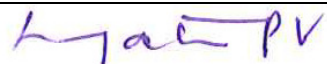
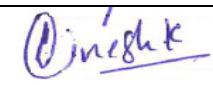





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MRS1 Project
Procurement Technical Specification
of Battery Box Assembly

	Name	Date	Signature
Approved By	Gayathri. PV	18.06.2020	
Reviewed By	Dinesh K	18.06.2020	
Prepared By	Lohith MV	18.06.2020	




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1. Introduction

1.1. General

This Procurement Technical specification (PTS) specifies the technical requirements for manufacture and supply of Stainless steel Battery Box system to be fitted in the Metro cars of 'MRS1' project for Mumbai Metro Line-2 & 7.

BEML will carry out all required works and activities as Contractor to the Employer for MRS1 project, while the subcontractor shall be responsible for all works required in this PTS with regard to manufacture, inspection and supply of Battery Box assembly and shall be responsible for supporting the BEML activities as contractor for MRS1 project.

The scope of work includes all items of work which may be required to meet the performance requirements, reliable and efficient operation of trains and meeting the best international practices even if not specifically mentioned in this PTS.

1.2. Train Composition and Battery Box System Arrangement

1.2.1. Train composition

The rake formation shall generally be as follows:

3 Car unit formation : DM – T – M –

6 Car Train formation: DM –T–M – M – T – DM

In case of 8-car formation (if required):

2 Car train formation : – T – M –


8 Car Train formation: DM – T – M – T – M – M – T – DM

Where,

DM : Driving Motor Car

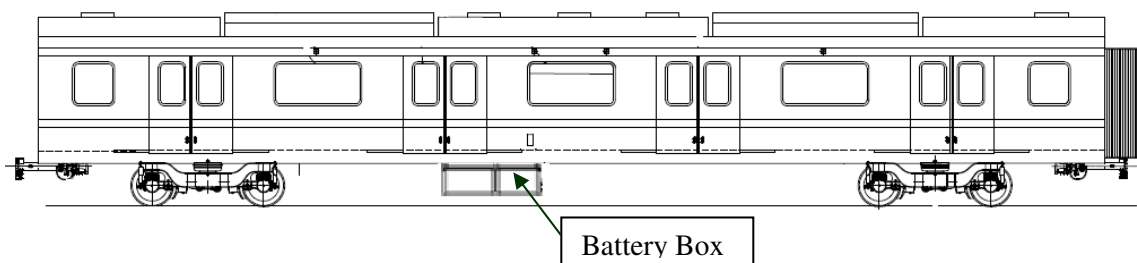
T : Trailer Car with pantograph

M : Non -Driving Motor Car

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1.2.2. Battery Box arrangement

Battery box will be mounted on all M-cars as shown in the figure below




Battery Box Arrangement –M Car

1.3. Climatic & Environmental Conditions

The car shall operate reliably and safely under the climatic and environmental conditions of Mumbai. Accordingly, the Battery Box assembly shall be designed to operate with satisfactory performance under the following conditions.

Description	Limiting Values
Maximum ambient temperature (See note below)	36 °C
Minimum temperature	14.3 °C
Humidity	≥ 95% RH
Rainfall	The annual precipitation is 2,078 mm with 34%(709mm) falling in the month of July.
Atmosphere during hot season	Extremely dusty including bird feathers
Maximum wind speed	150 km/h
Vibration and Shocks	The sub-systems & their mounting arrangements shall be designed to withstand satisfactorily the vibration and shocks encountered in service as specified in IEC 61373 and IEC 60571.
SO ₂ level in atmosphere	80 – 120 mg/m ³
Suspended particulate matter in atmosphere (TSPM)	360 – 540 mg/m ³
Flood Proofing	The traction sub-systems mounted on the under-frame will be designed to permit propulsion of the train at 10 kmph through water up to a depth of

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	50mm above rail level. Traction sub-systems shall be made splash proof in accordance with International Standards
Life	The Metro car is designed for min. 35 years of life. Accordingly, the subject items shall also not deteriorate in their performance for 35 years.


Note:

- 1) The temperature of the metal surfaces of the vehicles when exposed directly to the sun, for long periods of time, may be assumed to rise to 70°C.
- 2) Any moisture condensation shall not lead to any malfunction or failure.
- 3) Adequate margin shall specially be built into the design particularly to take care of the higher ambient temperatures, high humidity, dusty and corrosive conditions, etc. prevailing in Mumbai area.

1.4. Vehicle Performance Requirements

The vehicle performance requirements with fully loaded train and tangent track are as per the following table.

Item		All Corridors
Safe speed	With inflated secondary suspension	90 kmph
	With deflated secondary suspension	80 kmph
Maximum operational speed	With inflated secondary suspension	80 kmph
	With deflated secondary suspension	70 kmph
Minimum Design Average Acceleration rate for fully loaded (AW3) train on level tangent track shall be as under: 0 kmph to 40 kmph 0 kmph to 60 kmph 0 kmph to 80 kmph		1.0 m/s ² 0.75 m/s ² 0.40 m/s ²
Minimum Operational Average Acceleration rate for AW2 loaded train on level tangent track shall be as under: 0 kmph to 35 kmph 0 kmph to 60 kmph 0 kmph to 80 kmph		1.20 m/s ² 0.80 m/s ² 0.45 m/s ²
Average Service braking rate from 80 kmph to standstill for fully loaded(AW3) train on level tangent track.		1.0 m/s ²
Average Service braking rate from 80 kmph to standstill for AW2 train on level tangent track.		1.1 m/s ²
Average Emergency braking rate from 80 kmph to 0 kmph for fully loaded trains on level tangent track		1.3 m/s ²


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Jerk rate (Maximum)	0.75 m/s ³
Annual running distance of one train (for design purpose)	150,000 km
Note: The specified average minimum acceleration shall be the finally achieved values inclusive of the specified jerk rate.	

