

# **RAIL COACH FACTORY, KAPURTHALA**

MD35131

DATED: 30/01/2024

**Sub:-** Issue of specification No. **ANNEXURE TRAINSET-V Dt.27.03.2023 for Vande Metro coaches**

**Ref:-** 1. RCF/PLG/MP/FU/STORES/24-012 dated 29.01.2024  
2. Design office letter No. MD47131 AA003 dated 09/01/2024.

In ref. to letter under ref.1, please find enclosed a copy of under mentioned **ANNEXURE TRAINSET-V specification** , for information and necessary action at your end.

Specification No. **ANNEXURE TRAINSET-V**

Description: **STANDARD FIXING PROCEDURE FOR WINDOW GLASS FOR TRAINSET COACHES (FOR GUIDANCE)**

  
DY.CME/D2

CQM, CPLE, CWE/FUR, CWE/SHELL, CMM, CMT, DY.CPLE-II

SSE/Record(with original copy)

SSE/LIB. Design

SSE/Design/RCF/TKJ

Copy for information to:

DY.CME/DP

CDE

Copy in MD46571

**STANDARD FIXING PROCEDURE FOR  
WINDOW GLASS FOR TRAINSET COACHES (FOR GUIDANCE)**

Firm shall submit OEM of sealant, certified fitment procedure to ICF for approval before starting supply.

**PRODUCT USED:**

1. Sealant
2. Primer
3. Cleaner
4. Polish
5. Remover
6. Cotton waste
7. Gloves
8. Safety Goggle
9. Soap Oil

**TOOLS USED**

1. Angle Grinder
2. Epoxy application tool
3. Masking Tape 50mm (L=180M)
4. Sealant application gun
5. 'C' clamp
6. Suitable holding Jig fixture preferably with vacuum cups
7. Work bench to suitable height

**STEPS FOLLOWED:**

1. Pre-checking
2. Cleaning
3. Priming
4. Adhesive dispensing (For bonding and Gap filling)

**PROCESS FLOW FOR GLASS BONDING APPLICATION:**

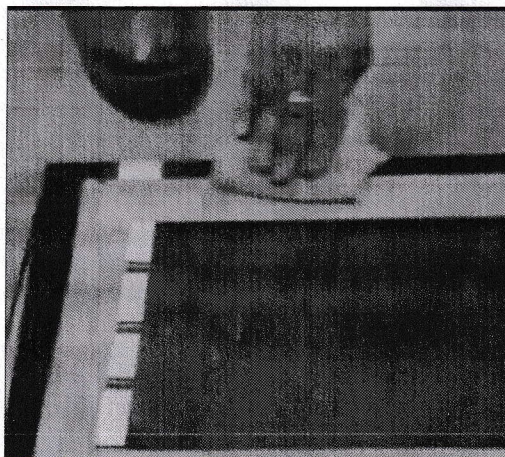
**PRE CHECKING:**

- After pasting the spacers, Pre-check the clear window shell opening by placing the windows using Vacuum cups to check proper matching and gap before starting the process.

**CLEANING:**

- Surface to be bonded must be dry, free from rust, oil, dust, grease and other contaminants. Using angle grinder (80grit) buffing of window fixing area needs shall be carried out.
- Glass surface & metal frame where primer is to be applied should be masked & cleaned with cleaner using a lint free cloth. Average time of evaporation is around 30 seconds.





Glass surface cleaning



Metal surface cleaning

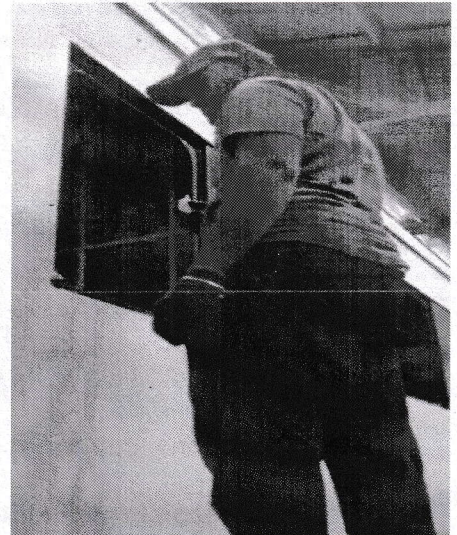
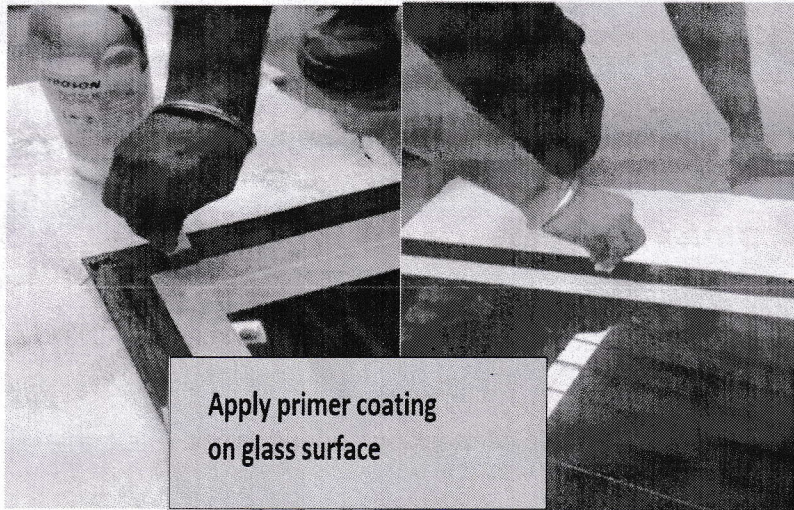
- Shell Window surface and sealed window outer surface other than sealant are needs to be masked (masking tape 40mm) before applying sealant. The masking tape shall not infringe the primer application area.

