

रेल कोच फैक्ट्री, कपूरथला

पत्र संख्या- MD35131

जारी करने की तिथि - 26/12/2023

विषय: विशिष्टता प्रकाशन संख्या RCF-MD-PS-2023-4 Rev 00.

आपको सूचित किया जाता है विनिर्देश दस्तावेज़ आधिकारिक तौर पर जारी कर दिया गया है।
कृपया जानकारी और अन्य आवश्यक कार्रवाई के लिए निम्नलिखित विशिष्टताओं की संलग्न प्रति प्राप्त करें

S. No	Description	Specification No.
1.	PURCHASE SPECIFICATION FOR PISTONLESS ELECTRO-PNEUMATIC PRESSURIZED FLUSHING SYSTEM	RCF-MD-PS-2023-4 Rev 00

Dy.Cme/D-II

CQM-I,II CPLE CWE/Fur CMM/ HSQ CMM/TKJ CWE/Shell

Dy.CMM/LHB/HSQ Dy.CMM/G CMT Dy. CPLE-I,II Dy.CMM/Fur

SSE/Filing Section

SSE/Library, Mech. Design

SSE Record (Original copy)

SSE/Dev.

Copy for kind information to:

CDE

Dy.CME/DP & S&B

भारत सरकार
रेल मंत्रालय
रेल डिब्बा कारखाना
कपूरथला
पंजाब 144602
स्थापित: 1986

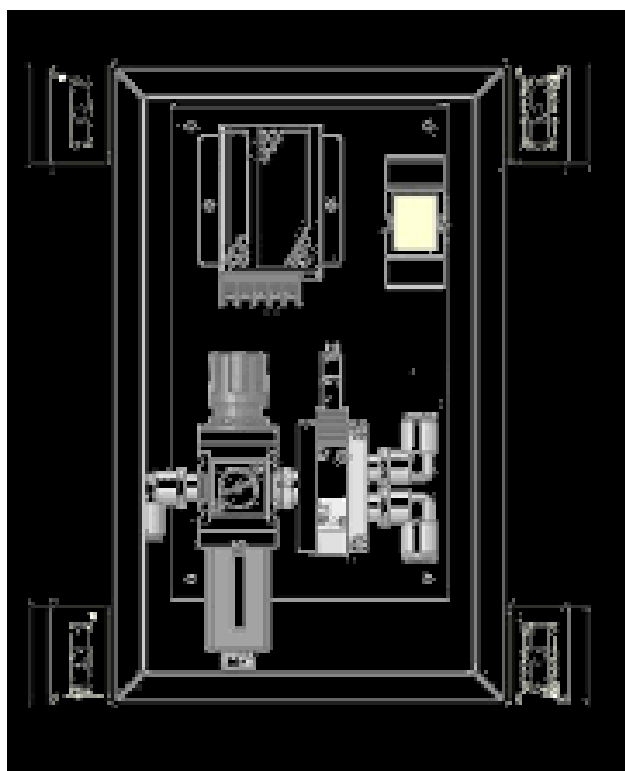


RCF
KAPURTHALA

Government of India
Ministry of Railways
Rail Coach Factory
Kapurthala
Punjab 144602
ESTT: 1986

पिस्टन रहित इलेक्ट्रो-न्यूमेटिक दबावयुक्त फ्लशिंग प्रणाली के
लिए खरीद विशिष्टता

**PURCHASE SPECIFICATION FOR PISTONLESS
ELECTRO-PNEUMATIC PRESSURIZED FLUSHING
SYSTEM**



Specification Number	RCF-MD-PS-2023-4		
Revision Number	0	Date of Issue	26/12/2023

Brief Description

This document contains the specifications required for purchase of Pistonless Electro-Pneumatic Pressurized Flush System (PEPPFS) suitable for use on LHB design coaches manufactured by RCF KXH.

FOREWORD

The modern railway vehicles manufactured at the Rail Coach Factory Kapurthala are designed for high safety and reliability and enable economical operations. Comfort of passengers is a key part of the design.

This purchase specification has been prepared to enable purchase of Pressurized Flushing System with high reliability and low maintenance suitable to be mounted into the available spaces provisioned in the design of the coach.

DISCLAIMER

This specification is based on the studies, trials & experience by RCF/KXH. Although every care is taken in specifying details adequately and unambiguously, RCF/KXH shall not be liable for any kind of damages / losses incurred by any and all due to errors or omissions in this document. When using the information described herein, the user is ultimately responsible for their own actions, as well as the actions of subordinates and assistants, and the consequences arising therefrom.

This document may mention numerous commercial and proprietary trade names, registered trademarks and the like (not necessarily marked as such), patents, production and manufacturing procedures, registered designs, and designations. RCF wishes to state clearly that the present legal situation in respect of these names or designations or trademarks must be carefully examined before making any commercial use of the same.

Names of industrially produced apparatus and equipment may be included to a necessarily restricted extent only and any exclusion of products not mentioned in this document does not imply that any such exclusion has been based on quality criteria or any other qualifying consideration.

COPYRIGHT


RCF/KXH has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission of RCF. Enquires relating to the copyright should be addressed to Public Relations Officer, RCF/KXH.

ADDRESS FOR COMMUNICATION

Public Relations Officer
Government of India - Ministry of Railways,
Rail Coach Factory
Kapurthala
Punjab
India
Pin: 144602
Website: www.rcf.indianrailways.gov.in

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

DOCUMENT CONTROL

Name	Designation	Signature	Reason
Arvind Kumar	SSE/Design	 Digitally signed by ARVIND KUMAR Date: 2023.12.26 17:25:30 +05'30'	PREPARED
T P Singh	SSE/Fur-II	 Digitally signed by TIJENDER PAL SINGH Date: 2023.12.26 17:34:52 +05'30'	PREPARED
Jugal Kishore	DyCME/Design-2	 Digitally signed by JUGAL KISHOR Date: 2023.12.26 17:35:20 +05'30'	REVIEWED
Akhilesh Misra	Chief Design Engineer	 AKHILESH MISRA 2023.12.27 11:12:11 +05'30'	APPROVED

LIST OF AMENDMENTS

S. No.	Amendment Date	Revision	Details
1.	26/12/2023	0	First issue for trials on new manufacture coaches at RCF ICF MCF

CONTENTS

0	Introduction	4
1	Objectives and Scope of the specification	4
2	List of standards & specifications referred	4
3	Abbreviations / Terminology	4
4	Pre-requisites for eligibility for bulk (regular) and development orders	5
4.1	Eligibility for Bulk / Regular Purchase	5
4.2	Eligibility for Developmental Purchase	6
5	Scope of Supply Set	7
5.1	Details of items on the scope of supply	7
6	Functional & Technical requirements for items in scope of supply	11
6.1	Form, Fit & Finish	11
6.2	Function	11
6.3	Interface	13
6.4	Environmental conditions and type approval	13
6.5	Quality, safety, and endurance requirements	13
7	Testing requirements	14
7.1	Type Testing Requirements	14
7.2	Routine Testing Requirements	14
7.3	Acceptance Tests	14
8	Quality Assurance, Tests & Documents	14
8.1	Makers test certificate for outsourced item	15
9	Marking, Labeling & Packaging	15
9.1	Marking / Labeling	15
9.2	Packaging	15
10	Prototype Approval	16
10.1	Validity of prototype approval	16
11	Conduct of Acceptance tests	16
11.1	Inspection Plan	16
12	Spare Parts	17
13	Lifecycle and Maintenance	17
13.1	Expected B10 life	17
13.2	Maintenance Interventions	17
14	Guarantee/Warranty	18
15	Information to be provided by purchaser	18
16	Information to be provided by bidder / supplier	18
16.1	Information to be provided at the time of the bid	18
16.2	Information to be supplied with the material consignment	19

LIST OF FIGURES

Figure 1: End user HMI	10
Figure 2: State-Transition Diagram of the PEPPFS	12

LIST OF TABLES

Table 1: List of referred standards	4
Table 2: Abbreviations & Terminology	5
Table 3: Order value for limits for development order	7
Table 4: Summary of Scope of supply set	7
Table 5: Quality Assurance Tests & Documents	15
Table 6: Format for Providing Details of Spares	17
Table 7: Maintenance intervention plan	18
Table 7: Information to be provided by the purchaser	18
Table 8: Information to be provided with the bid	19
Table 9: Information to be provided with material consignment	19

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

LIST OF Annexures

1.	PROFORMA FOR AUTHORITY FROM MANUFACTURERS
2.	MI005426 Space Envelope Attachment Wall
3.	MI007916 Backplate for PEPPFS

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

0 Introduction

Indian Railways has continuously evolved the flushing system on passenger coaches with a view to improve the passenger experience, reduce water requirements, reduce maintenance requirements and minimize the effective cost of deployment.

