



**BEML LIMITED**  
**BANGALORE**  
**R & D CENTER**

Doc No.	GR/TD/1563
Date	23.03.2020
Rev. No	3
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**Procurement Technical Specification of  
Aluminium Valve Box & Cover Assemblies  
for Metro cars**

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### REVISION HISTORY:

Rev. No.	Clause No.	Page No.	Changes	Revision Date
Nil			First issue	16.09.2015
1			Revised and updated	19.09.2015
2	7	10	Fire safety requirement added	05.02.2020
3	3	5	Qualifying criteria added	23.03.2020

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## 1. Introduction

### 1.1. General

This document specifies the requirements for Aluminium Valve box & cover assemblies to be supplied for Metro Project.

The Supplier shall be responsible for all works required in this PTS with regard to Valve boxes and shall be responsible for supporting BEML activities as contractor for Metro car Projects.

### 1.2. Climatic Conditions

The Metro Cars has to operate reliably and safely under climatic conditions shown in Table below.

Description	Limiting Values
Maximum ambient temperature	47°C (Refer note below)
Minimum temperature	3°C
Humidity	100% saturation during rainy season
Rainfall	Rain occurs generally from June to September. Average annual rainfall is approximately 650mm. maximum rainfall in any 24h period is 50mm.
Atmosphere during hot season	Extremely dusty
Maximum wind load	160 kg/m <sup>2</sup>
Vibration & Shocks	The equipment, sub-systems & their mounting arrangements shall be designed to withstand satisfactorily the vibration and shocks encountered in service as specified in IEC61 373 and 1EC 60571
S02 level in atmosphere	80 - 120 mg/ m <sup>3</sup>
Suspended particulate matter in atmosphere	360 - 540 mg/m <sup>3</sup>

**Note:** 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.

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## 2. Definitions and Abbreviations

The following definitions and abbreviations are applicable to the PTS.

- “Customer” means, the Order placing authority of the Mass Rapid Transport System (MRTS)
- “Customer's Representative” means, persons appointed by "MRTS Order placing authority" to act as an Engineer for the MRTS.
- “BEML” means the Contractor for procuring the Valve boxes for Metro Project.
- “Supplier” means the Supplier for supplying Valve boxes to BEML.
- “PTS” means BEML's Procurement Technical Specification.

## 3. Qualifying Criteria

The Subcontractor shall have Designed, Manufactured and Supplied the Valve Box & Cover assemblies and established their performance on suburban EMUs or metro cars in revenue service for a period of over 2 years. Subcontractor shall provide supporting documents (PO/performance certificate) along with offer.

Subcontractor shall provide the details of national/international standards used for manufacturing and testing of valve box and cover assemblies along with offer.

Subcontractor selection is subjected to the Employer approval.

## 4. General Requirements

The Supplier shall supply Valve box & cover assemblies in fully welded and painted condition in conformance to this PTS, purchase order requirements and the applicable drawings.

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#### **4.1. Defining of unclear aspects**

If any term or clause is not described in the specification or thought to be unclear, supplier shall discuss those with Design Team in BEML prior to making a contract to confirm their definitions.

After making a contract, Supplier shall follow the definition and opinions of Design Team in BEML.

#### **4.2. Responsibility of Supplier**

Supplier shall hold the responsibility for manufacturing and supplying of Valve box & cover assemblies in fully welded and painted condition in conformance to the PTS, purchase order requirements and BEML drawings.

### **5. Standards**

The standards applicable for the Valve box & cover assemblies shall conform to the standards as per the BEML drawings and PTS.

### **6. Scope of Supply**

#### **6.1. General**

The supplier shall supply Valve box & cover assemblies in conformance to the PTS, purchase order requirements and BEML drawings. The detail Scope of work & supply of all the Valve Box and Cover assemblies are as follows.

1. Procuring the aluminium sheets to the required specifications as per drawing from reputed aluminium sheet producers like M/s.Hindalco, M/s.Jindal or other equivalent reputed sources.
2. Linear & angular cutting, forming and machining as per the part drawing
3. Welding the Valve Box & Cover parts by employing certified / qualified welders, adopting TIG welding process using dedicated jigs as per assembly drawings and welding procedure standard.
4. Painting the Box and Cover assemblies to required thickness.

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5. Riveting of Hinge & Name plate in cover Assemblies.
6. Fixing of EPDM Sponge Rubber in Cover Assemblies.
7. Fixing of Locks and Brass Filters. (**Note:** Open/Close indicating groove / notch in the locks should be filled with red colour paint).
8. Sticking of OPEN/CLOSE indicating stickers in cover assemblies.
9. Final inspection, Packing and dispatch

## 6.2. Submission of Documents

The Supplier shall submit the following documents as a minimum

- ✓ Details of the existing infrastructure facilities with the supplier for aluminium fabrication.
- ✓ Details of weld jigs and Fixtures required for each Valve box & cover sub-assembly as per BEML drawings.
- ✓ Welder qualification certificates.
- ✓ Welding Process Qualification and Procedure Qualification Record (WPS & PQR).
- ✓ Quality Assurance Plan

The Supplier shall submit the following documents conforming to the Technical Specification along with every batch of supplies.