1.5. Track structure Parameters

The MRS1 cars will operate with the track parameters as specified in the following table:

Description	Elevated and At-grade Corridor		Underground Corridor
	Ballasted	Ballast less (DFF)	Ballast less (DFF)
Track Laying Gauge	1435 mm		
Rail Type (Main Line & Depot)	60 EI (UIC 60) 880/HH	60 EI (UIC 60) 1080/HH	60 EI (UIC 60) 1080/HH
Rail Profile	UIC 861-3		
Inclination Of Rail	1 in 20		
Sleeper Spacing (Main line)	600 mm ± 10mm	600 mm ± 10mm	700 mm ± 10mm
Sleeper Spacing (Depot)	650 mm ± 10mm	Not applicable	
Ballast Cushion Depth(Main line)	300mm	Not applicable	
Ballast Cushion Depth (Depot)	250mm	Not applicable	
Standard Rail Length	13m and 18m	18m	
Rail Panel Lengths	Longer than 200m		
Minimum Radius of Curvature	200m-Underground 110m-Elevated 100m-Depot		
Minimum Turn out Radius.- (Main line)	1 in 9 - 300m radius 1 in 7- 190m radius		
Minimum Turn Out Radius Depot	1 in 7 - 190m radius		
Maximum Cant Permissible	110 mm		
Maximum Cant Desirable	110 mm		
Maximum Cant Deficiency Permissible	85mm		
Maximum Cant Deficiency Desirable	85 mm		
Maximum Permissible Cant Gradient	1 in 440		
Maximum Desirable Cant Gradient	1 in 720		

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Turn-out Speed : Turnout (1 in 9) R-300	45 km/h	45 km/h	40 km/h
Turn-out Speed : Scissors (1 in 9) R-300	45 km/h	45 km/h	40 km/h
Turn-out Speed : In Depots (1 in 7) R-190	35 km/h	35 km/h	25 km/h
Turn-out Speed : Turnout (1 in 7) R-190	35 km/h	35 km/h	25 km/h
Turn-out Speed : Turnout(1 in 12) R-410	50 km/h	50 km/h	50 km/h
Turn-out Speed : Turnout(1 in 12) R-410	50 km/h	50 km/h	50 km/h
Turn-out Speed : Turnout (1 in 8.5) R-218	30 km/h	30 km/h	30 km/h
Turn-out Speed : Turnout(1 in 8.5) R-218	30 km/h	30 km/h	30 km/h
Maximum Gradient Main Line	4%		
Maximum Gradient Depot Connection	4%		
Minimum vertical curve radius of curvature	1500m		

1.6. Current Collection System

System Particulars	For all sections and depot
Supply Voltage System	25kV AC single phase 50Hz
Current Collection	Through Pantograph

1.7. Signalling System

Item	Description
Train Control System	CBTC based On board Continuous Automatic Train Control system (CATC) consisting of i) Automatic Train Protection ii) Automatic Train Operation (ATO) iii) Automatic Train Super-vision (ATS) iv) Attended/Unattended train operation (GoA2/GoA3/GoA4)
Train Control mode	i) Automatic mode ii) Coded Manual modes iii) Restricted Manual mode iv) Run on Sight mode v) Cut-out mode vi) UTO vii) Standby


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1.8. Principal Notional Vehicle Dimensions/ Leading Particulars

Description		Dimension
Gauge		1,435 mm
Maximum Length over body(including end-fairings)	DM car	22,010 mm
	T and M cars	22,010 mm
Maximum Length over couplers for all cars		23,000 mm
Maximum Width over Body		3,200 mm
Minimum Passenger Saloon Headroom		2,050 mm
Locked down pantograph height for 25kV AC cars from rail level at Car Centre Line		4,048 mm
Maximum Floor height above rail level of any unloaded vehicle		1,130 mm
Minimum Floor height above rail level of fully loaded vehicle		1,100 mm
Maximum height of coupler above rail level for unloaded vehicle		815 mm
Minimum height of coupler above rail level for fully loaded vehicle		740 mm
Bogie Wheel Base	Maximum	2400 mm
	Minimum	2200 mm
Distance between bogie centres	Maximum	15,100 mm
	Minimum	14,400 mm
Wheel diameters	New	860 mm
	Fully worn	780 mm
Maximum axle load		17 Tonne (including all tolerances as per IEC 1133-1992)

2. Definitions


- **"Employer"** means Delhi Metro Rail Corporation Limited (DMRC), its legal successors and assignees..
- **"Subcontractor"** means the Supplier who supplies the required stainless steel Battery box to BEML for MRS1 project.
- **"Contractor"** means the persons or person appointed by the Employer to undertake the execution of the works for MRS1 project.
- **"Contract"** means the contract between Subcontractor and BEML in relation to the supply of stainless steel Battery box for MRS1 project.