This specification has been developed based on the feedback of users and maintainers on the subject of Electro-Pneumatic Pressurized Flushing System currently extensively deployed on passenger coaches of Indian Railways.

1 Objectives and Scope of the specification

This document has been prepared with the objective of forming a standard specification for purchase of Pistonless Electro-Pneumatic Pressurized Flushing System (PEPPFS), alongwith a standardized mounting interface with the coach for LHB type passenger coaches of Indian Railways.

This specification includes functional, technical requirements of the items and it also lists the eligibility criteria for selection of vendors for contracting.

The eligibility criteria have been framed keeping in view the lifecycle requirements of the supplied equipment.

2 List of standards & specifications referred

S. No.	Standard Specifications /	Title
1.	AFNOR NF X 60-000	Industrial maintenance - Maintenance function
2.	AISI-304	American Iron & Steel Institute Steel Grade 304
3.	AISI-316L	American Iron & Steel Institute Steel Grade 316L
4.	EN45545	Railway applications — Fire protection on railway vehicles
5.	EN50124-1	Railway applications Insulation coordination Part 1: Basic requirements — Clearances and creepage distances for all electrical and electronic equipment
6.	EN50125-1	Railway applications Environmental conditions for equipment -Part 1: Rolling stock and on-board equipment
7.	EN50155	Railway applications - Rolling stock - Electronic equipment
8.	EN61373	Railway applications Rolling stock equipment Shock and vibration tests
9.	IEC/EN 60715	Dimensions of low-voltage switchgear and controlgear - Standardized mounting on rails for mechanical support of switchgear, controlgear and accessories
10.	IS2500-Part1	BIS Sampling Procedure for Inspection by Attributes
11.	RCF MDTs 49398	Technical Requirements and General Instruction for Direct Part Marking on Coach / Bogie Components

Table 1: List of referred standards

3 Abbreviations / Terminology

S. No.	Abbreviations / Terminology	Expansion / Explanation
1.	AISI	American Iron & Steel Industry
2.	BoM	Bill of Materials
3.	COTS	Common of the shelf
4.	GTIN	Global Trade Item Number (Global Systems One)
5.	HMI	Human Machine Interface
6.	KXH	Indian Railways station code for Kapurthala
7.	LED	Light Emitting Diode
8.	LHB	Linke-Hofmann-Busch the ToT partner for RCF/KXH.
9.	NRV	Non-Return Valve
10.	OD	Outer Diameter
11.	PEPPFS	Pistonless Electro-Pneumatic Pressurized Flushing System
12.	PLC	Programmable Logic Controller
13.	QAP	Quality Assurance Plan

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

14.	RCF	Rail Coach Factory
15.	SS	Stainless Steel
16.	S-T	State Transition
17.	ToT	Transfer of Technology.
18.	VDC	Voltage DC

Table 2: Abbreviations & Terminology

4 Pre-requisites for eligibility for bulk (regular) and development orders

The following eligibility criteria shall be followed for evaluation of offers. These are grouped into technical and financial requirements.

Note: The pre-requisites provided here are to be used as default requirements. These may be overruled by the eligibility requirements prescribed while processing the purchase.

4.1 Eligibility for Bulk / Regular Purchase

The following clauses list the eligibility for bulk (regular) purchase.

4.1.1 Technical Eligibility

The following shall be the technical eligibility requirements to qualify for bulk purchase.

4.1.1.1 OEM or Authorized by OEM

The bidder shall be the OEM or an agency authorized by the OEM.

Any firm quoting on behalf of OEM must submit tender specific authorization certificate in the prescribed proforma (enclosed as annexure 2) along with their offer and agree for inspection by the nominated agency (as the case may be) at the premises of their principals, failing which their offer shall be liable to be rejected.

4.1.1.2 Type approval reports by accredited labs

The bidder shall have the type-approval for equipment. The test shall be conducted at any ISO/IEC 17025 accredited laboratories in the country. The copies of the reports shall be submitted with the bid.

4.1.1.3 Make in India

The product shall be duly manufactured in the country and must fulfil the requirements for "Make In India" extant guidelines of Ministry of Commerce as valid on date of bidding.

4.1.2 Financial Eligibility

Bidder shall concurrently meet the following eligibility criteria mentioned in paragraphs as below for consideration of their offer for regular order.

Note: Incase of bidders authorized by the OEM's the financial eligibility shall be determined for the authorized agency.

4.1.2.1 Past Performance:

Tenderers should have successfully supplied the items SAME or SIMILAR to the tendered item/items to Railway PUs/Zonal Railways/Central or State Govt. Departments/Central/State PSUs/or any other organization as per tender schedule, in the period constituting the Current Financial Year and previous Three Financial Years in a single / multiple orders as described below.

Items considered same / similar for the purpose of evaluation shall be any type pressurized flushing or vacuum system fitted on Indian Railway Coaches.

4.1.2.1.1 Single Order

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

One single order having the value minimum 20% of the estimated value of current tender.

OR

4.1.2.1.2 Multiple Orders

Multiple orders having total value of minimum 30% of the estimated value of current tender.

The term 'Items SIMILAR to the tendered item/items' means the items as defined in the tender schedule besides the tendered item(s) itself. These items are also alternatively referred as 'Similar items' in this clause of eligibility criteria.

Firm should submit necessary documentary proof showing the details of supplied items along with value, such as Receipt Notes for Stock items, Receipt & Acceptance documents for Non-Stock supplies, copy of invoices with acceptance particulars etc. In addition to above mentioned documents, firm should submit a summary sheet along with its e-Offer, in following format, to establish its claim for compliance of this clause:

Purchase order/Contract no	Contract placing agency	Details of document used as proof of supply*	Description of similar item/s supplied	Date of supply	Quantity of item/items	Value of supplied Items
Total Value of similar items supplied (in Rs.)-						

**Note1: The date of the document produced as the proof of supply, will be considered as date of supply in case date of supply is not expressly shown in that document. Onus of submission of these documents lies completely with the tenderer only though the purchaser may utilize the Performance Records, if readily available with it.*

Note2: In case of composite contracts that include the component of supply of similar item/items along with other supply/service components, value of relevant supply component of similar items will be allowed to be considered for compliance of this clause, provided composite contract provides for a separable value of the similar item.

4.1.2.2 Financial Capability (Applicable for the tenders having estimated value more than 50 Lacs only)

Firm's Total Gross Revenue from Operations/Gross Sales Value, within the period of current financial year & previous three financial years (period to be reckoned as on the date of tender opening) must be minimum 150% of the estimated tender value.

Firm must submit a summary of financial year wise Gross Revenue from Operations/Gross Sales Value to show the compliance of this condition, duly supported by the copies of Income & Expenditure Statement or Profit & Loss account pertaining to the above period. These financial statements must be certified by a Chartered Accountant or any Statutory Auditor. The above-mentioned documents are required to be submitted by the tenderer along with the offer for consideration of regular order placement and onus of submission of these documents shall solely lie on the tenderer.