- ✓ Dimensional check sheets
- ✓ Material Test certificates
- ✓ Painting test certificates

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### **6.3. Marking & Packing**

Each part and sub-assembly shall be marked with the details of drawing numbers with a permanent marker. Each sub-assembly shall be wrapped separately with plastic cover so as to avoid scratch marks on the painted surface.

The Valve box & cover assemblies shall be properly packed and due care shall be taken to ensure that no damage occurs during transit.

### **6.4. Quality Assurance Program**

#### **6.4.1. General**

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

#### **6.4.2. Quality Assurance Plan**

The supplier shall develop and submit a Quality Assurance Plan (QAP) to BEML for review and approval based on ISO 9001 guidelines.

## **7. Technical Requirements**

### **7.1. General**

The Valve box & cover assemblies shall be fabricated from aluminium alloy sheets to grade A5052 of ASTM B209M. Dimensions and tolerances shall be maintained as per relevant drawings.

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## **7.2. Qualification of Welding Procedures.**

The welding procedures adopted for welding shall be qualified in accordance with EN 288 Pt-4. Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) shall be established.

## **7.3. Welder Qualification.**

The welders shall be qualified in accordance with EN 287-2

## **7.4. Manufacture of Valve box & cover assemblies.**

### **7.4.1. Fabrication**

- Fabrication of Valve box & cover shall be carried out using dedicated weld Jigs and fixtures.
- Suitable clamping arrangements shall be used during welding to avoid distortion.
- Ensure the components are free from grease/oil before carrying out the welding operation.
- TIG welding process shall be employed for welding the Valve box & cover assemblies.
- Welding Filler rod to grade ER 5356 of AWS A5.10 shall be used for welding the Valve box & cover assemblies.
- Qualified welders shall be employed for fabricating the Valve box & cover assemblies.
- Qualified TIG welding process shall be adopted for welding of the Valve box & cover assemblies.
- Due care shall be taken to obtain good quality welds without defects.
- Any welding scraps, sharp edges arising due to welding inside Valve box & cover shall be ground smooth before painting.
- Any minor modifications in the design leading to rework such as addition or deletion of brackets, holes and positional changes, the vendor shall be flexible to carry out the same.

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#### **7.4.2. Packing Rubber**

EPDM Sponge Rubber shall be used for packing in the cover assembly. The rubber shall be of high quality, excellent in sealing dust, water and winds to fulfill IP65 requirements, thermal insulation, shock absorber and good aesthetic appearance. Rubber material shall be of high strength, Ozone & UV resistant and non cracking. The rubber shall withstand the temperature range of -40° C to +120° C.

#### **7.4.3. Painting**

All valve box and cover assemblies after fabrication shall be painted. The assembly shall be cleaned and shall be free from oil and grease. The item shall be abraded with scotch brite to get a uniformly etched surface. The abraded surface shall be primer painted with Epoxy primer to grade EP 1119 of M/s KCC Paint to a DFT of 40 micron and subsequently finish painted with Polyurethane Paint to grade UT 5119 of M/s KCC paint to a DFT of 40 microns. Total DFT shall be 80-120 micron. Colour of primer- Grey, Colour of Finish Paint – NCS 8500N Grey. Thinner for EP1119 is 024 and for UT 5119 is 037U. the coating shall have uniform finish and colour and good aesthetics.

#### **8. Fire**

The fire safety requirements shall meet EN45545 standard. The vendor shall submit all the reports and certificates.

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## **9. Testing**

### **9.1. General**

The supplier shall perform all tests in accordance with the Standards specified in the drawing. Box and cover assembly of different designs shall be type tested against dust & water jets and should pass the IP65 test as per the standard EN60 529 / IEC 529. The vendor shall submit all the test reports and certificates. BEML and/or Customer representative have the right to witness any of these tests at any stage of test progress.

### **9.2. Inspection of Sheets for Box, Cover & Brackets.**

#### **a. Visual inspection**

Every sheet irrespective of lot size shall be examined visually for surface defects and irregularities. The sheets shall be free from defects that would impair the utility of the items.

#### **b. Chemical Composition & Mechanical properties**

The chemical composition and mechanical properties of the sheets shall conform to grade A5052 of ASTM B209M. The supplier shall submit test reports for every batch of supplies.

#### **c. Dimensional inspection**

The dimensions of the sheets shall conform to I.S.2676-81.

### **9.3. Inspection of fabricated Valve box & cover assemblies.**

All the dimensions as per drawing requirements shall be checked and recorded for each Valve box & cover assembly and the dimensional check sheets shall be submitted. All weld areas shall be visually inspected and shall be free from defects.

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#### **9.4. Inspection of Painting.**

After painting, the painting thickness on Valve box & cover assemblies shall be checked and test reports shall be submitted. The painting quality shall be good and painted surface shall be free from any defects.

#### **10. First Article Inspection (FAI)**

All Valve box and cover assemblies shall be offered for First Article Inspection (FAI) at the place of manufacture to BEML and/or Customer/his representative. Bulk production shall be taken up, only after obtaining clearance from BEML.