

Expression of Interest (EoI)**Notice for invitation for Expression of Interest for development of Painting of Interior & Exterior Car Panels from interested renowned players having state of the art facilities for Metro Applications.**

BEML is a schedule 'A' Company under Ministry of Defence, Government of India and is a multi technology company offering high quality products to diversified business segments viz. Defence, Rail & Metro, Mining & Construction etc.

BEML LIMITED is a leading supplier of Rolling Stocks for Metros in India and already has presence in Delhi, Jaipur, Bangalore, Kolkata & Mumbai.

In order to address these huge opportunities, BEML would like to off-load Painting of Panels for Metro Projects.

In Metro coaches, saloon and cab Interior panels are made up of Phenolic prepreg type GFRP panels, which incorporates a modern aesthetic appearance, smooth finish and smooth blending of edges with round radius. These GFRP panels include side wall, ceiling coving panel, Door coving panel, Infill strips, gangway cubicles, ceiling end panel & cab Interior panels, back wall Panels, Cab mask & cab skirt, driver desk & console and End fairings. The GFRP panels comply with fire safety requirements of EN 45545-2 HL3 R1.

The Panels of Metro Car are designed aesthetically attractive, pleasing and comfort to passengers and being categorized as under.

a) GFRP (Glass Fibre Reinforced Plastic) Panels currently being used are Nomex Honeycomb semi-sandwich Panels with Glass Phenolic Prepeg and Nomex Honeycomb core (*Vacuum bagging Autoclave cured prepreg moulding process with Nomex honeycomb core is used for manufacturing*).

b) Aluminium Honeycomb Panels are of Aluminum honeycomb bonded with Aluminum skin panel.

The exposed GFRP/Aluminium panel surfaces are to be painted with paint of scratch resistant, Anti-graffiti & fire resistant properties for a pleasant, high quality interior appearance, easy cleaning against stains of food & graffiti and for easy maintenance.

Painting System: The paint system shall be of epoxy primer and anti-graffiti polyurethane finish paints, complying with fire safety requirements of EN 45545-2 HL3 and shall be proven in railway Metro car application. The paint system shall be suitable for the environmental conditions of city in which Metro cars operates.

The whole interior panels in the saloon except ceiling panels are of low smoke and self-extinguishing lightweight GFRP & Nomex Honeycomb Composite panel.

The panels are fitted on the Carbody mounting frame by few concealed fasteners for easy maintenance and fine appearance.

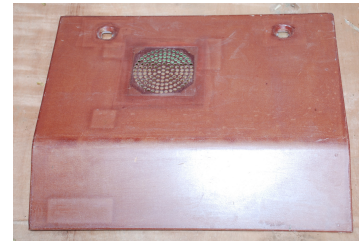
Cab interiors is designed to be aesthetically attractive, pleasing and comfortable to enhance the driver's working environment.

Illustrative Images

-Window Mask



-Ceiling End, Side & Door Covings, Cubicles, Infill strips, Cab (driver, Aux. desk & console)



-Cab Mask, Skirt & End Fairings



-Ceiling & Bulk Head Panels



Brief Requirements for Painting of Metro Panels

Purpose of this procedure is to contain the durability of Painting quality and to increase its quality by processing in accordance with Painting work procedure which is special for painting of Metro Panels.

The Firms should be reputed **renowned players having state of the art facilities for Painting of Metro Panels.**

1. Scope

Table 1: Scope of Supply of Material & Consumables

BEML Scope	Firm's Scope
<i>1. Raw Panels (GRFP & Aluminium Honeycomb).</i> <i>2. Paints (Putty, Primer & Finish)</i>	<i>1. Painting Operation</i> <i>2. Sandering paper, Sandering Machine, Ford #4 cup, Measuring instruments, Measuring Jar, PPEs etc and miscellaneous consumables.</i> <i>3. Packing & despatch to BEML.</i>