4.2 Eligibility for Developmental Purchase

To encourage MSME's and to increase the supplier base, the following relaxed eligibility is mandated for development orders.

4.2.1 Technical Eligibility

The bidder / manufacturer shall be in a business of design integration manufacture and supply of low cost automation equipment that includes fluid valves controlled by PLC's. The bidder shall demonstrate this by means of supplies made in the last 3 financial years and upto the date of tender opening in the current financial year.

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

The bidder shall provide a clause-by-clause compliance to the requirements of this specification.

4.2.2 Financial Eligibility

The requirements for financial eligibility are not applicable. However, it shall be ensured that the value of the purchase order on a vendor shall not exceed the financial capability and shall be determined as detailed in the table below.

Condition 1		Condition 2
The value of the order shall not exceed 5 times of the largest single order, for the same / similar items, within the period of current financial year & previous three financial years (period to be reckoned as on the date of tender opening).	AND	The value of the order shall be maximum 66% of firm's total gross revenue from Operations/Gross Sales Value, within the period of current financial year & previous three financial years (period to be reckoned as on the date of tender opening).
OR The value of the order shall not exceed 3 times of the sum of multiple orders, for the same / similar items, within the period of current financial year & previous three financial years (period to be reckoned as on the date of tender opening).		

Table 3: Order value for limits for development order

5 Scope of Supply Set

The following are the items included in the scope of supply set. The default set shall include all items as detailed here unless specifically excluded by the indenter / purchaser.

S. No.	Description	Quantity
1.	Pistonless pressurizer system assembly	1 Nos
2.	Commode / Indian Style Pan (as ordered)	1 Nos
3.	Disinfectant / deodorizer storage tank	1 Nos
4.	Air freshener storage tank	1 Nos
5.	Air freshener atomizer spray system	1 Nos
6.	Health Faucet	1 Nos
7.	Pneumatic Pump for Health Faucet	1 Nos
8.	Filter, Regulator, pressure indicator for pneumatic supply	1 Nos
9.	Power supply system	1 Assembly
10.	Programmable Logic Controller System	1 Assembly
11.	End-user HMI System	1 Assembly
12.	Maintenance / Diagnostic HMI System	1 Assembly
13.	All brackets, fasteners, consumables (e.g. adhesives, tapes sealant etc.) for mounting the system as per designed mounting on the LHB coaches. (Note there shall no requirement of any item to be bought over and above of the BoM supplied by the supplier / manufacturer)	1 Set
14.	All tubes / pipes / hoses alongwith the required end fittings to commission the system. (Note there shall no requirement of any item to be bought over and above of the BoM supplied by the supplier / manufacturer)	1 Set
15.	All wiring harnesses with required connectors, switches and any other devices. (Note there shall no requirement of any item to be bought over and above of the BoM supplied by the supplier / manufacturer)	1 Set
16.	Sticker for Instructions for using End user HMI	1 +1 Nos
17.	Sticker containing a quick troubleshooting guide	1 +1 Nos

Table 4: Summary of Scope of supply set

5.1 Details of items on the scope of supply

5.1.1 Commode / Indian Style Pan (as ordered)

The commode / Indian style toilet pan shall be provided as per the enclosed drawing. The raw material used shall be SS-AISI316L. This grade requirement shall overrule any other grade specified in the drawing.

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

5.1.2 Pistonless pressuriser system assembly

The pistonless pressuriser assembly shall consist of the following

1. **Pressurizing Chamber:** This shall be construction of 2 parallel seamless tubes of 60mm OD with a wall thickness of about 4 mm. The assembly shall have a total capacity of 3 litres. The material shall be SS316L.
2. **Water inlet and air vent system:** The water inlet interface shall be 26 mm size and controlled via a 3/2 way solenoid valve. This shall be arranged such that the air inlet shall be open to atmospheric pressure whenever water flows into the pressuring chamber. When the water flow is stopped, the air vent too shall be sealed
3. **Water flow sensor:** The water inlet pipe shall be fitted with a flow sensor to measure the water flow rate.
4. **Non Return Valve on water supply line:** A NRV shall be provided on the water supply line.
5. **Y-Strainer:** with full opening orifice shall be provided in the water inlet tubing.
6. **Air inlet system:** The air inlet interface shall be 18mm size. The air inlet port shall be controlled by a 3/2 way valve.
7. **Air Pressure Sensor:** An air pressure sensor shall be fitted on the air inlet line.
8. **Non Return Value on air supply line.** A NRV shall be provided on the air supply line to prevent flow of water into the pneumatic systems of the coach.
9. **Water level sensors for pressurizing chamber:** A suitable water level sensing system in dual on-line and single failover mode shall be provided. These sensors shall play a key role in checking the health of the overall system. Suitable algorithm shall be deployed to use the data generated from the sensors to indicate need for maintenance or failure of the system. An out of defined tolerance differential reading shall be treated as error. This condition shall prompt a manual selection of 1 out of 2 sensors.
10. **Water outlet system:** The water outlet port shall be of 26mm dia and shall be controlled by a solenoid operated angle seat valve, normally closed.
11. **Disinfectant / deodorizer inlet port:** This port shall be connected to the disinfectant / deodorizer fluid storage tank. The size of the port shall be 18mm. The port shall be controlled via suitable 3/2 way valve and shall be designed to work in sync with the air vent valve. When this port is opened the air vent shall also be opened.

5.1.3 Disinfectant / deodorizer storage tank

The disinfectant deodorizer storage tank shall be of sufficient capacity to store the fluid for atleast 100 flushes (or more). The manufacturer shall provide the details of the disinfectant / deodorizer fluid to be used with the system.

The tank shall be of such a design that provides visual reference of the quantity of fluid in the tank.

5.1.4 Air freshener storage tank

The air freshener storage tank shall be of sufficient capacity to store the fluid for atleast 300 sprays (or more). The manufacturer shall provide the details of the air freshener fluid to be used with the system.

The tank shall be of such a design that provides visual reference of the quantity of fluid in the tank.

5.1.5 Air freshener atomizer spray system

An air freshener atomizer spray system shall be provided with the nozzle located at 1200mm height above the lavatory floor. The atomizer system shall be powered using the available pneumatic supply and operated by suitable solenoid valve controlled by the microcontroller system.

5.1.6 Health Faucet

A health faucet with flexible pipe of length 1000-1200mm shall be provided with suitable clamps to hold the nozzle on the lavatory wall.

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

5.1.7 Pneumatic Pump for Health Faucet

A pneumatic / electricity powered pressuriser pump shall be provided to increase the pressure of the water supply to the health faucet to 1 bar (gauge) at flow rate of 50 lph.

5.1.8 Filter, Regulator, pressure indicator for pneumatic supply

The expected range of incoming pneumatic pressure is 5-6 bar. However, the system shall be designed to handle pressure upto 8bar.

This unit shall connect to the coach pneumatic system and supply air for the operation of the system. The port size of the unit shall be 18mm.

5.1.9 Power supply system

The power supply available in the coach is 110VDC. The power supply system shall be designed to work with the coach power supply system and provide the working voltage and power for operating the equipment. The system be designed to work with 24VDC to enable use of COTS equipment used in the automobile industry.

5.1.10 Programmable Logic Controller System

The PLC shall be provided to control the operation of the system. In case of errors in operation, the system shall be designed to assist trouble shooting by the maintainer.

5.1.11 Maintenance / Diagnostic HMI System

A maintenance / diagnostic HMI shall be provided on the PLC or as a separate unit mounted on the panel. Further diagnostic equipment shall be provided in the form of a connectable device (much like ECU analysers used on automobiles). One such handheld unit shall be provided with every 20 sets of the system unless specifically indicated in the scope of supply of the contract.

5.1.12 End user HMI System

The end user HMI shall be in the form as detailed below. This HMI shall be mounted on a SSAISI304 sheet of dimensions 120(W) x 90(H) mm.

