



PRODUCT STANDARD
SWITCHGEAR ENGINEERING DIVISION

SG12665 REV.01

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**PURCHASE SPECIFICATION FOR PROCUREMENT OF MEDIUM VOLTAGE SWITCHGEAR
VM12(700) FOR PSPCL (with 806 mm Instrument Panel)**

1. GENERAL:

This specification governs the manufacturing, assembly, Inspection, packing and supply of bolted house assembly of VM12(700) switchgear. Switchgear house assembly comprises of breaker chamber, CT chamber, busbar chamber, earthing arrangement. This spec also includes other components/sub-assemblies like instrumental panel with door, Sealable Chamber for TVM, 820mm rear extension chambers, end covers, Bolted Assembly of Truck, New Lead Screw for VM12(700) etc.

There will be following items: **Table-1**

Item No.	Description	Drg. No.	Wt. (in Kg)	Remarks
001	Switchgear Panel Set: 1 Set/panel	35219002594-V06 BP9089146814	CRCA 450 Kg Cu: 3.128 Kg	
002	Instrument Panel with Door	35219002015-V00 BP9089146768	CRCA 61.5 Kg	Door Punching Drawing shall be provided separately
003	Sealable Chamber for TVM with Door	25219001543-V00 BP9089146822	CRCA 30.5 KG	Door Punching Drawing shall be provided separately
004	End Covers: 1 set per Side of Board	35219002581-V01 BP9089146784	CRCA 58.5 Kg	
005	820 Deep Extra Extension Chamber for Incomer with PT	15219002505-V02 BP9089146806	CRCA 158.94 Kg	
006	820 Deep Extra Extension Chamber	15219002505-V01 BP9089146792	CRCA 157.9 Kg	
007	Bolted Assembly of Truck	35219001559-V02 BP9089134743	CRCA 57.1 KG	
008	New Lead Screw for VM12(700) (Including laser cut/machining components)	35211001904-V02 BP9089136681	22 Kg Steel items as per Drawing	

2. APPLICATION: To be used for manufacturing of VM12(700) Switchgear along-with VCB trolley.

3. MATERIALS REQUIRED:

- Bulk of the components is manufactured with 3tk/2tk CRCA steel. Some components are of 5 tk / 6 tk bright structural steel.
- Steel hinges with pins (Approx. 35 nos.) for doors/flaps.
- All materials used shall be as per our detailed manufacturing drawing, BOM, bought Out items as mentioned in drawing.

4. GUIDELINES FOR MANUFACTURING:

(Annexure- B -To be compulsorily filled & signed by Vendor and to be submitted in Technical Bid for acceptance and ensuring availability of latest drawing with vendor))

Vendor to submit their manufacturing quality plan within 7 days after placement of PO. BHEL will approve the quality plan within 1 week after receipt of QP. New Vendors to manufacture 2 prototypes within given days specified in PO or 60 days (whichever is earlier) after PO placement for approval by BHEL. Bulk manufacturing to be started only after prototype approval and clearance from by BHEL. Vendor to strictly adhere to the approved quality plan in the format for manufacturing of panel.

REV.	01	PRINTS TO:- MM (SCR) -1, SWM (Plg) -1	APPROVED -		
ALTD.	AT	Table-1 Updated	H R Patel Sd/-		
APPD.	AD		PREPARED	ISSUED	DATE
DATE.	21.10.21		Alankar Tripathi Sd/-	Arun Dewangan	14.10.21



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Vendor to visit BHEL Bhopal works for understanding the product. After the visit, Vendor to give undertaking that they have understood the requirement and they will be able to manufacture the assembly as per BHEL technical requirement and will be able to meet delivery requirement of BHEL.

Vendor to sign a confidentiality agreement at the time of PO placement as per BHEL policy.

Weight of the items as per drawing shall be verified at vendor works / BHEL and shall be maintained as per respective Items drawing nos of this specification.