#### PRIMER APPLICATION:

- Prior to use, shake the Aluminium bottle vigorously by hand for at least 2 minutes. A steel ball is provided in these bottles to assist mixing. This should move freely after 3 to 4 shakes. If it does not happen- this may indicate that thickening of primer has started. The primer which has obviously thickened is tainted and should be used for processing.
- Download the required quantity which will be enough for application in required numbers to avoid wastage at the end of the day.
- Apply primer on the sealant application surface.
- Primer can be applied thinly and evenly with felt applicator, sponge or brush. Apply primer to glass surface and metal frame.
- Allow the primer to dry for 10 to 20 minutes of time.
- Only a thin layer of primer is sufficient (around 40 to 50 micron wet). Thicker layer will take longer time to cure.
- Kindly make sure that enough width is covered by primer to accommodate the adhesive after spreading of bead.
- If earlier layer has become deactivated due to long inactive / open time (Note: Primer layer stays active up to 3-6 hours depending on storage condition of substrates), reapplication is okay after cleaning the old primer.







#### Important Check points:

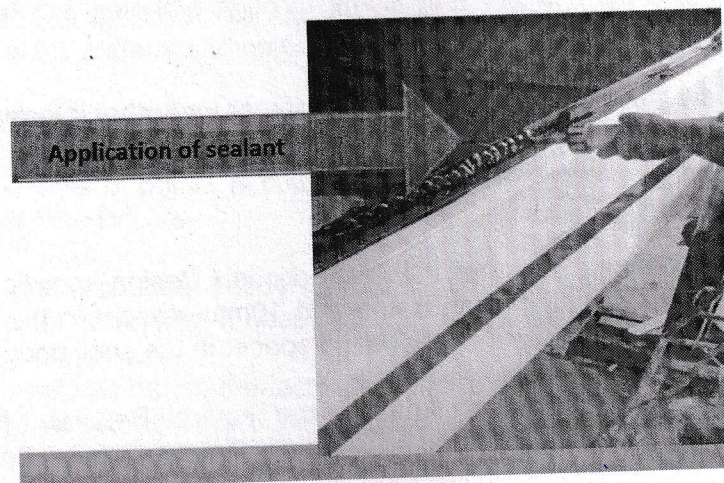
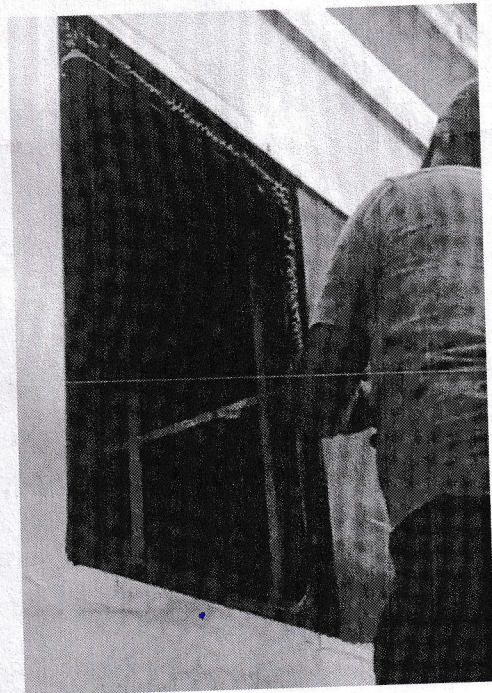
- Shake primer bottle vigorously by hand at least for 2 minutes to mix the contents thoroughly.
- Primers contain reactive adhesion promoters, it should never be applied directly from the original bottle. Instead, it should always be poured into small containers after shaking vigorously.
- The tempering of painted surface should not be more than 40°C before while applying.
- For primer, open bottle throw away time is one week.
- Re application of primer on already applied prime layer is not recommended. Because it will soften the partially dried primer and lead to long curing time of the primer.
- Ceramic coating on glass is recommended to protect the adhesive from UV exposure (from sunlight) which may come through pinholes and hair line gaps in primer application.
- Refer Technical Data sheet of the respective primer for further information.