The components of the HMI are described below:

1. **LED Indicator RED (ERROR):** To indicate a system fault. The indicator to flash when activated.
2. **LED Indicator YELLOW (WAIT):** To indicate a wait period. The indicator to flash when activated.
3. **LED Indicator GREEN (READY):** To indicate system ready. The indicator shall be brightly and constantly lit when activated.
4. **Push Button GREEN (FULL):** A 30mm size push button (push to make) switch for input for a full flush selection. The self-illumination LED shall glow green when the system is ready for flushing, else it shall remain extinguished.
5. **Push Button BLUE (HALF):** A 22mm size push button (push to make) switch for input for a half flush selection. The self-illumination LED shall glow green when the system is ready for flushing, else it shall remain extinguished.

All switches used shall be industrial grade with sealed contacts with rated life of 1 million cycles. The end user HMI switches shall be self-illuminated with green LED.

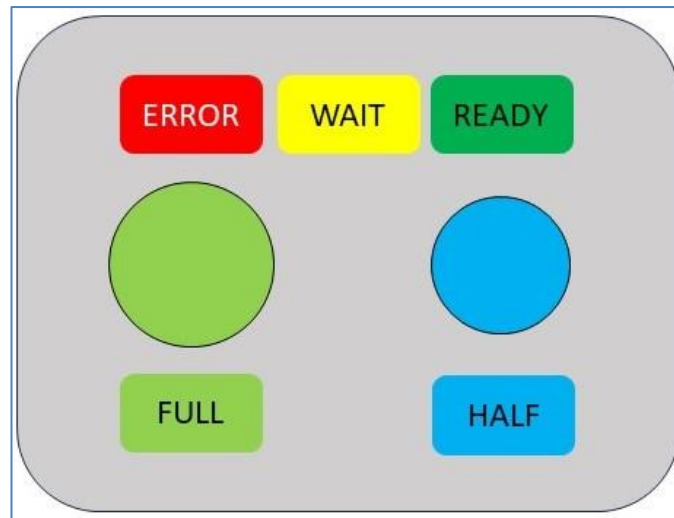


Figure 1: End user HMI

5.1.13 All brackets, fasteners, consumables (e.g. adhesives, tapes sealant etc.) for mounting the system as per designed mounting on the LHB coaches.

All brackets', fasteners shall be of SS AISI304 or better.

All adhesives, sealants, tapes and consumables shall be of standard makes. Approval, of the indenter or their authorized representative, shall be taken prior to the supply.

All materials shall be HL3 rated.

(Note there shall be no requirement of any item to be bought over and above of the BoM supplied by the supplier / manufacturer)

5.1.14 All tubes / pipes / hoses alongwith the required end fittings to commission the system.

All materials shall be HL3 rated.

All end fittings shall be of SS AISI304 or better.

All tubes / hoses / flexible pipes shall be capable of handling upto 8 bar pressure. If any deviation is required, the same shall be requested specifically and granted only after approval by the indenter or their authorized representative.

(Note there shall be no requirement of any item to be bought over and above of the BoM supplied by the supplier / manufacturer)

5.1.15 All wiring harnesses with required connectors, switches, and any other devices

All materials shall be HL3 rated.

All switches shall be type approved for 1 million cycles.

All connectors used shall type approved for 100,000 connect-disconnect cycles.

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

(Note there shall be no requirement of any item to be bought over and above of the BoM supplied by the supplier / manufacturer)

5.1.16 Sticker for Instructions for using End user HMI

A suitable sticker shall be designed and the same approved by the indenter or their authorized representative.

5.1.17 Sticker containing a quick troubleshooting guide

A suitable sticker shall be designed and the same approved by the indenter or their authorized representative.

6 Functional & Technical requirements for items in scope of supply

The functional and technical requirements of the items listed in the scope of supply are provided in the following paragraphs.

6.1 Form, Fit & Finish

The complete system shall be designed to fit on the lavatory wall behind the attachment wall. The relevant drawing is enclosed.

6.1.1 Mounting backplate & space envelope

The system components shall be mounted on a backplate. The backplate for mounting the equipment shall be as per the drawing MI007916 (annexed).

This back plate shall be bolted on the lavatory wall by means of SS-AISI304 studs of 10mm dia. The stud holes pattern shall be as per the sketch enclosed.

The backplate shall be equipped with sections of DIN Rails (Top hat rail IEC/EN 60715 – 35 × 7.5 or Top hat rail IEC/EN 60715 – 35 × 15) suitably placed to mount all the equipment on the backplate.

It shall be ensured that the overall dimensions of the equipment shall be suitable to fit into the space envelope as per drawing MI005426 (annexed).

6.1.2 Gross Weight of the complete assembly

It shall be ensured that the overall weight of all mounted equipment including the backplate shall not exceed 15kg.

6.1.3 Finish

All metal items shall be SS as specified with unpainted brushed steel finish.

6.2 Function

The flushing system shall clean the bowl completely and transfer the fecal matter into the bio-toilet tank.

The flushing system shall be ready to flush within 10 seconds after each use. This system shall be designed for 150 flush cycles in 24 hours or better. The components of the system shall be designed to cater to this high usage.

The equipment is expected to do the following functions

1. Interface with the coach mechanical / plumbing / electrical and pneumatic systems as described in this document.
2. Provide a simple to use pressurized flushing in 2 options a full flush (approx. 2 litres) and a half flush (approx. 1 litre).
3. Provide dosing of deodorizer / disinfectant after every flush or after ever 1 hour interval. The time interval of dosing of the deodorizer / disinfectant shall be configurable by the end user in the range from 30min to 1440 min in increments of 15 min.

4. Provide atomized air freshener spray in the toilet after every flush or after every 10 minutes. The time interval of dosing of the air freshener shall be configurable by the end user in the range from 5min to 1440 min in increments of 5 min.
5. Provide pressurized water for the health faucet.
6. The controller system is expected to retain its configuration and state of operations upon restart from any power interruptions. The configuration settings shall be stored on board in non-volatile memory.
7. It shall be ensured that the reboot of the controller brings the system upto a safe state and does not result inadvertent flushing operation.
8. The system is expected to provide an operation mode and a maintenance mode for maintenance mode.
9. The system shall log data on nonvolatile memory and the last 50000 entries shall be retrievable. The log files shall be configured as circular log files. It shall be possible to download the data from the device by using a USB Drive / physically removing the flash drive or by using a dedicated handheld device or a generic notebook with a specific application. The following event shall be logged
 - 9.1. System power up and power down
 - 9.2. The values recorded by the sensors (logged every minute)
 - 9.3. User request inputs (full / half flush request button press)
 - 9.4. Successful completion of flushing cycle
 - 9.5. Every deodorizer / disinfection cycle
 - 9.6. Failure and error log incase of a failed flushing cycle.
 - 9.7. Any errors logged

6.2.1 Disinfectant / Deodorizer & Air freshener

Metazene based deodorizer shall be used preferably. The firm shall propose and get prior approval for the chemical to be used.

Suitable long lasting air freshener shall be used. The firm shall propose and get prior approval for the chemical to be used.

6.2.2 States and transition of the equipment

The following diagram provides a guide to the expected states and the transition of the system. This S-T diagram shall be used as a reference. The manufacture may offer more features (requiring a different S-T diagram). However, such improvements should be approved prior to supply by the indenter or their authorized representatives.

