

SCOPE OF WORK

1. **Name of Work:** Repair of the pressurized Flushing system (PFS) and Electro pneumatic Pressurized Flushing system (EPPFS), including supply of required materials by firm.
2. **Period of Contract:** 12 months or As per LOA
3. **Place of work:** Kharagpur Workshop
4. **Quantity:** As per LOA
5. **Activities to be carried out:**
Pre-inspection will be jointly carried out by consignee, contractor & inspection authority if any.
 - a) Stripping of PFS/EPPFS
 - b) Overhauling of PFS/EPPFS
 - c) Testing and re-fitment
 - d) Repositioning of Pressurizer unit if required as per CAI issued by Railway authority.

6. **Stripping of PFS/EPPFS:**

After allotment of coaches, contractor shall strip the complete assembly of water pressurization system/water pump of PFS/EPPFS for repairing. This work involves stripping, overhauling, re-fitment and testing of existing PFS/EPPFS fitted in Coaches.

7. **Overhauling of PFS/EPPFS:**

- i) Check air pressure availability.
- ii) Check if the power supply is working or not. Check the timer and relay.
- iii) Ensure proper connection of wires and replace the wires if required and secure if found slack.
- iv) Check whether there is any air or water leakage on pipe lines connection of Pans commodes.
- v) Clean the Y-Strainer. If water is not coming out, there may be a chance of the strainer filter being choked which required to clean or replace.
- vi) A metallic Y-Strainer from a standard brand, as recommended in MCF letter no.RBL-MD46111(Pt-1) Vol-I dt:06.07.2024 , Rev-03, should be installed between the water tank and Stainless Steel (SS) water pipeline as advised by railways.
- vii) Check the functioning of push button, solenoid valve, timer, MCBs, SMPS, Relay and PE converter. If any of these components are not working, defective parts should be replaced by new ones.
- viii) All electrical wires should be free from tape joints and should be protected with electrical sleeves and properly secured and ensure proper electrical connections in the system.
- ix) Check whether the water line ball valve is open and functions properly when closed. Defective ball valve should be replaced with a new one.
- x) Dismantling of water pressurizer unit and its components such as water locking unit, NRV, pneumatic fittings and tubing. The contractor must replace the water pressurizer unit only after confirmation from Railways after checking the condition of defective pressurizer unit on dismantling. (The decision for complete replacement lies with Railways).

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- xi) Cleaning of water side barrels and air side barrels with the use of suitable cleaning agents.
- xii) Cleaning of the water locking unit and replacement of helical spring, if found beyond repair then a new water locking unit should be provided.
- xiii) Replacement of inlet and outlet NRV to be done, if required.
- xiv) Replacement of complete sealing kit (all rubber component).
- xv) Replacement of air side and water side piston if damaged.
- xvi) Replacement of PU pipe, PU fitting and silencer of cylinders.
- xvii) Replacement of cylinder assembly rods if damaged/defective.
- xviii) Cleaning and repairing of piston rod and replacement in case of defect/damage.
- xix) Replacement of air filter regulator available on coach.
- xx) Replacement of mounting nut bolt for water pressurizer assembly on coach.
- xxi) Cleaning of middle and rear end cover of water pressurizer assembly and replacement if required.
- xxii) Replacement of front end cover of water pressurizer if required.
- xxiii) Replacement of thermoplastic rubber hose connected from toilet bowl/western commode to water pressurization pump.
- xxiv) Replacement of nyloc nut to size M10 used for mounting of water pressurization unit on coaches.
- xxv) Disassemble the nozzles, waste pipeline fittings and water pipe fittings and clean these components after steeping them with 4% citric acid solution for 1 hour [to be arranged by contractor at his own cost].
- xxvi) The failed/replaced component has to be deposited in the workshop with proper record.

8. Testing and re-fitment

- i) After repairing work, additionally provide the NRV-1/4" in between the Isolating Cock and Air Filter Regulator Lubricator (AFRL) unit of EPPFS (Electro-Pneumatic Pressurized Flushing System) in LHB coach for preventing water ingress from EPPFS to air brake pipe line as per CAI issued vide letter no RBL-MD46111-XII (Pt-1), Vol-I on 02/01/2024.
- ii) After provision of NRV-1/4" in between the Isolating Cock and AFRL, the contractor shall assemble the PFS/EPPFS assembly.
- iii) After assembly of PFS/EPPFS the contractor shall test the assembled PFS/EPPFS System before fitting on the coach, so that deficiency can be attended to.
- iv) Contractor shall fit the repaired water pressurizer assembly on the respective coaches and shall perform the on-coach testing of PFS/EPPFs satisfactorily.
- v) Check pneumatic connection as per assembly drawing 270-04-00-000. Check input pressure using a pressure gauge. Check the air ball valve is open. Check the airline for any clogging. Check output pressure from the pressure regulator using a pressure gauge.
- vi) Check the water connection as per assembly drawing 270-05-00-000. Check input connection from overhead tank to the pressurizer unit. Check the water ball valve is