2. Categories of Panels

Table 2: Panel Types & sizes for Painting Booth, Drying Oven requirement

Type	Category	Particulars	Max. Apprx. Size in (LxW) in Mtrs
GRFP (Glass Fibre Reinforced Plastic) Panels	<i>A</i>	<i>Window Masks</i>	3.83 x 1.75
	<i>B</i>	<i>Ceiling End, Covings, Cubicles, Infill strips, Cab Panels</i>	2.66 x 1.75
	<i>C</i>	<i>Cab Mask, Skirt & End Fairings</i>	3.08 x 2.95
Aluminium Honeycomb Panels	<i>D</i>	<i>Ceiling Panels & Bulk Head Panels</i>	2.50 x 1.24

3. Process Requirement for Paining of Phenolic GFRP & Aluminium Substrates

a) Surface Preparation: *Visually Inspect the substrate for deep troughs due to die, honey comb damages, cracks, undulations for GRFP Panels, resin dried layers, layer peel off, dents and any other.*

Visually examined surfaces shall be thoroughly degreased and then be mechanically abraded for proper bonding of Putty with the surface. All dirt and resultant debris must be thoroughly removed and surfaces which have been contaminated during abrading stage should be degreased again using thinner / cleaning Solvent prior to application of Putty.

b) Putty Application On Undulations and Pin Holes: *Phenolic GFRP/AL Surfaces having Pinhole/defects and to hide the fibre grain structure of GFRP/AL panel surface and smoothen it, a very thin layer of putty is to be applied before and after primer application.*

Note: These thin layers of Putty have to be so thin that during Sandering, precaution to be taken not to excessively sander; otherwise fibre layer may get damaged. two or more layers may be required, as thicker putty will shrink after drying.

Clean the substrate thoroughly to remove dust / debris from Sandering operation and to degrease to remove any surface contamination resulting from previous operation and to wipe with clean cloth.

c) Putty Application: *Prepare the Putty by mixing thoroughly using Acetone to produce a Homogeneous mixture (Mixing Ratio, Base: Hardener, 100: 1~3 by Wt% & Add 10% Acetone).*

Apply a thin layer of Putty before Primer application using stainless steel spatula and allow in natural drying or forced drying in baking oven.

After drying, visually examine the Panel Surface for undulations and surface inaccuracies.

These thin layers of Putty have to be so thin that during Sandering, precaution to be taken not to excessively sander; otherwise fibre layer may get damaged. two or more layers may be required, as thicker putty will shrink after drying. If defects are found, repeat the Procedure. Otherwise proceed for 1st layer of Primer Application on entire surface.

d) Primer Application: *Prepare the Primer paint mix thoroughly, Epoxy based Primer Paint is a two component two pack system, a Base component and an Activator component. The base component shall thoroughly be mixed until a uniform color is produced, the activator shall then be added to the base and then again thoroughly stirred for at least five minutes to reduce homogenous mixture, maintaining Spray Viscosity 24~28 sec. with Ford Cup # 4. The mixing ratio of the base & activator is 3:1 volumes. Finally the base of the activator shall then be thinned with appropriate amount of 024 Thinner (30-60%). the thinned material shall then be thoroughly stirred before application.*

Apply primer paint (Spray Painting) and allow in natural drying or forced drying in baking oven.

DFT shall be measured using Paint coating thickness Gauge for GFRP substrate.

e) PU Finish Application:

Prepare the Finish paint mix thoroughly, Polyurethane based finish Paint is a two component two pack system, a Base component and an Activator component. The base component shall thoroughly be mixed until a uniform color is produced, the activator shall then be added to the base and then again thoroughly stirred for at least five minutes to reduce homogenous mixture, maintaining Spray Viscosity : 20~24 sec. with Ford Cup # 4.

The mixing ratio of the base activator is 4:1 volumes. Finally the base of the activator shall then be thinned with appropriate amount of 037U Thinner (30-60%). the thinned material shall then be thoroughly stirred before application.