#### Application of sealant (Bonding):

- Use spacers at equal space as per ICF instructions / Design specifications. (NOTE: 7mm spacer is used currently in the frame and 10mm stopper in the bottom side of the glass). Adhesives can be used to place the spacer in the shell body frame.
- Cut the Nozzle in V shape as per thickness of the required Bead and Apply a uniform bead of adhesives on the window fixing shell area.
- Ideally nozzle should be touching the glass/ metal surface during sealant application. Otherwise, bead may sag.
- Bond the glass immediately after adhesive application without any delay.



- Make sure that stoppers are used at the base of the glasses on frame wherein metal body frame does not provide a support against gravity.
- Vacuum cups shall be used for holding the window to the shell frame
- After bonding it is recommended to remove the excess sealant between the gap of glass and metal frame and clamping the glass can be done using suction cap or glass holding fixtures.
- Let the glass be in its position for 5-6 hours before any movement.
- Any light further work or movement of coach should be done only after 4-5 hours.
- The level of windows with respect to shell shall be checked with straight edge.
- Functional curing happens within 24 hours. Remove all masking/support tapes.
- It is recommended the glass only using Vacuum cups or similar handling tools.



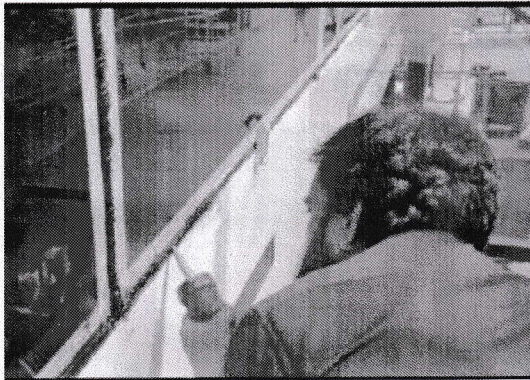
Note: Currently the clamping is done by drilling and holding, in this case additional care needs to be taken. Clamping shall be avoided and Vacuum cup or Magnetic latches shall be used to avoid damaging of sidewall



- The windows shall be glued and held in position by using suitable fixtures for 24hrs.
- The fixture shall be attached to carbody either by vacuum cups or magnetic latch so that it will not damage the sidewall.
- The fixture shall ensure uniform alignment and level of windows.
- Fixtures required for one coach set shall be available depending on production requirement. Firm shall ensure availability of enough number of fixtures.
- The bead shall be uniform and shall be visible like a gasket.
- The OEM of sealant shall be associated in fitment procedure and firm should ensure.

### **Gap filling Exterior and Interior (Sealing)**

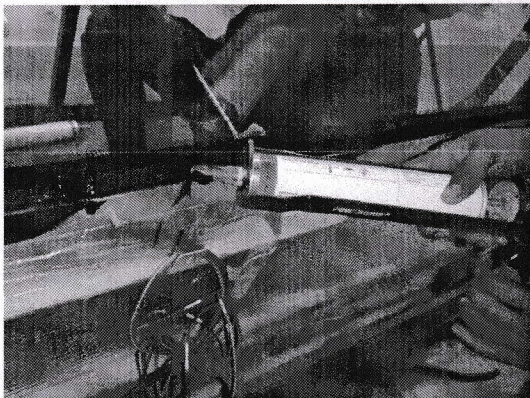
- Apply sealant in the gap between the metal and glass on the exterior and Interior surfaces.
- Remove the excess sealant with the flat panel / tool to ensure smooth finish of the adhesive.
- Use the smoothening agent for final finishing
- After this it is recommended to allow 18-24 hours for further curing process.



Exterior Gap Filling



Smoothening the Exterior Surface



Interior Gap filling



Smoothening the surface



### Important check points

- Adhesive curing continues upto next 6 to 7 days dpnding on temperature & humidity conditions of surrounding environment.
- Glass bonding should be done immediately after the application of adhesive within 5 minutes.

Glass bonding should be the last application. All the adjustment like door and window alignment should be done prior to that as no further work is allowed for next 4 to 5 hours.

### Recommended storage conditions:

- Cleaner – 15 to 25°C
- Primer – 15 to 25°C
- Sealant – 10 to 30°C

K. Jothiman  
SSE / F

G. m.  
SSE / ms

G. m.