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- **“Engineer”** means any person nominated or appointed from time to time by the Employer to act as the Engineer for the purposes of the Contract and notified as such in writing to the Contractor.
- **“Engineer’s Representative”** means any Assistant of the Engineer appointed from time to time by the Engineer.
- **“BEML”** means the Contractor to procure the stainless steel Battery box for MRS1 project cars.

3. Qualification criteria

- Subcontractor shall be a reputed stainless steel fabricator with in-house infrastructure facilities and qualified stainless steel welders. Supporting documents shall be submitted along with the technical offer.
- The subcontractor should have manufactured and supplied stainless steel battery box assembly and such supplies should have been in use and have established their satisfactory performance and reliability on at least three Mass Rapid Transit Systems in revenue service over a period of three years or more (in each MRTS) either outside the country of origin in three different countries or in an MRTS in India. Supporting documents for the above shall be submitted along with the technical offer.
- Along with the technical offer, the subcontractor shall submit the filled Vendor approval form along with all the required supporting documents for obtaining the vendor approval for stainless steel Battery box assembly from DMRC. Selection of Vendor is subject to DMRC approval.
- The firm should undertake to provide the support during DLP
- The firm should give an undertaking to supply spares for a minimum period of 10 years from the date of last car supplied by BEML under this contract.
- The firm should have requisite dedicated infrastructure facilities for the fabrication of stainless steel assemblies. The details of the infrastructure facilities shall be submitted.
- The firm should have established international quality and systems certifications like ISO-9001 / ISO -14001/ IRIS. The certificates shall be submitted.
- The firm should possess qualified welders for welding Stainless steel. Welder qualification certification shall be submitted.

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4. Standards

The design, testing and manufacturing of the battery box shall conform to the latest editions of internationally recognized Standards viz., Indian, American, European, Japanese, ISO, etc.

5. Design Criteria

The Battery box shall comply with the following Design Criteria, as a minimum.

5.1. Battery Box


- i. The box for battery shall be such that to avoid any corrosion throughout the service life on any account and the box shall last for the lifetime of the cars. Within the battery box, the battery shall be mounted in roll out trays to allow for easy maintenance.
- ii. The roll out system shall be corrosion resistant, and shall be provided with the necessary stops and locks to limit the travel of the battery box and retain it in both extreme positions. When rolled out, the entire top of the battery shall be exposed. All the battery terminals, including battery positive and negative main connections shall be easily accessible for maintenance work.
- iii. The box interior / the roll out trays shall be lined with a non-flammable, electrolyte proof, insulating material of suitable thickness. The box shall be ventilated to preclude the possibility of built-up of any gas. Vibration proof automatic lock shall be provided to ensure absolutely no relative movement of the batteries inside the tray.
- iv. The battery box shall be sized to have at least 10% extra space to accommodate augmented capacity battery. Extra space shall be suitably packed.
- v. Battery box shall not deshape/sag during lifetime of the car. Adequate strength shall be built in the battery box by providing suitable ribs etc. FEM & fatigue report of the battery shall be submitted to establish the same.

6. Technical Requirements

6.1. General

Battery box is used to mount the battery inside it. Battery set is mounted in a detachable battery tray with a suitable fold-out bar to facilitate easy access for battery maintenance and replacement. The battery tray shall be shaped to support and locate the battery.

Battery box is installed in M-car, this box is suspended from the underframe for easy access during maintenance and inspection. To vent the gas that can be produced from the battery during the charging, vents are provided on the top & side of battery box. Rubber seal is provided in the door of battery box to

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prevent ingress of water inside the battery box.

Battery box size and weight are generally as follows

Length: 2651mm

Width: 955mm

Height: 665mm (Mounting brkt)

Weight: ~260 kg (approx.)

Approximate Battery cell weights are generally as follows

- Weight of Battery cell : 375 Kg / Tray
- Total Weight = 375 kg x 2 Tray = 750Kg.

The battery box shall be made of austenitic stainless steel to grade 304L. Each battery box consists of 2 trays. The battery tray shall be mounted on rectangular tubes of the side and partition section in the battery box, and battery tray shall be so arranged that a fork lift truck can lift the each battery tray out in its box as a unit once the cables and box fixing are released. Stainless steel trays can be easily rolled out on two fold-out bars when access is needed to battery cells. Stoppers at the end of fold-out bars shall prevent the trays from rolling out of the guides. The fold-out bar shall also be used to keep the battery trays in a locked position in the box. By using this fold-out bar, battery tray shall incorporate a secure quick release safety locking mechanism to keep the battery set in position, of which the locking and releasing position is easily identifiable. Activation of fold-out bar (locking mechanism) shall separate the battery tray from the battery box.

Each lid of the battery box shall be provided with top mounted hinges and each lid shall be secured with compression locks when it is in the closed position. The whole front of the box shall be clearly accessible when the lids are removed.


6.2. Qualification of welding procedures

The welding procedures adopted for welding shall be qualified in accordance with EN 288 Pt-3. WPS and PQR shall be established.

Welding Process Qualification (WPS & PQR) as per EN / ISO / DIN shall be submitted

6.3. Welder Qualification

The firm shall have qualified welders for stainless steel fabrication and the welders should have been qualified in accordance with EN 287-1. Welder qualification certificate shall be submitted along with technical offer.

