

SCOPE OF WORK

Annexure-A

MANUFACTURE AND SUPPLY OF TC-END WALL ASSEMBLIES FOR MEMU-3P PROJECT

I. Brief Scope of Work & Quantity :

Sl No.	Part No.	Part Descrn	Qty/ TC1	Qty/ TC2	Qty/ TC3	Total Quantity Reqd for 36 Cars	Scope of Work
END WALL ASSY							
1	84944001C1SC	E/W SKINNING ASSY- TC1& TC2	1	1	0	24	Supply of Fabricated TC End Wall Assy in Unpainted Condition.
2	84944001C2SC	E/W SKINNING ASSY-TC3	0	0	1	12	
3	84944002SC	E/W SKINNING ASSY- TC1,TC2, TC3	1	1	1	36	

LIST OF SUBASSEMBLIES TO BE SUPPLIED BY VENDOR ALONG WITH END WALL ASSEMBLY IN LOOSE CONDITION:

SI.NO	PART NO	DESCRIPTION	UOM	QTY/ TC1	QTY/ TC2	QTY/ TC3	Total Qty Required for 36 Cars
1	92840005	HANDLE ASSY.	NO	1	1	1	36
2	EMUM24006	HANDLE COMPLETE	NO	1	1	1	36
3	T26504	TAIL LAMP BRACKET	NO	2	2	2	72
4	T24514C2	HANDLE	NO	3	3	3	108
5	T24502C2	LADDER FOOT STEP	NO	9	9	9	324
6	84944176	CHANNEL	NO	4	4	4	144
7	84944177	CHANNEL	NO	4	4	4	144
8	84944178	ANGLE	NO	8	8	8	288

Note :

- Rake Formation: 1 Rake- 2DMC+2TC1+2TC2+2TC3
- End walls to be supplied as a set (TC1+TC2+TC3) Formation
- Vendor should be approved source of RDSO/ICF/RCF
- Manufacture & Supply of Aggregates should conform to Latest drawings and to the material specification/Standards/Test, indicated in the respective drawings is to be adhered/ensured.
- Firm to supply aggregates for one TC Car to ascertain the fitment/installation aspects before bulk supply.

II : DETAILED SCOPE OF WORK FOR END WALL :

i. Details of TC End Wall Assy

1. End Wall Consists of following Major Sub Assemblies:
 - End Construction (PA & NPA End)
 - End Panel Assembly
 - Frame for UIC Vestibule

ii. Manufacturing of Detailed Components:

1. All Components to be only manufactured by CNC Flame Cutting/Plasma Cutting/Laser Cutting/Shearing for Plates & Sheets, Saw Cutting for Tubes/Pipes/Bars/Rods. Vendor shall submit nesting plan to BEML for Approval before taking up for manufacturing.
2. Dress, Grind and Deburr cut edges of all detailed components and all edge preparation to be carried out by beveling.
3. Straightening of Components to be carried out where ever required before taking up for forming/Machining/Assembly.
4. All Plasma cut/Flame cut/Laser cut components to be shot blasted/Cold Phosphated before taking up for forming/Machining/Assembly. All Parts/Members shall be first degreased & derusted and Paint with Weld Primer.
5. Forming of Parts to be done by reducing Tool Marks.
6. Machining of Components to be carried out as per drawing requirement. All machined surfaces to be protected from rusting by applying rust preventive oils and physical damages if any.
7. Mass production of detailed components can be taken up only after getting acceptance from BEML for first sample/ Proto Assy Clearance.

iii. Fabrication of Subassemblies/Assemblies:

1. All subassemblies/Assemblies to be fabricated out of weld jigs in order to achieve uniformity in dimensions, quality of above production. This Jigs to be shown to BEML/SIT during manufacturing Proto and subsequent production.
2. Welding of Fabrication Structures to be carried out as specified in drawings.
3. Welding shall be carried out uniformly along the length to avoid distortion. During Fabrication, Weld defects, Weld spatters, heat marks etc due to welding shall be removed before taking up for next assembly. Welder should be qualified for the requirements of IS: 7310 and IS: 817 or any equivalent international standards.
4. Fabricate all major Sub Assemblies viz, End Construction (PA & NPA End), End Panel Assemblies, Frame for UIC Vestibule Unit etc., as per Drawings.
5. Dimensional check in accordance with the check sheet shall be carried for all major Sub-assemblies before taking for Major Assembly and report to be submitted to BEML.
6. Loading of Sub assemblies viz, End panel assembly, end construction (PA & NPA End) on Main assembly Jig as per drawing, after welding of structure with End panel assembly, Centre Panel and other details to be installed.

7. Assemble frame for UIC vestibule on End wall Assembly and assemble channels and angle on vestibule frame, weld as shown in the drawing. Locate and install other details specified in Drawing.
8. Cleaning of the Surface of the End wall with Pressurized Air/Emery paper to remove dust & Debris.
9. Inner side of End wall Assembly and Intermediate parts to be cold phosphate and Outside skin should be Degreased and Derusted.
10. Skin tensioning of the End Wall shall be so carried out that variation from profile of maximum 1 mm per meter length of the End Wall is achieved.
11. The End wall assembly shall be checked for its Dimensions after End wall structure stage and after completion of Full assembly, in accordance with check sheets and reports to be submitted to BEML.
12. End wall Center Line to be marked/Visible along and across (Inside and Outer Side) on all End Wall Assemblies.
13. All other dimensions / standards / specifications to be maintained / followed for all Subassemblies / Assemblies as per respective Drawings with latest alterations. Before starting the production, vendor should ensure to manufacture as per the latest drawing as and when it is updated