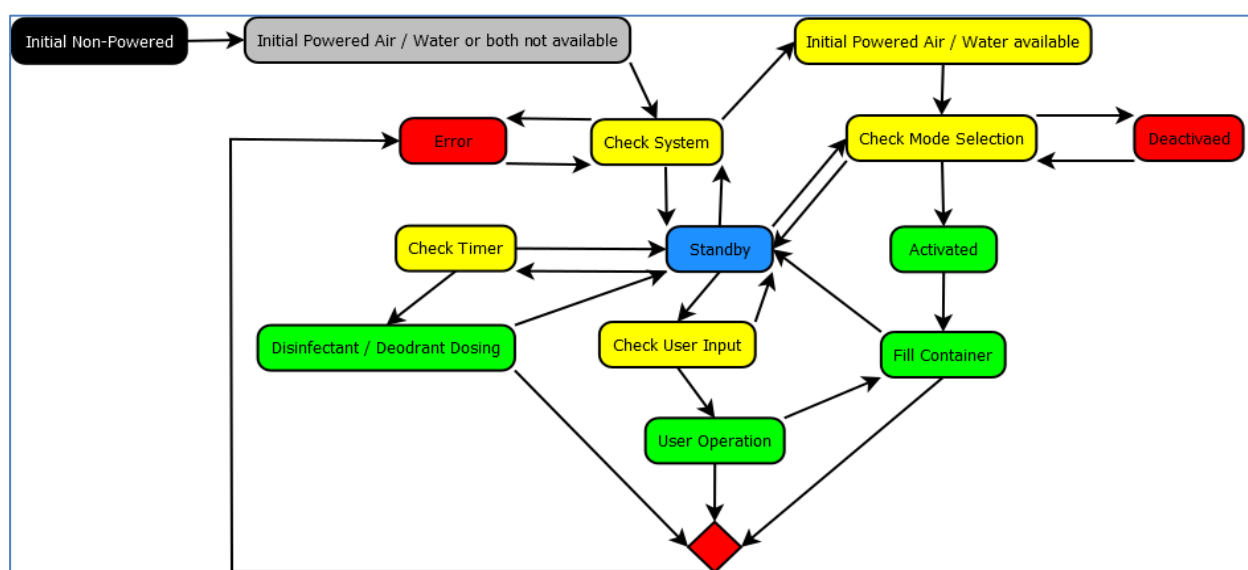


Figure 2: State-Transition Diagram of the PEPPFS

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

6.3 Interface

The interface of the equipment to the coach systems are summarized below:

6.3.1 Mechanical

The requirement for the mounting interface is provided under form and fit heading.

6.3.2 Electrical

The electrical power supply interface shall be 2 wire 110VDC (tolerance of +/- 40% as per EN50155) with grounding lead and maximum power load of 100w.

6.3.3 Pneumatic

The pneumatic system interface shall be 18mm OD with a pressure of 3-8bar. The maximum consumption shall be limited to 5 litres per minute at the rated pressure.

6.3.4 Plumbing

The plumbing interface shall be of 26mm OD with a pressure head of 0-4m of water. Maximum consumption shall be limited to 5 litres per minute.

6.4 Environmental conditions and type approval

6.4.1 Reference operating environment

6.4.1.1 Ambient Temperature Range

The ambient temperature range shall be from -5°C to +50°C degrees Celsius

6.4.1.2 Relative Humidity

The relative humidity shall range from 30% - 100%.

6.4.1.3 Shock and Vibration

As per EN61373 Category 1 Class A.

6.4.2 Environmental type testing

The complete equipment shall be type tested for compliance to EN50155. The following details shall be used for type testing to the standard.

1. Performance criterion A Clause 4.2.2
2. Operating Temperature class: OT3 (Clause 4.3.2)
3. Switch-on extended Operating temperature: ST1 (Clause 4.3.3)
4. Temperature variation: H2 (Clause 4.3.4)
5. Shock & Vibration EN 61373 category 1 class B. (Clause 4.3.5)
6. Electromagnetic compatibility EN 50121-3-2. (Clause 4.3.6)
7. Relative Humidity EN50125-1 (Clause 4.3.7)
8. Pollution Degree EN 50124-1 (Clause 4.3.7)
9. Interruption of voltage supply S3 (Clause 5.1.1.4)

6.5 Quality, safety, and endurance requirements

All materials and components used for the manufacture of the system shall be of established and proven quality. The manufacturer shall provide the bill of materials clearly describing the component / source. The requisite MSDS or the TDS shall be enclosed with the BoM.

The following shall be followed while selecting the materials for manufacture.

1. All switches shall be heavy duty industrial type with sealed contacts, rated for atleast one million operations.

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

2. All relays shall be automotive grade or better with sealed contacts, rated for atleast 100,000 operations or more.
3. All electrical connectors shall be type approved for 100,000 connect-disconnect cycles.
4. All seals / gaskets shall be of FKM (fluoro elastomer, Viton®)
5. All cables shall be e-Beam irradiated type.
6. All valves used in the system shall be type approved for 1,000,000 cycles of operations
7. The connection of the system on the vehicle shall be done in compliance to EN50343.
8. System insulation shall be as per EN 50124-1
9. Useful life of the equipment shall be L2 (10 years) as per EN 50155 (clause 5.2)
10. Protective coating for PCB shall be as per PC2 as per EN 50155 (Clause 10.7).
11. Personnel safety against electric shock shall be in accordance with EN 50153;
12. Insulation coordination shall be in accordance with EN 50124-1;
13. Personnel safety against effects of excessive temperature shall be in accordance with EN ISO 13732-1
14. Fire behaviour shall be as in compliance to EN45545 HL3

6.5.1 Conformance to requirements of EN50155

Manufacturer / supplier shall provide a detailed clause by clause compliance of the offered equipment vis-à-vis the requirement stated in EN50155. The compliance document shall be submitted as a part of the bid.

7 Testing requirements

7.1 Type Testing Requirements

The equipment shall undergo type testing as per the schedule prescribed at clause 13.3 of EN50155 (Table 12). The tests marked "O" are treated as not applicable.

7.2 Routine Testing Requirements

The equipment shall undergo type testing as per the schedule prescribed at clause 13.3 of EN50155 (Table 12). The tests marked "O" are treated as not applicable.

7.3 Acceptance Tests

The following shall be considered as activities constituting the acceptance test.

1. Review of documentation and physical tally of all materials and bought out assemblies to confirm compliance of the requirements for each item as detailed in this document. The copies of all documents checked shall be provided with the consignment.
2. Check of the offered configuration vs the type tested configuration of the equipment. These shall be identical.
3. Operation of the system. The system shall perform as per the requirements stated in this document.
4. Over pressure test at 10 bar air pressure to check for leakages. The system shall operate normally as described in this document.
5. Under pressure test. The system operation shall be tested at 3 bar air pressure. The system shall operate normally as described in this document.
6. Over voltage test at 1.4 times the nominal voltage of 110VDC to check for system operation. The system shall operate normally as described in this document.
7. Under voltage test. The system operation shall be tested at 0.6 times the nominal voltage of 110VDC. The system shall operate normally as described in this document.

8 Quality Assurance, Tests & Documents

The following table provides an overview of the system for quality assurance.

RAIL COACH FACTORY, KAPURTHALA, PUNJAB 144602	Printed: 2023/12/26 Page 14 of 20
---	--------------------------------------

Requirement Description	Requirement Detail	Remarks
Quality Assurance Plan	The manufacturer shall have a detailed quality assurance plan. The plan shall be submitted for approval by the indenter / purchaser. The QAP document shall clearly document the following and control the test record formats. 1. Control over outsourced products and processes 2. Testing of raw material and establishing its traceability. 3. Sampling Plan 4. Type Tests 5. Routine Tests 6. Acceptance Tests	The QAP shall be submitted in PDF softcopy, digitally signed by the Head of Quality Department of the manufacturer.
Type Tests	The type tests shall be conducted by the manufacturer whenever the design, materials, processes change. The details of required type test are mentioned elsewhere in the document.	The records of the type tests shall be maintained by the manufacturer and shall be made available upon demand. These records shall be traceable and verifiable.
Routine Tests	The manufacturer shall conduct routine tests as per the approved QAP. The records of tests conducted shall be verifiable upon request.	The records of the type tests shall be maintained by the manufacturer and shall be made available upon demand. These records shall be traceable and verifiable.
Acceptance Tests	The acceptance test shall be conducted on batches offered for delivery. The tests shall be conducted as per the details mentioned elsewhere in the document.	These shall be conducted by the consignee or their authorized agency prior to dispatch. All infrastructure required to enable acceptance tests shall be provided by the bidder / OEM.