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6.4. Fabrication, Workmanship and Finish

- i. Fabrication of Battery box shall be carried out using proper weld Jigs and fixtures. Suitable clamping arrangement shall be used during welding so as to avoid distortion.
- ii. The detail components shall be free from oil, grease, dirt, etc. before taking up for assembly & welding.
- iii. Qualified welders only shall be employed for fabricating the Battery box assembly.
- iv. Qualified welding process shall be adopted for welding of the Battery box assemblies.
- v. Due care shall be taken to obtain good quality welds without defects and blow holes to avoid leakages.
- vi. Any welding scraps, sharp edges arising due to welding inside Battery box shall be ground smooth to avoid damages to the cables and battery.
- vii. The SS battery box shall be free from defects and tool marks.
- viii. No joints shall be permitted in sheets used for manufacture of battery box and all joints between sheets shall be leak proof.
- ix. All weld joints shall be pickled and passivated.
- x. Foldable arms shall be maintained in level position when opened for smooth functioning of battery pull out tray.
- xi. Flatness between baffles of the trailer assembly should be maintained.
- xii. All SS Battery box shall be made to confirm to the dimensions on drawings supplied along with purchase order.


6.5. Sealing

Rubber sealing Gasket of DIRAK make to part no. 209-0201.00-A4872EN with metal insert shall be provided all round the front face of the battery box without any gap at the joint. The gasket shall meet the requirements of EN45545 HL-3 in respect of fire, smoke and toxicity. Sabatack 750XL sealant (Make M/s. SABA DInxperlo- BV) shall be used inside U strip of the rubber gasket to fix the gasket and at gasket joint.

Chloroprene (CR4) 2mm rubber sheet complying to EN45545 HL-3 shall be provided below the air vent flange to arrest the water ingress and all round Sabatack 750XL sealant shall be applied.

6.6. Locks & Hinges

Stainless Steel adjustable Compression locks & Hinges of M/s. DIRAK or M/s. Southco make only shall be used for battery box.

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6.7. Marking

Each battery box shall be punched with Manufacturer name, Sl. no. and corresponding drawing number. This Sl. no shall co-relate with Dimensional check sheet Sl. no.

7. Quality Assurance Program

7.1. General

The subcontractor shall hold ISO 9001 certification and shall manufacture the product accordingly. The subcontractor shall submit a copy of ISO 9001 certification along with the offer. The subcontractor shall monitor and control the Quality systems as per ISO 9001 guidelines. BEML and/or DMRC's representative may periodically conduct compliance audits of the subcontractor's Quality management system.

7.2. Quality assurance plan

The subcontractor shall develop and submit a Quality assurance plan (QAP) to BEML for review and approval based on ISO 9001 /IRIS guidelines.

8. Scope of Supply


8.1. General

The subcontractor shall supply SS Battery Box assembly in conformance to the PTS, purchase order requirements and the applicable drawings. The subcontractor shall meet the system requirements for Battery Box assembly in accordance with Design Criteria as at clause 5, as a minimum. Any modifications suggested by battery supplier shall be implemented.

8.2. Submission of Documents

The Subcontractor shall submit the following documents conforming to the Technical Specification as per the timelines specified by BEML.

- i. Type test procedure document covering all the tests as per PTS.
- ii. FAI Procedure document.
- iii. Type test & FAI reports.
- iv. Material test certificates
- v. Dimensional check sheets
- vi. Water tightness test reports
- vii. Weighment document with actual weights of the Battery box

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8.3. Packing

The subcontractor shall provide proper packing to avoid transit damages during shipment of the Battery box.

9. Inspection & Testing

9.1. General

The Subcontractor shall carry out inspection as per the drawing requirements and this PTS. BEML/DMRC have the right to witness any of these tests at any stage of test progress.

ITEMS	TYPE TEST	ROUTINE TEST
Visual Inspection	•	• (100% supplies)
Dimensional Inspection	•	• (100% supplies)
Water tightness test	•	• (100% supplies)
Anodizing coating thickness test	•	
Load test	•	
Weight	•	
Material test	•	• With every batch of supply

9.2. Type test


i) Load test

A uniformly distributed load of 375 Kg shall be put in each of the 2 trays and smooth operation of the tray shall be checked. The trays shall also withstand this load and the maximum deflection at the end of foldable guide assembly when measured, shall be less than 3mm with trays in loaded condition and pulled outside.

9.3. Routine test

i) Visual inspection

Every SS battery box, irrespective of lot size shall be examined visually for surface defects and irregularities. The SS battery box shall be free from weld lumps, weld spatters, cracks, tool marks and any other defect that would impair the utility of the battery box.

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ii) Dimensional inspection

Dimensional inspection of the battery box shall be carried out and all parameter including that specified in drawing shall be recorded and the dimensional check sheet shall be submitted along with the supplies.

iii) Water Ingress Test of Battery Box

Each Battery box shall be tested for water ingress as per IPX5 of IEC 60529. There shall be no water ingress inside the battery box. The rubber packing shall be sealed properly to ensure that there shall be no water ingress inside the battery box.

9.4. First Article Inspection (FAI)

The subcontractor shall offer the stainless steel Battery box for First Article Inspection by BEML/ DMRC in accordance with the BEML/DMRC approved FAI plan prior to serial production in order to confirm that the item produced fully complies with the technical specifications, System design and manufacturing process.