For manufacturing of the panel, following are also to be ensured:

- 4.1 Vendor will be given detailed drawings at the time of enquiry. The panels shall be manufactured as per drawings. **Vendor to ensure to use only latest revision drawings for manufacturing. For each New Purchase Order, vendor shall obtain fresh set of latest drawings from BHEL. Declaration as per annexure – B regarding receipt drawing with latest revisions shall submit by vendor at the time of enquiry.**
- 4.2 Tolerance on steel sheet thickness shall be + 0.14 mm / -0.0 mm) **i.e. no-where the thickness of the rolled steel sheet shall be below 3mm and 2mm respectively.** Tolerance of + 0.21 mm / -0.0 mm shall be maintained for sheet steel of 4 mm to 6.0 mm thickness. Tolerance on 5x40 copper shall be as per tolerance of standards. **Deviation in tolerances will not be acceptable. (CTQ)**
- 4.3 All hardware used shall be of property class 8.8, Zinc plated and Gold/ white/Yellow/ Blue passivated, as specified by BHEL during bulk manufacturing & supply. Plating thickness shall not be less than 13 micron. **(CTQ)**
- 4.4 Quality of weld shall be grade – IV as per BHEL standard AA0622101 unless otherwise called in drawing. All welded joints shall be properly dressed before finishing. Length of welds shall be as per respective drawings.
- 4.5 Each part of house shall be manufactured from single piece of sheet as called in BHEL drawing **(CTQ).**
- 4.6 Vendor to ensure verticality of side sheets of all items throughout its height. Vendor to ensure the use of welding/assembly fixtures for welding/assembly respectively and shall be in the scope of vendor. BHEL will not be giving any fixtures for ensuring verticality and horizontality.
- 4.7 Width of panel after assembly to be maintained as per drawing.

All parts, components shall be free from distortions, waviness, burrs and other surface defects.

5. COLOUR & FINISH :

- 5.1 All panels should be of Light Grey color shade 631-IS 5(1961 latest edition) with powder coating (Outer Surfaces). The inner painting in the panels shall be of white color.
- 5.2 Powder coating shall be done for the fabricated assemblies. Thickness of paint shall be maintained **70 microns**. At **no place paint thickness shall be less than 60 microns (CTQ)**. All sheet steel work shall be pretreated, in tanks, in accordance with IS:6005.



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Degreasing shall be done by alkaline cleaning. Rust and scales shall be removed by pickling with acid. After pickling, the parts shall be washed in running water. Then these shall be rinsed in slightly alkaline hot water and dried. The phosphate coating shall be "Class-C" as specified in IS:6005. The phosphated surfaces shall be rinsed and passivated. After passivation, Electrostatic Powder Coating shall be used. Powder should meet requirements of IS 13871 (Powder coating specification). Finishing paint shade for complete panels will be informed during PO placement.

5.3 Vendor shall use only M/s Asian Paints PPG Pvt. Ltd., M/s Berger Paints India Ltd., M/s Kansai Nerolac Paints Ltd make Paints in the panels. Panels having Fading / Peeling off paint, if found, shall be rejected.

5.4 Vendor to supply 1 bottle of spray paint against BHEL PO (Colour shade to be informed by BHEL Planning dept.) per 10 sets of the assembly as per Item 001 (CTQ).

5.5 Adhesion of paint shall be tested by vendor & record to be maintained for each panel.

6. INSPECTION & TEST REQUIREMENT BY THE MANUFACTURER:

6.1 Manufacturer to ensure that all the inspection is done at their works as per BHEL standard procedure / approved QA plan. Check list to be filled for each house & to be signed by their QC. Record to be maintained for each panel as per QA plan.

6.2 02 nos. random houses from one manufactured lot shall be joined together and verified for IP4X protection class (1 mm dia wire shall not able to insert between any joints). There should be no gap between instrument panel & breaker panel for each manufactured lot when instrument panel is mounted on house assembly (CTQ).

6.3 Individual instrument panel shall be suitable for dust ingress protection class- IP5X.

6.4 On the above randomly selected house assembly, 2 nos. exhaust duct shall also be assembled for verification of matching weld nuts.

6.5 Manufacturer to ensure that all the material test certificate as per material spec. requirement is maintained. Dimensional record shall be maintained for all components as per approved quality plan.

6.6 No sharp points / cut edges shall be accepted.

6.7 Manufacturer to check and ensure quality of welds, length of welds and freedom from distortion, waviness, burrs and other surface defects as per drawing.

7. TEST CERTIFICATES:

Three copies of certificates shall be supplied along with consignment giving the following information.

- BHEL Order No.
- Manufacturer's/Supplier's Name.
- Batch/Lot No.
- Quantity Supplied.
- Dimension report of finished house as per approved quality plan.
- Duly filled checklist as called in acceptance criterion.
- Conductivity & hardness tests for copper material & phosphor bronze contact (for each lot).
- Adhesion Certificate for painting.



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8. IDENTIFICATION MARKINGS FOR TRACEABILITY

Each panel shall have to punch following details and shall be visible in the CT chamber left side sheet (looking from rear).

- Suppliers code,
- P.O. No.,
- Batch no. and Serial no. of cubicle.
- Date of supply.