Table 5: Quality Assurance Tests & Documents

8.1 Makers test certificate for outsourced item

Makers test certificates shall be provided along with the consignment for all outsourced items and services.

Note: The manufacturer / supplier shall ensure that all material supplied shall comply to the requirements of this specification. The purchaser may audit and conduct a detailed check of supplied fittings, including its raw material as and when required.

9 Marking, Labeling & Packaging

The items shall be suitably packed and labeled as described below.

9.1 Marking / Labeling

All components and sub-components of the equipment shall be marked using DPM technology. Alternative technology for marking may be suggested. However, all marking / identification systems shall have a service life more than the service life of the components on which the marking is made.

The contractor shall propose and seek approval of IR, for the scheme prior to application.

The guidelines contained in RCF-MDTS-49398 shall be applicable for setting up the marking scheme

9.2 Packaging

The equipment shall be suitably packed to prevent damage during transport. Each package shall be accompanied by a verified list of items packed.

Note: All packing and labeling materials used shall be environment friendly and as per the approved norms.

10 Prototype Approval

Prototype approval shall be required for the first-time supply of the equipment. This approval shall be granted by the indenter / purchaser, or any agency authorized by the indenter.

The prototype approval shall be done prior to bulk supply and shall include the following

1. Review and approval of QAP
2. Review and approval of all test certificates: raw materials, makers certificates for outsourced items and type test certificates and any other certificates as deemed necessary.
3. Review and approval of the product BoM
4. Review and approval of all documents governing the form, fit, function and interface requirements.

10.1 Validity of prototype approval

The prototype approval granted shall be valid till such time the following remain unchanged

1. The specification (this document)
2. Manufacturer's design
3. QAP
4. BoM
5. Form, fit, function and interface documentation

11 Conduct of Acceptance tests

The acceptance test shall be done following the SQC processes defined in IS2500-Part1. The inspecting agency shall prepare an inspection plan and conduct the inspection.

11.1 Inspection Plan

11.1.1 Parameters

The following parameters shall be used for determination of the sampling requirements.

Sampling Plan Type	Inspection Level	AQL Critical	AQL Major	AQL Minor
Single Sampling	G-II	0.0	2.5	4.0

Note: The sample size and accept/reject numbers shall be determined based on the offered lot as per the SQC plan parameters detailed in the table above.

11.1.1.1 Critical Attribute

Attributes that create a loss of function shall be treated as critical attributes. All requirements specifically mentioned in this specification, shall be treated as critical attributes.

11.1.1.2 Major Attribute

Attributes that create loss of form, fit and interfacing issues shall be treated as major attributes.

11.1.1.3 Minor Attribute

Attributes that create loss of appearance.

11.1.2 Normal, tightened, and reduced inspection

The inspection shall start with normal inspection level-II above and shall be switched to reduced (G-I) or tightened (G-III) following the process described in the standard.

12 Spare Parts

The Manufacturer / Supplier shall provide a list of spares with its offer to be kept with IR for ensuring smooth operations and maintenance during warranty.

The Manufacturer / Supplier shall ensure the availability of spare parts or replacement parts of the supplied system for a period of at least 10 years. List of spares and its cost shall be submitted along with the offer for tender (format prescribed below). This shall be irrespective of the fact whether the vendor/supplier or his sub vendor(s) have stopped manufacturing of the equipment(s) to the design supplied to Indian Railways.

S. No.	Description of Component	Manufacturer	Product Code	Offer Price (₹)
1				
2				
3				

Table 6: Format for Providing Details of Spares

13 Lifecycle and Maintenance

13.1 Expected B10 life

The expected B10 life of the equipment shall be 36 months. This is also the Maintenance Free Operation Period (MFOP).

13.2 Maintenance Interventions

All maintenance requirements shall be handled as under as per AFNOR NF X 60-000.

Maintenance Level #	IR Responsibility	Contractors Responsibility
1	Conduct L1 maintenance by trained personnel at respective maintenance depots.	Impart training to all personnel for L1 maintenance. Provision of spares, consumables and SMT's .
2	Conduct L2 maintenance by trained personnel at respective maintenance depots.	Impart training to all personnel for L2 maintenance. Provision of spares, consumables and SMT's. Provide supervision and handholding support.
3	Provide all necessary support to the contractor for conducting maintenance. Deploy personnel to be trained on the job.	Impart training to all personnel for L3 maintenance. Provision of spares, consumables and SMT's. Provide supervision and manpower for conducting the maintenance schedule.
4	Provide all necessary support to the contractor for conducting maintenance. Deploy personnel to be trained on the job.	Impart training to all personnel for L4 maintenance. Provision of spares, consumables and SMT's. Provide supervision and manpower for conducting the maintenance schedule.

Maintenance Level #	IR Responsibility	Contractors Responsibility
5	Provide all necessary support to the contractor for conducting maintenance. Deploy personnel to be trained on the job.	Impart training to all personnel for L5 maintenance. Provision of spares, consumables and SMT's. Provide supervision and manpower for conducting the maintenance schedule.

Table 7: Maintenance intervention plan

14 Guarantee/Warranty

The equipment is expected to be easy to fit and maintain, with inspection intervals matching the maintenance schedule of rolling stock on which it is installed.

The supplier shall provide a warranty for all supplied items for a period of 42 months from date of fitment or 48 months from the date of supply whichever is earlier.

All information required for filing a warranty claim shall be provided in a warranty certificate and as part of the data matrix 2D bar code.

Note: In case any maintenance schedule, inspection/checks are required to be done during the warranty period, this shall be clearly indicated by the bidder.

The purchaser shall specify if the payments for the same shall be made upfront or upon actual conduct of the schedule.

Lapse of warranty on account of non-conduct of specified schedule shall not be acceptable.

15 Information to be provided by purchaser

The purchaser, while using this purchase specification shall provide the following information.

S. No.	Information to be provided	Important Note
1.	The purchaser must state the number of handheld diagnostic systems to be supplied alongwith the equipment.	If not specified, the full kit as described here shall form the scope of supply.
2.	The purchaser may specify lot sizes for inspection and delivery.	If not specified, the supplier shall offer the lot sizes as per their convenience.

Table 8: Information to be provided by the purchaser

16 Information to be provided by bidder / supplier

The following information shall be provided by the bidder / supplier.

16.1 Information to be provided at the time of the bid

The following information shall be included with the bid. These documents shall be used to determine suitability for placement of purchase orders.

S. No.	Information to be provided	Important Note
1.	The document indicating details of registration of the bidder on the MCA portal.	The document shall be verifiable from the MCA Portal.

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

2.	Letter of consent / MoU with manufacturer of the fittings. The document must have unambiguous authorization and address the warranty requirements specified in this specification.	This document is required in case the manufacturer is authorizing another entity to bid on their behalf. The document shall be traceable and verifiable and shall contain the contact details of the persons authorized to verify the same.
3.	Previous supply credentials / testimonials containing the list of supplies made in the last 4 (four) years of similar items.	The document shall contain the contact details (phone number / email-ID) of the purchasers. These may be contacted by the purchaser for performance feedback.
4.	Copy of the detailed QAP.	The document must contain the details as specified in the clause on quality assurance in this specification.
5.	Copy of the BoM	
6.	Copies of all type testing reports	

Table 9: Information to be provided with the bid

16.2 Information to be supplied with the material consignment

S. No.	Information to be provided	Important Note
1.	Test Certificates for routine tests (as detailed in the QAP) conducted by the manufacturer or third-party agencies.	The test certificates shall be traceable and verifiable.
2.	Test Certificates for acceptance tests (as detailed in the QAP) conducted by the manufacturer or third-party agencies.	The test certificates shall be traceable and verifiable.
3.	Complete packing list for the consignment.	