The Subcontractor shall ensure that the produced stainless steel Battery box is compliant to all requirements prior to inviting for testing and FAI. The pre-test result prior to official testing/FAI shall be submitted with the invitation letter to request BEML/ DMRC witness.

At the FAI, the subcontractor shall make available all pertinent design and manufacturing process documentation, test records, material certifications, etc.


During FAI ,if any inspections or tests indicate that specific hardware or documentation does not meet the specified requirements, the appropriate items shall be repaired, replaced, upgraded, or added by the Subcontractor at their own cost, as necessary to correct the noted deficiencies. After correction of deficiency, all tests necessary to verify the effectiveness of the corrective action shall be repeated.

If FAI has to be repeated due to non-compliances/ deficiencies noticed, the cost towards the same and the cost towards BEML/DMRC visit to subcontractor's place for witness of re-FAI shall be to subcontractor's responsibility.

Upon acceptance of the FAI by BEML/DMRC, the subcontractor can proceed to manufacture all pertinent hardware. The hardware must meet or exceed the quality standards set at the FAI, and must incorporate any comments made by BEML/DMRC at the FAI.

Subcontractor shall note that BEML/DMRC FAI clearance will not relieve the subcontractor's responsibility towards design, development, testing, manufacture and supply during the revenue service.

At any point of time, during the execution of the contract, if BEML/DMRC has

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any concerns about the quality of the product supplied, BEML/DMRC reserves the right to randomly draw samples from any of the supply lots and the sub-contractor shall carryout the type tests at accredited outside labs and shall submit the reports.

10. Appendix

- Vendor Approval form.
- Technical offer Submittals Check List

11. Attachment

- Applicable drawing as per the below list

SL. NO.	DRAWING NO.	REV NO.	DESCRIPTION
1	525-50001	01	BATTERY BOX ASSEMBLY

12. Submittals with Technical offer

The subcontractor shall provide as a minimum, the following along with the technical offer for technical evaluation:

- Complete Technical Offer for Battery box assembly.
- Details of infrastructure facilities available for the production of Battery box.
- Details of weld jigs & Fixtures required for the production of Battery box.
- Quality Assurance Plan (QAP).
- Welder qualification certificates for stainless steel welding.
- Welding process qualification (WPS & PQR) records.
- Supporting documents for Qualification Criteria compliance (Clause 3).
- Clause-wise comments against the PTS Doc No. GR/TD/4946.
- Duly filled vendor approval form along with supporting documents including QAP & ITP for MRS1 project, company profile with infrastructure facilities, product range etc., and satisfactory revenue service performance certificate from end user/Metro corporations for the Battery Box.

Date:

Proforma No: MRS1/BEML/V.NNO/CAT-___/___/M/___

<u>CHECKSHEET FOR</u> <u>SUBMISSION OF DOCUMENTS FOR</u> <u>NOTICE OF NO OBJECTION FOR SUB-CONTRACTOR/VENDOR FROM DMRC</u>			
ITEMS:			
Category	A	Items manufactured outside India and proposed to be used in all MRS1 trains.	<input type="checkbox"/>
	B	Items manufactured outside India and proposed to be used in all MRS1 trains but likely to be localised after some part quantity from OEM (shall be declared by BEML).	<input type="checkbox"/> Equivalent Localisation Quantity : __ Trainsets
	C	Locally manufactured items proposed to be used in all MRS1 trains.	<input type="checkbox"/>
1	Proforma for Submission of documents		<input type="checkbox"/> YES <input type="checkbox"/> NO
2	Vendor Details	Annexure-I	<input type="checkbox"/> YES <input type="checkbox"/> NO
3	Sub-Vendor Detail	Annexure-I	<input type="checkbox"/> YES <input type="checkbox"/> NO
4	Certificate from BEML	Annexure-II	<input type="checkbox"/> YES <input type="checkbox"/> NO
5	Copy of technical purchase specification of BEML		<input type="checkbox"/> YES <input type="checkbox"/> NO
6	Inspection and Test Plan		<input type="checkbox"/> YES <input type="checkbox"/> NO
Note:	1	Incomplete documents will not be reviewed by DMRC.	
	2	Items used in DMRC's existing rolling stock do not automatically qualify for use unless specifically approved by DMRC for this project.	
<div style="display: flex; justify-content: space-between;"> (BEML Limited) _____ (Proposed Vendor) </div>			

