TEROSON®

Cargo Trailer Panel Bonding Procedure with TEROSON® MS 9399™

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Introduction

For over a decade, specialty vehicle manufacturers such as trailer and bus manufacturers have been using TEROSON® MS 9399™, a silane modified polymer based adhesive, to bond panels of various composition to steel and aluminum framing members. TEROSON® MS 9399™ offers such features as a water tight seal, repositionability of panels during assembly, high green strength, flexibility of the cured joint, and cosmetic attractiveness. Traditional mechanical fastening of the panel assemblies can be laborious and unappealing cosmetically with the potential of having water leaks in the future. This document will outline the proper procedures for utilizing TEROSON® MS 9399™ in a panel to post assembly process to achieve the best possible results.

Factors for Success

Henkel recommends that you test all new adhesive applications under simulated or actual end use conditions to ensure the adhesive meets or exceeds all of your required product specifications.

- Cleaning of posts from excessive rust or contaminant.
- A CLEAN, WHITE CLOTH or applicator bottle/tip (see page 3) is used to apply TEROSON® SB 450™ - a new cloth is required for each trailer.
- Rust preventatives should be removed per manufacturer guidelines.
- Post preparation using a 60 grit grinding wheel on steel surfaces or 120 grit grinding wheel on aluminum surfaces (if oxides are present).
- Apply TEROSON® MS 9399™ within a reasonable amount of time to not compromise cleaning of post.
- Substrates and adhesive should acclimate to 60-80°F prior to bonding for ideal dispense and cure properties. (Colder temperatures will result in lower flow rates and slower cure times. Use warming blanket if needed to reach desired temperature).
- To optimize green strength and other mixed properties of TEROSON® MS 9399™, make sure to use the green, square mix nozzle, Henkel Item # 98667 (sold separately).
- The use of damming tape ≥ 0.040” in thickness to control bondline thickness and to ensure aesthetics by eliminating adhesive squeeze-out
- Adequate amount of TEROSON® MS 9399™ to fill overlap joint.
- Rolled seams to compress adhesive joint for maximum wet out and adhesion properties.
- Bonded assemblies should cure for 1.5-2 hours at +60F or higher, before exposing to colder temperatures.
- Overlapping, painted top coat panels are the most sensitive surfaces to bond, so proper surface preparation is critical.
- Surface cleanliness is important. In case of any doubt, clean again. TEROSON® SB 450™ can be used as a general purpose cleaner as well as a Surface Adhesion Promoter.

Materials/Equipment Required

DESCRIPTION	ITEM NUMBER	FUNCTION
TEROSON® MS 9399™ (400 ml)	2081733	Bonding Agent
TEROSON® MS 9399™ (Pail A)*	2079210	Bonding Agent
TEROSON® MS 9399™ (Pail B)*	2079212	Bonding Agent
TEROSON® MS 9399™ (Drum A)*	2079211	Bonding Agent
TEROSON® MS 9399™ (Drum B)*	2079593	Bonding Agent
Mix Nozzle	98667	Static Mix Nozzle
TEROSON® SB 450™ Active Cleaner	642844	Cleaner/Adhesion Promoter
0.040” x 0.25” Double-Sided Foam Tape	—	Gap control
Pneumatic Dispense Gun, 400 ml	983438	9399 dispenser
Abrasive 60 grit Grinding wheel	—	Post preparation (Steel)
Abrasive 120 grit Grinding wheel	—	Post preparation (Aluminum)
White Cloth	—	Active cleaner applicator
Designetics™ Applicator Bottle	Designetics™ PN 21BF	Active Cleaner Container
Designetics™ Applicator Tip	Designetics™ PN 32DF	Active Cleaner Dispense
Designetics™ Applicator Bottle Cap	Designetics™ PN 14A	Container Cap
Seam Roller	—	Spread adhesive within seam

*These package sizes require pail pumps and meter mixed dispense systems

Major Steps

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6. Assembly of Remaining Panels. . . . . page 10

Cargo Trailer Panel Bonding Procedure

Step 1 – Post Preparation

Steel Posts

a. Remove any rust preventative from the bonding surface, per manufactures guidelines.

b. If rust and contamination is present on the surface, use a 60 grit power grinder to abrade the posts down to bare metal.

c. Typically, if abrasion with a power grinder (not orbital sander) is done right, cleaning is not needed at this point.

d. If any doubt, use a 50% water/50% isopropyl alcohol (IPA) cleaning solution to help remove additional contaminants.

