkaline (pH of 6 to 8 is recommended) and free of damaging solvents. If there is any doubt concerning the suitability of the cleaner we recommend testing it on a separate piece of sheeting or on a small section of a sign.

B. Pressure Sprayers

Avoid high pressure sprayers. Do not direct sprays at sheeting edges. Do not abrade the sign by using brushes with stiff bristles or by unnecessary scrubbing.

C. 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 any 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.
3. Rinse the entire sign face with clean water. Allow to drain dry.

D. Tar, Oil, Diesel Smut, Bituminous Material

If this material remains after steps 1 through 3 above, moisten soft cloth with 3M™ Citrus Cleaner, kerosene, mineral spirits or VM&P Naptha and wipe the area lightly. Following solvent wipe, wash with detergent and water, then rinse with clean water. Allow to drain dry.

Do not use strong solvents. Do not spray the solutions directly onto the sheeting surface. Avoid the sheeting edges.

Warning: Cleaning the sign surface with solvents may cause damage to the sign face.

E. Graffiti Spray Paint

When a vandalized reflective sign is judged to be nonfunctional due to paint on the sheeting or process color, restoration may be attempted, but is not normally successful. The type of paint, length of exposure and type of remover used may adversely affect the performance life of the sheeting. 3M™ Premium Protective Overlay Film could alleviate this situation. See Product Bulletin 1160 or 1150.

It is recommended to begin by testing a small area with a cloth moistened with a mild solvent such as mineral spirits, VM&P Naptha, or 3M™ Natural Cleaner to determine if the graffiti can be removed without damage to the process color or sheeting.

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

If mild solvents are unsuccessful, progressively stronger solvents may be tried such as lacquer thinner, MEK (Methyl Ethyl Ketone) toluene, xylene, acetone and commercial graffiti removers.

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

Sign Maintenance Management

A. Nighttime Inspection - all sign installations should be inspected at night with normal low beam headlamps at least annually. The purpose is to identify needed replacements due to inadequate retroreflectivity performance, inappropriate message, missing or obscured signs. Weathering reduces retroreflectivity so that eventually signs are required to be replaced for this cause. Signs with questionable nighttime appearance can be measured instrumentally to determine if replacement is necessary in accordance with current agency standards for retroreflectivity. Instrumental measurements can be made during daylight.

B. Inventory and Record Keeping - it is desirable for management and maintenance of the sign system to be able to identify the history of individual signs in the field. Use of a computerized inventory record is one method. A benefit of a computerized sign inventory is the capability of itemizing all signs by installation date, type, manufacturer of reflective sheeting, size, direction facing and location so the appropriate inspection and replacement can be simplified.

Identification

A. Sign Stickers - A functional identification method is to apply a sticker with a date code. Sticker color, varied each year, permits rapid identification from a vehicle. This permits field crews to identify and replace signs known to be of an age approaching failure. Sign dating stickers are available from 3M.

B. Date Coding - signs can be date coded with a logo printed into the border of the sign. The position is rotated yearly to correspond with hours on a clock face. The year 2004 would be coded by a logo in the border at 3 o'clock, 2005 at 4 o'clock, etc. At the next decade the logo shape would change but the clock code would continue. The logo is visible on field inspection and in photolog records.

Large Multi-Panel Signs

Overlay panels are usually used to replace the face of an existing sign. This provides a low cost means of refurbishing since field disassembly and transportation to and from the sign shop for stripping and reapplication is eliminated. Overlay panels are normally fabricated using 0.08 aluminum. The long dimension of overlay panels must be vertical. Avoid horizontal butt splices. Reflective sheeting background can be applied with either the heat lamp vacuum applicator or squeeze roll applicator. Follow color matching instructions (see Information Folders 1.4 and 1.6). Direct applied copy is recommended and is applied in the shop. Lay out panels as they will be assembled on the sign, following matching instructions, then position and apply the copy and borders in the shop. Cut copy at all panel joints (see Information Folder 1.10).

Demountable copy is applied in the field. It may be helpful to lay out the copy in the shop and predrill the copy mounting holes through overlay panels, then drill through the existing sign after the overlay panels are mounted in the field.

Overlay Panel Installation

Remove any demountable copy and borders from the old sign face. Install overlay panels in order. Attach at top edge using 3/16 inch aluminum rivets. Panels should be riveted down the center at 24 inch intervals and then riveted along the edges at 12 inch intervals from the top down. Panels 3 feet or less in width require riveting of edges only. Install second and subsequent panels by butting the edges and installing in the same manner. Panels are applied vertically. Do not use horizontal joints.

Signs having round or button head bolts or rivets which protrude from the face should have overlay panels shimmed out so that a smooth flat surface results. 2 x 4 inch shims are cut from 0.08 aluminum stock. These are attached at rivet locations with double coated tape. Attach a sufficient thickness of shims so that the panel smoothly bridges bolt heads. Shims are placed at 12 inch intervals at panel edges so that adjacent panels can be riveted to the same shims.

Sheeting Removal

Removal of old weathered reflective materials permits reuse of metal sign backings.

A. Small Volume

Small volume removal is usually carried out using a minimum of equipment. Experience has shown that brush-on strippers, such as commercial paint removers, are usually effective, although there are considerable variations in the rate at which different removers act. Follow manufacturer's directions for use.

Occasionally, reapplication of the stripping agent may be required to dissolve and remove the adhesive layer. It may be possible to remove the adhesive layer by wiping with a solvent mixture of 75% MEK - 25% toluene or 3M™ Natural Cleaner.

B. Large Volume

The most economical method is to use a hydrostripper. The metal backing is then reused. Contractors are available who can perform this service.

Health and Safety Information

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

FOR INFORMATION OR ASSISTANCE

CALL:

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IN CANADA CALL:

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Internet:

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Traffic Safety Systems Division

3M Center, Building 0235-03-A-09
St. Paul, MN 55144-1000
1-800-553-1380
www.3M.com/tss

3M Canada Company

P.O. Box 5757
London, Ontario N6A 4T1
1-800-3MHELPS

3M México, S.A. de C.V.

Av. Santa Fe No. 55
Col. Santa Fe, Del. Alvaro Obregón
México, D.F. 01210

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