Table 10: Information to be provided with material consignment

Document No:	RCF-MD-PS-2023-4	Revision No: 0	Date Issued: 26/12/2023
Specification Title: Purchase specification for Pistonless EPPFS Rev-0-d0			

ANNEXURE 1 PROFORMA FOR AUTHORITY FROM MANUFACTURERS

No.

Dated.....

To

The President of India,
Acting through the [Designation of Purchase Manager]/[Railway Unit]

Dear Sir,

Sub:- Tender No.....

We.....an established and reputed manufacturer of
having factories at..... do hereby authorize

M/s.
(Name and address of Agents)

to represent us, to bid, negotiate and conclude the contract against Tender No.....

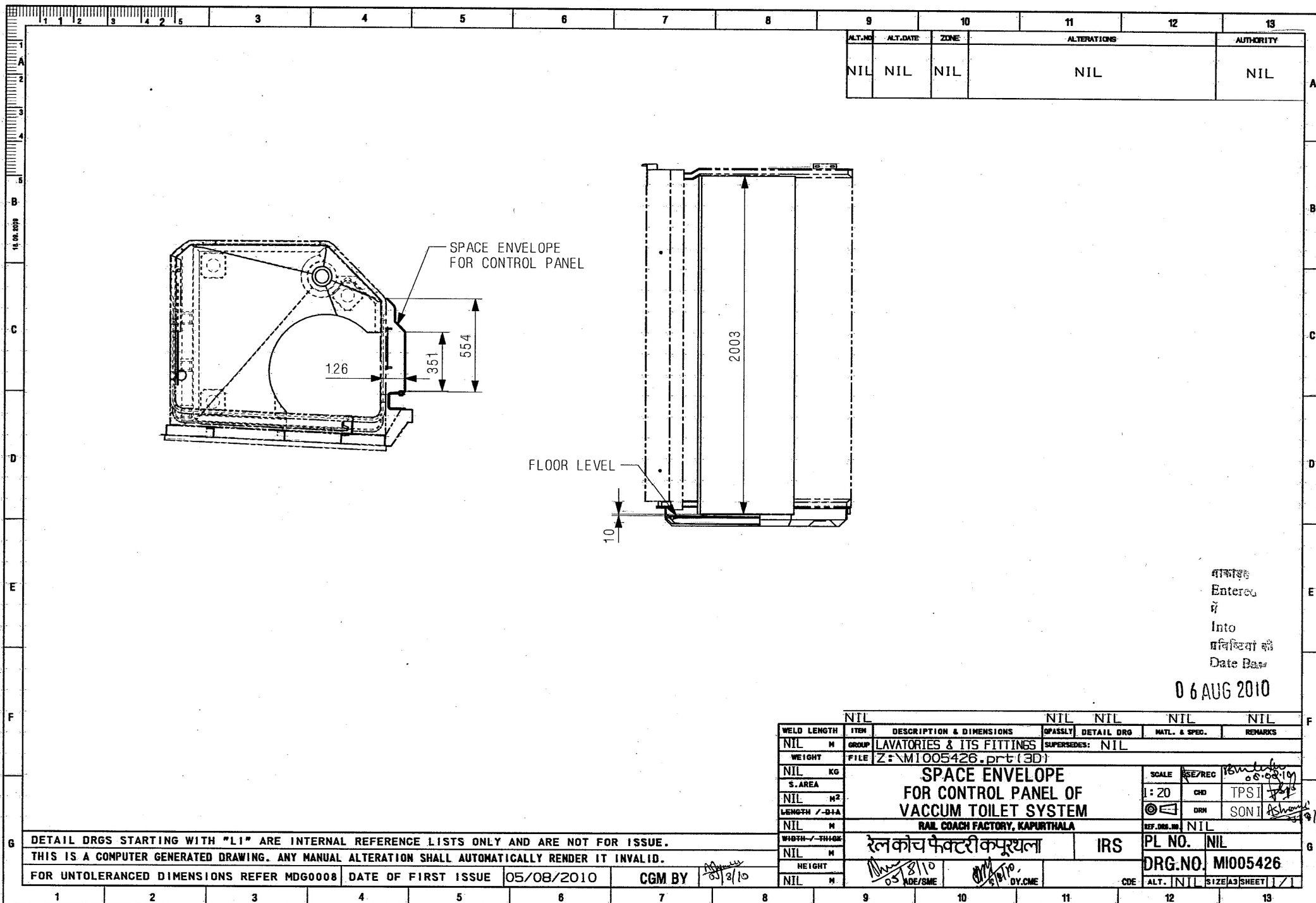
No company/firm or individual other than M/s. are
authorized to represent us in regard to this business against this specific tender.

Yours faithfully,

(Name) for & on behalf of M/s.....

(Name of Manufacturers)

Note: - This letter of authority should be on the Letter Head of the manufacturing concern and should be signed by a person competent and having the power of attorney to bind the manufacturer.