Aluminum Posts*

*Note: if no oxidation is present on the aluminum, then the following preparation is optional

a. Abrade post to clean and remove any oxidation using a 120 grit power grinder (not orbital sander).

b. If abrasion with a grinder is done properly, additional cleaning is typically not needed at this point.

c. If any doubt, use a 50% water/50% isopropyl alcohol (IPA) cleaning solution to help remove additional contaminants.

Galvanized Steel Posts

a. Remove any forming oils with an appropriate cleaner that will not leave any residue on the metal surface.

b. Important; never abrade the surface, so not to expose fresh, reactive zinc, as it will negatively compromise the durability of the adhesive bondline over time.

Cargo Trailer Panel Bonding Procedure

Step 2 – Preparation of TEROSON® MS 9399™ Adhesive, 400 ml cartridge

a. Allow adhesive to acclimate to 60°F to 80°F.

b. Place the TEROSON® MS 9399™ - 400 ml cartridge into pneumatic gun.

c. Adjust pneumatic gun pressure to a low setting.

d. Remove cap and plug from nozzle-end of cartridge.

e. Screw static mix nozzle onto the cartridge.

f. To optimize green strength and other mixed properties of TEROSON® MS 9399™, make sure to use the green, square mix nozzle, Henkel Item # 98667 (sold separately). Do not use the white round nozzle.

g. Adjust pneumatic gun pressure to the maximum setting.

h. Prime the nozzle by pulling trigger to allow adhesive to flow through the mix nozzle.

i. Dispense a small amount of adhesive onto a rag or scrap part to allow thorough mixing.

j. The cartridge is now primed and ready for use.

Cargo Trailer Panel Bonding Procedure

Step 3 – Application of Damming Tape

Damming tape only needs to be used at the seams of overlapping panels.

The damming tape serves 4 purposes:

1. Ensures adequate gap for maximum adhesive properties
2. Prevents squeeze out of adhesive from seam
3. Assists in holding the panel in place while the adhesive fully cures
4. Allows for easier repair process, if panels get damaged once in use.

Apply the damming tape as follows:

a. Apply damming tape to the backside of the next panel to be assembled.

b. Align the outside edge of the damming tape an 1/8 inch from the edge of the panel and apply the tape along the entire length of the panel.

c. Begin to peel away 3 inches of the release film, but do not remove completely. Leave the 3” of film hanging, so it is easy to peel away the remaining film, once the panel is assembled to the trailer frame.

Note: To maximize efficiency of the trailer assembly process, it is often beneficial to prepare a batch of panels with damming tape off line and ahead of time

Cargo Trailer Panel Bonding Procedure

Step 4 – Assembly of First Panel

a. Dispense a ¼" diameter bead of TEROSON® MS 9399™ to the center of the posts that will be mated with the panel.

b. Assemble panel within 5 minutes of applying adhesive.

c. For extra panel support, drive 2 screws or use double-sided foam tape to temporarily hold panel at top. Screws can be removed once the adhesive fixtures in approximately 20 minutes.

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Step 5 – Activating / Cleaning of Panels

a. Using either a clean white cloth or an applicator bottle with tip*, wipe the exterior side of the leading edge of the assembled panel with TEROSON® SB 450™ Active Cleaner.

b. To prevent streaking, only apply the TEROSON® SB 450™ Active Cleaner to the surface area that's equivalent to the width of the overlap joint – approximately 1 to 2 inches.

c. Apply enough active cleaner to the surface to leave behind a wet, but non-drip film.

d. Allow the TEROSON® SB 450™ Active Cleaner to flash-off or dry before applying adhesive. This typically occurs in less than one minute when temperatures are between 60°F to 80°F, but can vary with changes in environmental conditions.

e. Be sure to change cloth frequently to prevent transferring any possible contaminants to other bond areas.

f. If unsure of TEROSON® SB 450™ Active Cleaner application coverage, use a black light to verify coated area. The product contains a fluorescent dye, which reflects upon exposure to black light to confirm that it has been applied.