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- open. Check the water line for any clogging. Check the output connection of the water pressurization system to the toilet pan/bowl.
- vii) Check all the connections as per assembly drawing 270-03-00-000. Check the pneumatic connection of the solenoid valve in the panel. Check the pneumatic connections of the pressurizer unit. Check air pressure available. Check the input NRV and output valve 2/2 valve for any clogging. Check if the power supply is working or not. Check the timer and relay.

9. Repositioning of Pressurizer unit:

- i) Vide letter No. MC/CB/LF/Anaerobic, letter No. MD/FUR/LAV.FIT/101 and No. CAI/RCF/MECH/LHB/093 instructions have been issued to shift the pressurizer unit to be shifted from underframe to onboard behind the CDTs panel wall on the lavatory.
- ii) The contractor shall fit the tested water pressurizer onboard the coaches as instructed in letter No. MC/CB/LF/Anaerobic, letter No. MD/FUR/LAV.FIT/101 and No. CAI/RCF/MECH/LHB/093.
- iii) Trials were conducted in the workshop as per letter No. MC/CB/LF/Anaerobic and letter No. MD/FUR/LAV.FIT/101. With reference to drawing RDSO/CG/DRG/24052 in LHB AC Coaches as mentioned No. MC/CB/LF/Anaerobic, pressurizer fitted on brackets prevented the closing of CDTs door panel and engagement of barrel bolts. With reference to drawing MI007851 in No. MD/FUR/LAV.FIT/101, instructions for embedding studs in lavatory walls are not clearly explained. Hence, the contractor shall directly fit the pressurizer and other components with nut bolt arrangement on the lavatory wall without using brackets and studs.
- iv) The contractor shall adjust the position of control panel, filter regulator, SS water pipe 20 mm or any other equipment on CDTs panel in position as per reference of drawing No. MI007851 for Coaches, RDSO/CG/DRG/24052 for coaches. The contractor shall change the position of mounting brackets of pressurizer, water locking unit and NRV position if required for easy engagement of barrel bolts of CDTs panel.
- v) The contractor shall fit the tested ok pressurizer unit on the CDTs panel, make all the plumbing and pneumatic connections and ensure that barrel bolts/locks of CDTs panel engage easily.
- vi) For shifting of water pressurizer unit onboard behind attachment wall, water pressurizer unit, water piping, pipe fittings, clamp nut bolts, pneumatic piping and fittings shall be dismantled from underslung and shall be re-used to the maximum extent possible.
- vii) All pneumatic piping and electrical wiring shall be routed through a protection sleeve and securely tied on a clamped wall.
- viii) Fasteners mentioned as item 2,3,4,5,6 in drg No. RDSO/CG/DRG/24052 and item 1,2,3 in drg No. RDSO/CG/DRG/24053 or any other fastener as per requirement will be supplied by the contractor.

10. Procedure of work:

The contractor shall supply the following material for repairing/overhauling the pressurized flushing system of coaches. The contractor shall use the following list of

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materials for repair/overhauling. Whether the in-coming coach is received with Pressurized Flushing System or Electro Pneumatic Pressurized Flushing system of any version, the out-going condition should fulfill the conditions of MMDTS 19027 Rev. 3

All the items/Spares required for AMC/POH work shall be as per MMDTS 19027 Rev. 3.

Annexure-I

Sr No	Description	unit	Qty per PFS	Total qty in 3360 PFS	% replacement	Total Qty to be replaced
1	Complete sealing kit for piston and water pressurizer suitable to Make	Set	1	3360	100%	3360
2	Fitting straight connector 8 mm tube 1/4"	No.	3	10080	20%	2016
3	Nylon piston for water side suitable to make	Set	1	3360	15%	504
4	Nylon piston for air side suitable to make	Set	1	3360	15%	504
5	PU tube 8 mm	meter	1	3360	100%	3360
6	angle seat valve - 3/4"(water locking unit)	No.	1	3360	40%	1344
7	Modified water control valve 3/4" NRV	No.	2	6720	40%	2688
8	3/4" worm drive clip	No.	4	13440	100%	13440
9	SS 304 honing cylinder water side	No.	1	3360	10%	336
10	SS 304 honing cylinder air side	No.	1	3360	5%	168
11	Piston rod chrome plated with suitable thread for piston	No.	1	3360	10%	336
12	Cylinder assemble rod MS	No.	4	13440	10%	1344
13	ELECTRICAL PUSH BUTTON (1 NO+1 NC) WITH GREEN LED INDICATOR	No.	1	3360	50%	1680
14	Timer SASRJ/202/24V DC	No.	1	3360	20%	672
15	Timer SASRJ/202/110V DC	No.	1	3360	30%	1008