ALT. NO.	ALT. DATE	ZONE	ALTERATIONS	AUTHORITY
NIL	NIL	NIL	NIL	NIL

आकाश
Entered
में
Into
प्रविष्टि का
Date Base

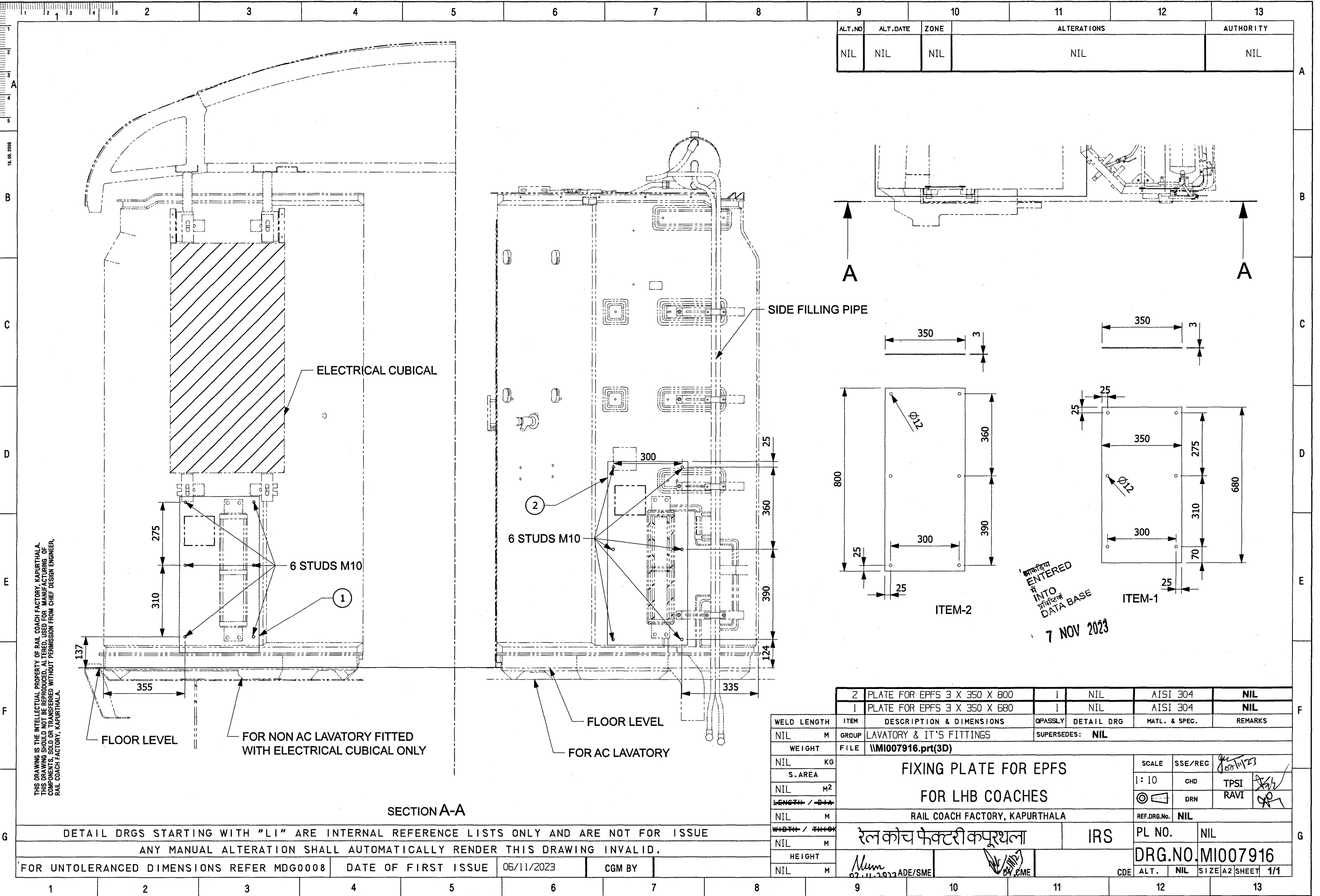
06 AUG 2010

WELD LENGTH	ITEM	DESCRIPTION & DIMENSIONS	SPASSLY	DETAIL DRG	MATL. & SPEC.	REMARKS
NIL	M	GROUP	LAVATORIES & ITS FITTINGS	SUPERSEDES:	NIL	
NIL	KG	FILE	Z:\MI005426.prt (3D)			
NIL	M	SPACE ENVELOPE FOR CONTROL PANEL OF VACCUM TOILET SYSTEM				
NIL	M	RAIL COACH FACTORY, KAPURTHALA				
NIL	M	रेलकोच फैक्टरी कपूरथला	IRS			
NIL	M	HEIGHT	8110			
NIL	M	WIDE/SME	8110			
NIL	M	DY.CME				
NIL	M	CDE				

SCALE	SEE/REC	DATE	06-08-10
1:20	CHD	TPS	
DRN	SONI		
REF. DRG. NO.	NIL		
PL NO.	NIL		
DRG. NO.	MI005426		
ALT.	NIL	SIZE	A3
		SHEET	1/1

DETAIL DRGS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE.
THIS IS A COMPUTER GENERATED DRAWING. ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER IT INVALID.

FOR UNTOLERANCED DIMENSIONS REFER MDG0008 DATE OF FIRST ISSUE 05/08/2010 CGM BY 05/8/10



THIS DRAWING IS THE INTELLECTUAL PROPERTY OF RAIL COACH FACTORY, KAPURTHALA.
THIS DRAWING SHOULD NOT BE REPRODUCED, ALTERED, USED FOR MANUFACTURING OF
COMPONENTS, SOLD OR TRANSFERRED WITHOUT PERMISSION FROM CHIEF DESIGN ENGINEER,
RAIL COACH FACTORY, KAPURTHALA.

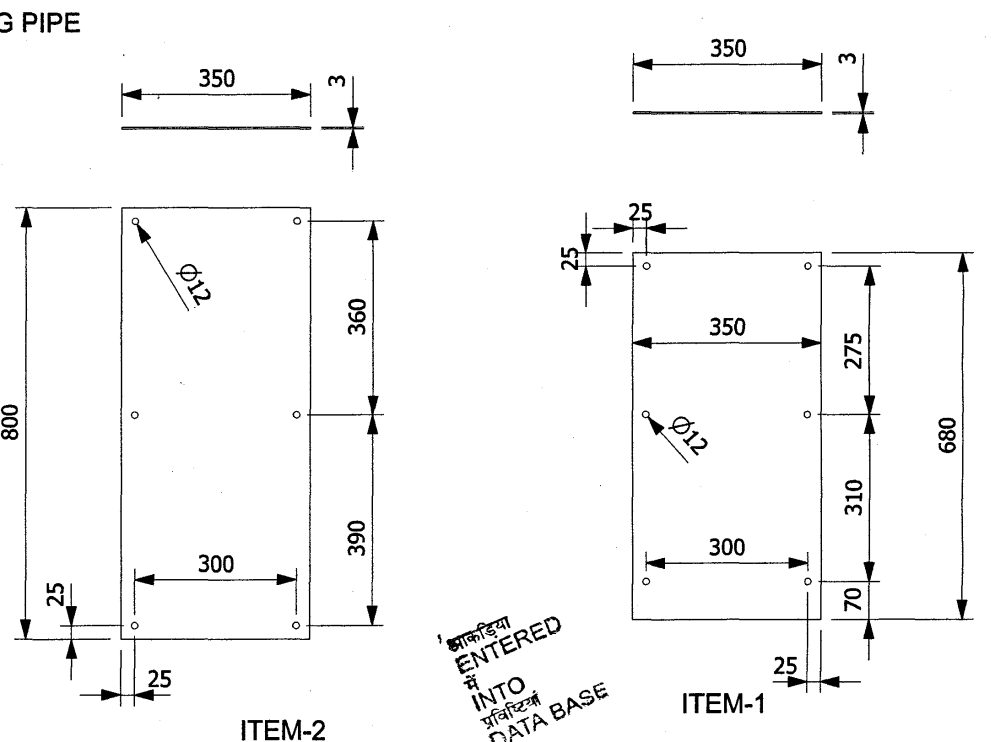
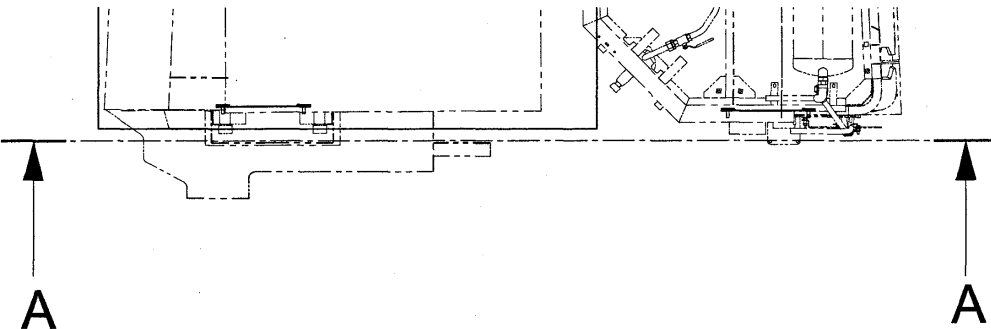
SECTION A-A

DETAIL DRGS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE

ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER THIS DRAWING INVALID.

FOR UNTOLERANCED DIMENSIONS REFER MDG0008 DATE OF FIRST ISSUE 06/11/2023 CGM BY

ALT.NO	ALT.DATE	ZONE	ALTERATIONS	AUTHORITY
NIL	NIL	NIL	NIL	NIL



ENTERED
INTO
DATA BASE
7 NOV 2023

	2	PLATE FOR EPFS 3 X 350 X 800		1	NIL	AISI 304	NIL		
	1	PLATE FOR EPFS 3 X 350 X 680		1	NIL	AISI 304	NIL		
WELD LENGTH	ITEM	DESCRIPTION & DIMENSIONS		QPASSLY	DETAIL DRG	MATL. & SPEC.		REMARKS	
NIL	M	GROUP	LAVATORY & IT'S FITTINGS		SUPERSEDES:		NIL		
WEIGHT	FILE	\\MI007916.prt(3D)							
NIL	KG	FIXING PLATE FOR EPFS FOR LHB COACHES				SCALE	SSE/REC	8/20/17	
S.AREA						1: 10	CHD	TPSI	✓
NIL	M ²							RAVI	✗
LENGTH / DIA									
NIL	M	RAIL COACH FACTORY, KAPURTHALA				REF.DRG.No.	NIL		
WIDTH / THICK		रेल कोच फैक्टरी कपूरथला			IRS	PL NO.	NIL		
NIL	M					DRG.NO.	MI007916		
HEIGHT		Mum 02.11.2013 ADE/SME		✍/BMP ADE/SME		CDE	ALT.	NIL	
NIL	M					ALT.	NIL	SIZE A2 SHEET 1/1	