Date: _____

Proforma No: MRS1/BEML/V.NNO/CAT-___/_____/P1/_____

PROFORMA FOR SUBMISSION OF DOCUMENTS FOR NOTICE OF NO OBJECTION FOR SUB-CONTRACTOR/VENDOR FROM DMRC					
1	Item description				
2	Vendor particulars along with proposed manufacturing unit submitted in Annexure-I	<input type="checkbox"/> YES		<input type="checkbox"/> NO	
3	Technical Specification & Inspection Plan	—			
3.1	Enclosed copy of Technical Purchase Specification of BEML	<input type="checkbox"/> YES		<input type="checkbox"/> NO	
4	Details of experience/ satisfactory performance to establish compliance with ERTS 3.2.2.				
The Information shall be submitted in following format:					
S.No.	Mass Rapid Transit System where proposed sub-system/equipment/component has been used	Country	Quantity Used	Period in satisfactory Revenue Service [from/to] (Min 3 yrs in each MRTS)	Manufacturing Unit
	1	2	3	4	5
1	1				
	2				
	3				
2	1				
	2				
	3				
3	1				
	2				
	3				
4	1				
	2				
	3				
4.1	Based on above, is the proposed item compliant with ERTS 3.2.2				<input type="checkbox"/> YES <input type="checkbox"/> NO
4.2	Is the proposed manufacturing unit compliant with ERTS 3.2.2				<input type="checkbox"/> YES <input type="checkbox"/> NO
4.3	Confirmation that the subsystems used in MRS1, as proposed herein, shall have NO CHANGE in source, manufacturing unit, components, specification, material etc. from those approved unless got specifically approved from DMRC.				<input type="checkbox"/> CONFIRMED <input type="checkbox"/> NOT CONFIRMED
4.4	Information submitted herein as above is certified as correct, strictly in accordance with the MRS1 contract conditions and has been verified by BEML. In case any information is found to be factually incorrect or at variance with contract conditions at any stage, BEML commits to replace the concerned 'sub-system' in complete fleet as per the instructions of engineer, which shall be final and binding. In such case, BEML shall not be eligible either for seeking any claim whatsoever or for seeking extension of contract delivery period.				<input type="checkbox"/> CONFIRMED <input type="checkbox"/> NOT CONFIRMED
4.5	Confirmation that DMRC may depute a team of Engineers (around six) at Sub-contractor/vendor's office for requisite duration with a view to expedite finalization of designs in accordance with contract 'MRS1' conditions ERGS 5.11.3.				<input type="checkbox"/> CONFIRMED <input type="checkbox"/> NOT CONFIRMED
5	Notwithstanding the vendor approval communicated by DMRC on the proposal of BEML, responsibility for manufacture, testing, supply, commissioning and quality control shall continue to rest solely with BEML and BEML will be solely responsible for meeting all contractual requirements.				<input type="checkbox"/> CONFIRMED <input type="checkbox"/> NOT CONFIRMED
<div style="display: flex; justify-content: space-between;"> (BEML Limited) _____ (Proposed Vendor) </div>					

Date: _____

Proforma No: MRS1/BEML/V.NNO/CAT- ____ / ____ /P2/ _____

6	Category B - Sourcing from facilities in India after supply of agreed quantity from approved manufacturing unit.	
6.1	In case OEM wants to use manufacturing facilities in India (other than his own) for items for which the OEM has been approved, it shall enter into an agreement with such selected Indian equipment manufacturer and obtain prior approval from DMRC. No change in composition, rating, type, model no., manufacturing process, quality standards, design, etc. and make of the components used in assemblies/sub-assemblies of such equipment as manufactured by the approved parent vendor shall be made without specific prior approval of the Engineer.	
6.2	In case the vendor uses his own facilities for indigenization after part supply of equipment from the approved manufacturing unit, no change in design, component type/make, quality standards, manufacture procedure, sourcing of materials etc. shall be made without specific prior approval of the Engineer.	
6.3	In case OEM wishes to change/make/type specifications, etc. of any sub-components for supplies to be sourced from Indian facility, specific prior approval of the Engineer shall be obtained for changes made, model, specification, etc. Responsibility for obtaining such prior approval shall rest solely with the contractor.	
6.4	In case of local manufacturing of carbody or any other item(s) manufactured by BEML/OEM and used in initial trains, BEML shall be exclusively responsible for all quality assurance and inspection and their implementation and also ensure provision of physical partition as per the ERGS 1.1.7	
7	Category C- Locally Manufactured Items	
7.1	Does the manufacturing unit satisfy ERTS 3.2.2	<input type="checkbox"/> YES <input type="checkbox"/> NO
7.2	If not, basis/justification for proposal to be submitted for DMRC review	<input type="checkbox"/> YES <input type="checkbox"/> NO
8	BEML confirms that in terms of ERTS 3.2.2, they would seek Notice of No Objection for Sub-Contractor/Vendor from DMRC notwithstanding the item(s) being used in DMRC's existing rolling stock.	<input type="checkbox"/> YES <input type="checkbox"/> NO
9	BEML shall submit Certificate as per enclosed Annexure-II confirming:	
9.1	Compliance with Clause 6.6 of ERGS and GCC Clause 5.8 regarding supply of software tools/documents/materials etc.	
9.2	Compliance with Clause 8.12 of ERGS regarding supply of all drawings, specifications, patterns etc. in case the manufacture of these items is discontinued by the proposed vendor.	
10	Commitment from the vendor that in case of any future procurement action by DMRC, he shall quote directly to DMRC.	
11	Commitment from the Vendor to provide technical support through permanent positioning of Vendor's staff at depots for meeting DLP obligations as per ERTS clause 3.2.5.	
12	BEML commits that the vendor shall be complying with all relevant contract clauses.	
<div style="display: flex; justify-content: space-between; align-items: flex-end; padding-top: 20px;"> <div>(BEML Limited)</div> <div>_____ (Proposed Vendor)</div> </div>		

Date:

Proforma No: MRS1/BEML/V.NNO/CAT- ___/___/___/A1/___

Annexure-I	
SUB-Contractor/VENDOR/SUB-SUPPLIER DETAILS	
1	Vendor/Sub-supplier OEM Name
2	Details of item proposed to be sourced
3	Sourcing by: <div style="display: inline-block; vertical-align: top; margin-left: 10px;"> (a) BEML <input type="checkbox"/> (b) Proposed Main vendor <input type="checkbox"/> </div>
4	Marketing Office/Head Office
4.1	Complete address (including website)
4.2	Contact person details in Head Office
	<ul style="list-style-type: none"> • Name • Designation • Telephone • Fax • Mobile • Email
5	Details of proposed compliant plant/manufacturing unit from where item is proposed to be sourced
5.1	Complete address (including website)
5.2	Contact person details
	<ul style="list-style-type: none"> • Name • Designation • Telephone • Fax • Mobile • Email
5.3	Supply details of the manufacturing unit for the proposed item or item with similar design.
5.4	It is confirmed that the proposed manufacturing unit and the vendor are fully compliant with ERTS 3.2.2
5.5	We commit that in case of any future procurement action by DMRC, the proposed vendor shall quote directly to DMRC without any involvement of BEML.
5.6	We confirm that we will provide technical support through permanent positioning of our staff at depots for meeting DLP obligations as per ERTS clause 3.2.5.
5.7	We have carefully gone through all relevant clauses of the MRS1 Contract and shall fully abide by the contract conditions and decisions communicated by DMRC during contract execution without exception.
<div style="display: flex; justify-content: space-between;"> (BEML Limited) _____ (Proposed Vendor) </div>	

Date:

Proforma No: MRS1/BEML/V.NNO/CAT- __ / __ /A2/ __

Annexure-II	
<u>Certificate for compliance with Contract conditions regarding Software requirements.</u>	
<p>This is certified that in the contract between BEML and _____ (proposed vendor) for supply of _____, specific conditions for confirming total compliance with the following contract condition/clauses have been included and agreed to between BEML and _____(proposed vendor):</p>	
(a)	<p>Clause 6.6 of ERGS and GCC 5.8</p> <p>It is certified that we shall provide full access of application software(s) and any other software /hardware tools to DMRC which they may specifically require for the intended purpose specified in this specification. For all commercial software BEML shall provide all available documentation for the application and maintenance of that software.</p> <p>Complete documentation along with the software to be supplied by BEML and its Vendor(s) shall comprise of Signal flow diagram, flow charts, functional blocks, details of signals, interpretations so as to enable engineer to debug and implement vehicle/train level modifications based on DMRC's experience, operational & maintenance requirements. Full access to the application software to DMRC shall be provided for this purpose.</p> <p>It shall be possible for DMRC to modify/change various parameters/logics used in the software and implement the changes on trains. Full facilities including any software/hardware tools, simulation/test bench which are essential for this purpose shall be supplied.</p> <p>It is committed to supply the software/hardware etc. within the scope specified in respective clauses of ERTS relevant for the proposed item/vendor and we would be fully complying with GCC 5.8</p>
(b)	<p>Clause 8.12 of ERGS:</p> <p>It is certified that _____ (proposed vendor) will supply all drawings, specifications, patterns and any other information required by DMRC for arranging such items in case the manufacture of these items is discontinued within 10 years by the proposed vender.</p>
<div style="display: flex; justify-content: space-between;"> (BEML Limited) _____ (Proposed Vendor) </div>	

Undertaking for Technical/Service Support

Appendix -1
Page 6 of 6

To Delhi Metro Rail Corporation Ltd.


We _____ (proposed Vendor) shall provide Technical/Service support during Commissioning and post Commissioning period, till completion of the Defect Liability Period, for Mumbai Metro Line 2 & 7, 'MRS1' Project from their local office in India.

BEML Limited

(sign, Name & designation with stamp)