*see page 3 for bottle/tip information

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Step 6 – Assembly of Remaining Panels

a. Dispense a ¼" bead of adhesive along the outside edge of the mounted panel and along the center of the next posts.

b. With the damming tape applied to the backside of the overlapping panel, place the panel squarely onto the previously assembled panel, making sure to allow enough overlap for an adequate seam - typically 1-2 inches.

c. Ensure that the adhesive does not make contact with the damming tape. In some cases, applying the adhesive at the overlap can be done just prior to removing the release film.

d. Apply hand pressure along the length of the seam to mate the 2 panels.

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Step 6 – Assembly of Remaining Panels

e. Remove the release film from the damming tape.

f. Use a seam roller to evenly apply pressure to the entire length of the bonded joint to ensure the damming tape secures the panel in place and the adhesive is spread properly throughout the joint.

g. Repeat this procedure for all remaining panels.

FAQs

Q What happens if I don't clean or abrade the posts before installing the panels?
A Adhesion could be lost to the post, leading to lower overall strength and durability.

Q Can I apply TEROSON® MS 9399™ without letting the posts and panels acclimate to 60°F?
A Yes, but the wet out of the TEROSON® MS 9399™ will not be as good, which could lead to lower overall strengths.

Q Does the open time of TEROSON® MS 9399™ lessen if warmer climates prevail?
A Yes, higher temperatures shorten the open time of TEROSON® MS 9399™.

Q Is TEROSON® MS 9399™ affected by seasonal changes in temperature and humidity?
A Yes and No, TEROSON® MS 9399™ is a two-part chemistry (a catalyst is incorporated in the formulation) so ambient moisture is not a large concern. The higher or lower temperatures will shorten or increase the open time of the TEROSON® MS 9399™.

Q Is there a way to tell if TEROSON® SB 450™has been applied to the affected area.
A Yes, a black light will fluoresce the TEROSON® SB 450™.

Q What is the lowest temperature TEROSON® MS 9399™ will still cure.
A Testing has shown cure will still take place at temperatures as low as 30°F.

Q What happens if I assemble my parts after 5 minutes from dispensing?
A The High Position Tack ("green strength") of the adhesive will diminish as time elapses, thus we recommend you assemble your parts within 5 minutes. If you wait a longer time to assemble your parts, this could result in your panels sliding/shifting while the adhesive cures. However, this concern can be alleviated by using a strip of double sided tape or a screw at the top of the panel to fixture the panel in place.

Troubleshooting

A. Panel seam delamination

Identify delamination as adhesion or cohesion failure.

1. Adhesion failure causes

- Panel paint/coating
  – Contact technical customer service for assistance with knife bead adhesion testing.
- Contamination of panel surface
- No active cleaner or uneven coverage
- Panel installed after recommended open time
- Poor mixing of TEROSON® MS 9399™
- Excessive force on panel seam

2. Cohesion failure causes

- Excessive force on panel seam
- Poor mixing of TEROSON® MS 9399™

B. Panel to Post delamination

Identify delamination as adhesion or cohesion failure.

1. Adhesion failure causes

- Contamination of post surface
- Poor abrading
- Poor wet out
- Low roller pressure
- Poor mixing of TEROSON® MS 9399™
- Excessive force on panel seam

2. Cohesion failure causes

- Excessive force on panel seam
- Poor mixing of TEROSON® MS 9399™

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Henkel Corporation
Engineering Adhesives
One Henkel Way
Rocky Hill, Connecticut 06067, U.S.A.
Tel: 860-571-5100
Fax: 860-571-5465

www.henkelna.com/truckandtrailer