9. PACKING AND MARKING:

10.1 Each cubicle assembly & other items shall be wrapped in bubbled polythene. Over the bubbled polythene wrappings, corrugated paper board wrapping shall be done. Any special care required shall be done to avoid damage during transit. Corrugated paper board will have both sides flat liner. If any other type of packing is proposed by vendor, then Vendor to get approval of the sample of packing type & material before first supply and Manufacturer stamp to be marked on each packing. Packing list to be enclosed in each panel. **Supply of scratch free item is sole responsibility of vendor.**

10.2 Item 1.3 of Table 1- Loose Items - Each set (i.e. per panel set) of items to be packed together in a wooden box, as single despatchable unit.

10.3 Item 3 of Table 1 - Exhaust Duct (Plenum) - Each set (i.e. per panel set) of items to be packed together in a wooden box, as single despatchable unit.

10. DEVIATIONS:

Deviation, if any, shall be clearly brought out at the offer stage itself by the vendor or else shall be deemed meeting all specification requirements.

11. REJECTION AND REPLACEMENT:

If the material does not comply with the requirements of this product standard during receipt & inspection at BHEL or if any defect is found during further processing of the material, BHEL reserves the right to reject the whole consignment notwithstanding any previous certification of satisfactory testing and/or inspection and the supplier shall replace the material free of cost immediately so as not to hamper BHEL's further assembly plan. Scratch due to transportation shall also be liable for rejection of panels.

12. PRE-REQUISITES:

Following are pre-requisites to be ensured by the bidding vendor:

1. CNC punching & bending machines.
2. Facility for powder coating. If facility is not there with the vendor, there should be a contract agreement with sub-vendor for powder coating (bidding vendor should have separate approved quality plan of sub vendor for powder coating).
3. Testing facility of paint thickness, adhesion etc.
4. Copper material conductivity, dimensions, and tin plating thickness checking measurement facility.

13. ENCLOSURES:

1. Nil

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(To be filled and signed by Vendor for acceptance by BHEL QC dept.)

ANNEXURE-A (Page 1 of 2)

CHECK LIST FOR HOUSE OF VM12(700)

Sl. No.	Description of Checkpoint	Vendors Confirmation Y/N
1	Sheet thickness verified as per component drgs for Breaker chamber side sheet, CT chamber side sheet, Front door & rear covers.	
2	Latest revision of all drgs available and considered for punching/manufacturing.	
3	Overall dimensions verification done as per drg and found within tolerance of ± 2 mm.	
4	Dimension of 700 ± 2 mm is checked & found maintained both at top and bottom edges of breaker chamber front(min 4 locations) and rear of CT chamber(min 4 locations).	
5	Assemblies of house structure verified for verticality in each chamber i.e. Breaker chamber, CT Chamber, cable chamber and instruments panel, extra extension chamber by checking tool. Checking tool to be manufactured by vendor.	
6	Gasket on door properly placed and no gap available all around.	
7	Smooth operation of door locks & its latching checked and found OK.	
8	All the bending checked for sharpness and found OK.	
9	No gap available between top cover and frame of Busbar chamber, breaker chamber and instrument panel (verified through light)	

Date:

Sign & Stamp
QC- Manufacturer



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ANNEXURE-A (Page 2 of 2)
CHECK LIST FOR HOUSE OF VM36

Sl. No.	Description of Checkpoint	Vendors Confirmation Y/N
10	All H/W (grade 8.8) are fitted in the top & bottom rear covers.	
11	All parts, components are free from distortions, waviness, burrs and other surface defects.	
12	Paint Shade as per BHEL requirement.	
13	Paint Thickness is found min 60 microns, Min.	
14	Paint adhesion is found OK.	
15	Paint is not available at earthing pad/ earthing boss/threaded portion of pad/boss/studs etc.	
16	Suppliers name and P.O. No. Punched on despatchable units for proper identification.	
17	Door hinges are aligned in one line and found as per drawing.	
18	One bottle of spray paint against per 10 sets of the assembly as per Item 001 of spec.	

Date:

Sign & Stamp
QC- Manufacturer

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(To be filled, signed & submitted by Vendor at the time of bidding
for acceptance by BHEL)

ANNEXURE-B

CHECK LIST FOR HOUSE OF VM12(700)

Declaration

BHEL PO no.: _____

PO Date: _____

It is confirmed that all the drawings with latest revisions required for manufacturing of the switchgear panel is received at our end. We will manufacture the equipment as per the given drgs.

Date:

Sign & Stamp
Authorized representative (Manufacturer)

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