III. INSPECTION & CLEARANCE :

a. Proto Inspection :

1. Offer the Sub Assemblies Viz, End Construction (PA & NPA End), End Panel Assemblies Frame for UIC Vestibule Unit etc, in Tack Welded Condition to BEML/SIT inspection.
2. Offer End wall assembly to BEML/SIT inspection in Jig Loading stage of End wall structure, in Tack Welded Condition.
3. Offer for BEML/SIT inspection after Loading Frame for UIC Vestibule unit on end wall and after tack welding of Vestibule unit to end wall structure.
4. Offer the completed Proto End wall to BEML/SIT inspection. Associate with BEML/SIT inspection team for final inspection & clearance. Firm shall carryout any modifications suggested by BEML/SIT inspection team, without any additional cost.

b. General Inspection Condition:

1. Offer All End wall assemblies to BEML/SIT inspection. Associate with BEML/SIT team for final inspection & clearance and firm shall carryout any modifications suggested by BEML/SIT Inspection team.
2. The Construction throughout End Wall Assemblies shall be absolutely Water Tight. All End wall welded joints shall be tested after End wall Assembly by Applying Chalk Powder on one side and Kerosene oil on other side and Dye Penetration Test to be carried out for all End wall weld joints as and when insisted by BEML/SIT inspection team at their discretion.
3. Chemical and Mechanical testing of samples should be carried out as and when insisted by BEML/SIT inspection team at their discretion

4. BEML/SIT at their sole discretion may inspect any item at any stage of Manufacturing of End wall Assembly.
5. The Vendor shall maintain & provide a copy of test reports, inspection reports and Check sheets to BEML/SIT Inspection Team. All the witnessed inspection reports like kerosene oil leak test, dye penetrate testing, chemical & Mechanical testing, Dimensional report etc. should be submitted to BEML in digital form via email or CD/DVD.

IV. Delivery Schedule :

1. Proto TC End Wall Assemblies shall be delivered to BEML at RC-II Unit/ Bangalore Complex, after Inspection Clearance & after implementing any modifications if any suggested by BEML/SIT.
2. After Successful Installation of Proto End Wall Assemblies at BEML, Bulk Production to be taken up after obtaining Clearance from BEML Inspection Team.
 - TC End Wall Assemblies - 12 Cars/Month (After Proto Clearance).
3. All aggregates to be supplied as a set in Car wise using proper holding Jigs to RC-II Unit, KGF/Bangalore Complex based on confirmation by M/s.BEML.

V. Material Scope:

1. BEML Scope :

- a) Raw materials in the form of Plates/Sheets.
- b) Rounds and Tubes in full Lengths.
- c) Bought Out Items as mentioned in SI.No.VII
- d) Applicable Drawings.
- e) Inspection Check Sheet/Inspection Test Plan for End wall Assembly, End Construction (PA & NPA), End Panel Assemblies, Frame for UIC Vestibule Unit etc.,

2. Vendor Scope.

- a. All required welding consumables, Rust Preventive oils, Lubricants as specified in Drawing/RDSO Specifications.
- b. Material Specification of Welding consumables, Rust Preventive Oils, Derusting/ Degreasing/Cold Phosphate consumables & **paints** and its expiry details shall be furnished to BEML for approval before manufacturing of the first proto End Wall Assembly.

VI. General Notes to Comply:

1. Quality Assurance Plan (QAP) should be submitted by firm for approval.
2. Process Qualification Record (PQR)/Welding Procedure Specification (WPS) should be available.
3. Vendor should be ISO: 9001 – 2015 Compliant.

4. Before taking up manufacturing activity, Self-Inspect the M/s BEML supplied component for transit damages, In case of any defects same has to be communicated with detailed report and send back the same to BEML in as is condition.
5. Vendor shall submit nesting plan to BEML for Approval before taking up for manufacturing. Off cuts and Scrap generated during manufacturing of components to be returned to BEML as per approved nesting plan.
6. Ensure components supplied by M/s.BEML and Fabricates Subassemblies and Assemblies are stored properly and damages due to poor & improper storage, workmanship etc. should be the responsibility of Vendor.
7. Vendor shall ensure the proper fitment of aggregates while shell integration/furnishing at initial batches of supply & further in case of any fitment issues at RC-II unit KGF and Bangalore Complex. Vendor has to engage their representative for necessary correction and implementation of those corrections in further supplies.
8. Any minor scope Changes/Modifications in drawing or during inspection if any to be taken up by vendor without any additional cost.
9. Ensure all End wall assemblies to be properly Stored/Protected/Covered to avoid Rusting and Damages at vendor premises and also to supply to BEML in Rust Free condition.
10. All End wall assemblies to be properly protected to avoid damages during loading, unloading and transportation.

VII. LIST OF BOUGHT OUT ITEMS UNDER BEML SCOPE:

SI.NO	PART NO	DESCRIPTION	UOM	QTY/ TC1	QTY/ TC2	QTY/ TC3
1	CC25165	HELICAL SPRING	NO	4	4	4
2	CC25251	SPECIAL STUD	NO	4	4	4
3	CC25264	HANDLE FOR HOLDING DEVICE	NO	4	4	4
4	RFN0171210	HEX. NUT M12-6	NO	4	4	4
5	RFP0113232	SPLIT PIN DIA 3.2 X 32 L	NO	4	4	4
6	RFS6250510	SLTD CHEESE HD SCREW 5X10	NO	24	24	24
7	EM25102	HAND RAIL ARRGT	NO	4	4	4