Proposed Vendor

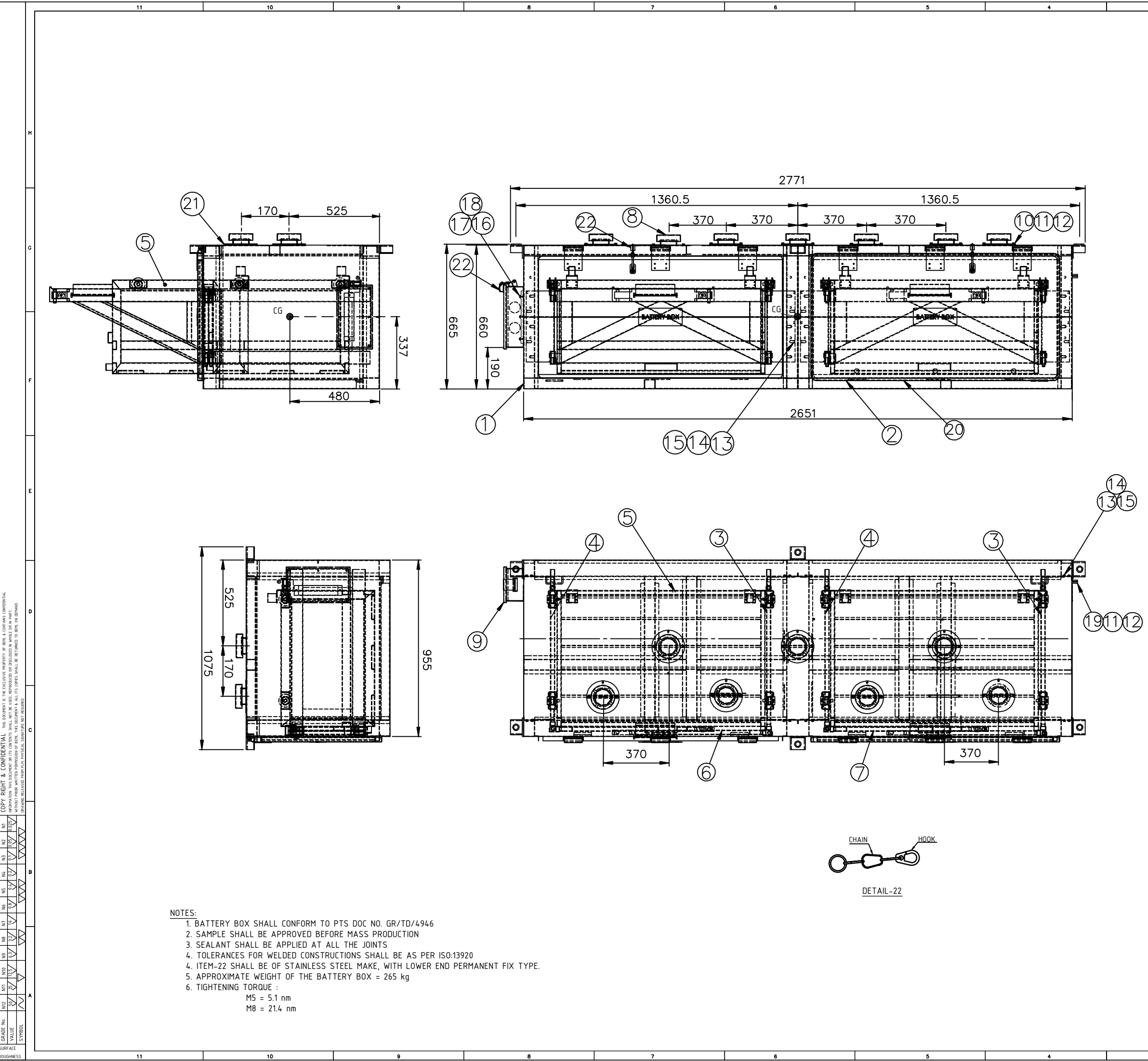
(sign, Name & designation with stamp)

	TECHNICAL OFFER SUBMITTALS CHECK SHEET	Project MRS1
Aggregate	Battery Box	PTS DOC No.: GR/TD/4946
BEML Enquiry/ RFQ Reference :		

Sl. No.	DETAILS	SUBMITTED	NOT SUBMITTED
1	Complete Technical Offer for Battery box assembly	<input type="checkbox"/>	<input type="checkbox"/>
2	Details of infrastructure facilities available for the production of Battery box	<input type="checkbox"/>	<input type="checkbox"/>
3	Details of weld jigs and Fixtures required for the production of Battery box.	<input type="checkbox"/>	<input type="checkbox"/>
4	Quality Assurance Plan	<input type="checkbox"/>	<input type="checkbox"/>
5	Welder qualification certificates for stainless steel welding	<input type="checkbox"/>	<input type="checkbox"/>
6	Welding Process Qualification (WPS & PQR) records	<input type="checkbox"/>	<input type="checkbox"/>
7	Supporting documents for Qualification Criteria compliance (Clause 3).	<input type="checkbox"/>	<input type="checkbox"/>
8	Clause wise comments against PTS Document No. GR/TD/4946	<input type="checkbox"/>	<input type="checkbox"/>
9	Duly filled vendor approval form along with supporting documents including QAP & ITP for MRS1 project, company profile with infrastructure facilities, product range etc., and satisfactory revenue service performance certificate from end user/Metro corporations for the Battery Box	<input type="checkbox"/>	<input type="checkbox"/>

Note : Incomplete submissions are liable for Rejection.

Signature of the Bidder with Seal



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GRADE No.
VALUE
SYMBOL
SURFACE
ROUGHNESS

- NOTES:
- BATTERY BOX SHALL CONFORM TO PTS DOC NO. GR/TD/4946
 - SAMPLE SHALL BE APPROVED BEFORE MASS PRODUCTION
 - SEALANT SHALL BE APPLIED AT ALL THE JOINTS
 - TOLERANCES FOR WELDED CONSTRUCTIONS SHALL BE AS PER ISO:13920
 - ITEM-22 SHALL BE OF STAINLESS STEEL MAKE, WITH LOWER END PERMANENT FIX TYPE.
 - APPROXIMATE WEIGHT OF THE BATTERY BOX = 265 kg
 - TIGHTENING TORQUE :
M5 = 5.1 nm
M8 = 21.4 nm

3		2					1					
MACHINING DEVIATIONS FOR LINEAR DIMENSIONS		RANGE		0 - 6	6 - 30	30 - 120	120 - 315	315-1000	1000-2000	2000-4000	ABOVE 4000	RA
TOLERANCE		TOLERANCE		±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	~
FOR DIMENSIONAL TOLERANCES OF SHEET METAL PARTS AND WELDED STRUCTURES, REFER STD. RD-227												
UNSPECIFIED TOLERANCE FOR LINEAR AND ANGULAR DIMENSIONS REF. IS 2102 (PT-1) (MEDIUM)									QUALITY OF WELD JOINTS REF. RD 230 MEDIUM			
VALUES OF SURFACE TEXTURE SHALL BE AS PER COMPANY STD DS-1012.C									STATUS:		PRODUCTION	
WELDING SHALL BE CARRIED OUT AS PER IS: 9595-96												