Apply Finish paint (Spray Painting) and allow in natural drying or forced drying in baking oven.

DFT shall be measured using Paint coating thickness Gauge for GFRP substrate & Check the Glossiness using Gloss meter.

Finish painted panels shall be visually inspected under illumination of 800 lux minimum. If defects are found, the panel shall be rejected. If the defected panels are to be used, the entire paint and primer layer should be removed and process shall be re-started.

f. Notes to Comply

- i. Metro Panels shall be properly packed and dispatched to avoid transit damage, paint peel off, scratches, dents etc.*
- ii. Painting Booth Environmental Clearance Certificate from Statutory authorities to be produced.*
- iii. The Paint Materials required for Painting of Metro Panels will be in BEML Scope and strictly adhering to requirement/specifications. Damages/wastages due to poor & improper storage of items, workmanship etc. shall be the responsibility of Firm.*
- iv. The Firm shall be responsible for Painting works on Panels supplied during warranty for any Painting defects.*
- v. Firm to depute representative at BEML, BC to carry out reworks (if any) raised by BEML Quality/ Customer inspection and transit damages of Metro Panels.*
- vi. Capable of delivering Minimum of 400 Sq.m per month (8 Cars) painting surface area.*
- vii. Firm will be provided all time 3 months inventory of BEML Raw Materials and to be returned within 3 months.*
- viii. Scope may be increased during process based on mutual acceptance and based on performance like Quality and Delivery Schedule. BEML reserves the right to reduce/cancel the scope in case of failure by firm to meet delivery schedule.*
- ix. Firm to make presentation at BEML premises with above and additional details to show case their capability. Further, BEML will depute a team for assessment. Subsequently the customer also will assess the firm.*

g. Inspection & Clearance

- i. All Inspection Check sheets of Finished Painted Panels to be provided to BEML.*
- ii. Period calibration of Test Instruments*
- iii. An Inspection team (BEML/Customer representative) will be deputed at Firm's premises during Proto Panels Painting for Process validation and also during regular production.*
- iv. The Painted Metro Panels shall be offered to BEML inspection/BEML Customer inspection. The firm shall associate with BEML quality team for final inspection & clearance from end user and should carry out any modifications suggested by inspection/quality team.*
- v. Only Certified Painters shall be allotted for Metro Panels Painting.*

4. Criteria for Qualification

a) Firm should have the following minimum facilities

- i. Dust free covered space for processing & storage of Panels, Paint materials.*
- ii. Painting Booth of sufficient size to accommodate the Panels as per Table-2.*
- iii. Drying Oven of suitable size.*
- iv. Gloss Meter, Coating Thickness Gauge (DFT), Ford cup, Digital Thermo- Hygrometer, Digital Stop watch, Digital pH meter, Pressure gauge, Spectrometer and Digital Thermometer etc.*
- v. Covered Space & Stands for storing the Raw/Finished Panels.*

b) Other requirements

- i. Only Indian Firms are eligible to participate in the EoI and Shortlisted firms will be included in the Tender only after BEML's Customer Approval.*
- ii. Firms which have failed to execute contract as per schedule regarding the Painting of Metro Panels as per earlier Purchase Order of any Metro project; within past 5 years need not participate in this EoI.*
- iii. Firm black listed within past 5 years by any Metro, Govt., Pvt Organizations due to any reason need not participate in this EoI.*
- iv. Firm has to execute Integrity Pact, NDA before Order execution, Firms confirming will be eligible to participate in this EoI.*
- v. Firm to share their Similar Product Acceptance details by Customer for last 5 years.*
- vi. Submission of Quality Certificates such as ISO 9001, ISO 14000, OHSAS 18001 and other Certificates issued by member of International Association for Classification Societies related to Company as applicable.*
- vii. The Firm activities, location, relationship with respect to Painting or other related works shall not have any business interest conflict with BEML.*
- viii. During the pendency of the Contract, Certified/ Trained Manpower should not be diverted to other Projects.*