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16	5/2 WAY SINGLE SOLENOID VALVE BSP 1/4 INCH (WITH MOUNTING 24VDC COIL)	No.	1	3360	40%	1344
17	Solenoid valve AMX CE 1100-9 110V DC	No.	1	3360	30%	1008
18	Solenoid valve coil 24V DC or 110 V DC	No.	1	3360	20%	672
19	M8 nut with washer for assembled rod- 16 Nos	No.	16	53760	20%	10752
20	M12 nut with washer for piston rod - 02 nos	No.	2	6720	20%	1344
21	Spring for water locking unit	No.	1	3360	20%	672
22	Thermo-plastic hose pipe 20 bore x 1.5 meter	meter	1.5	5040	100%	5040
23	Stainless Steel hex head screw M10*30	No.	4	13440	100%	13440
24	Stainless Steel Nyloc nut to size M10	No.	4	13440	100%	13440
25	Fitting male elbow 1/8" for 8 mm tube	No.	2	6720	50%	3360
26	Fitting male elbow 1/4" for 8 mm tube	No.	3	10080	50%	5040
27	Silencer(muffler) 1/4"	No.	1	3360	100%	3360
28	Silencer (muffler) 1/8"	No.	1	3360	100%	3360
29	5/2 push pull type spring return valve(knobs,pneumatic fittings, fasteners,mounting plate,nut bolts)	No.	1	3360	20%	672
30	Fitting equal tee 8 mm tube	No.	2	6720	50%	3360
31	Hex Nipple-1/4"	No.	1	3360	100%	3360
32	NRV-1/4"	No.	1	3360	100%	3360
33	Information Sticker Regarding PFS/EPFS System	No.	1	3360	100%	3360
34	SS ELBOW 3/4" BSP BOTH END FEMALE THREAD FOR WATER LINE	No.	1	3360	10%	336
35	Nozzle 1"x 3/4"	No.	2	6720	10%	672
36	FERRULE CONNECTOR FOR AIR LINE (APPLICABLE SS	No.	1	3360	10%	336

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	TUBE SIZE 1/2" and 1/4" BSP MALE THREAD) IN PNEUMATIC LINE					
37	FERRULE CONNECTOR FOR AIR LINE (APPLICABLE SS TUBE SIZE 3/8" and 1/4" BSP MALE THREAD) IN PNEUMATIC LINE	No.	1	3360	10%	336
38	NOZZLE 3/4" X3/4"	No.	2	6720	10%	672
39	PRESET AIR FILTER AND REGULATOR 1/4" AT 3 BAR PRESSURE WITH BRACKET,PNEUMATIC FITTINGS AND FASTENERS	No.	1	3360	10%	336
40	ISOLATING COCK (1/4" BSP WITH BOTH END FEMALE THREAD)	No.	1	3360	10%	336
41	Middle cover of cylinder	No.	1	3360	10%	336
42	Front cover of cylinder	No.	1	3360	10%	336
43	Rear end cover of cylinder	No.	1	3360	10%	336
44	SMPS i/p 110 V to o/P 24 V	No.	1	3360	5%	168
45	PE Converter	No.	1	3360	5%	168
46	Complete water pressurizer	No.	1	3360	5%	168
47	Control Panel	No.	1	3360	5%	168
48	Conduit Pipe	meter	1	3360	50%	1680
49	Wire with sleeve for EPPFS	meter	1	3360	10%	336
50	Electric push button plate	No.	1	3360	50%	1680
51	3/4"angular strainer with nipple	No.	1	3360	100%	3360
52	MCB for control panel	No.	1	3360	10%	336
53	SS corrugated pipe	meter	1	3360	10%	336
54	cable tag	No.	1	3360	100%	3360
55	Service Connectors	No.	1	3360	10%	336

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Note:

- i) Prior approval of the nominated Senior Section engineer of railways shall be taken for suitability check of supplied materials before fitment in the system.
- ii) Pressurized flushing systems are of different make/companies like SPAC, Airflow, Amit Engineers, IMI Norgren, Cemcon, Darshan, Oasis, CMT, Jekon, National Engineers, TMC, Janatics etc. Contractor has to arrange the spares in the above table suitable to make. The spares include the items as per MCF Spec No. MMDTS-19027 rev-03. The contractor must provide the same for provision of spares for conversion as per MMDTS-19027 Rev-03 and other latest modifications issued from time to time as advised by Railways.
- iii) Prior approval of Railways is required in case of deviation from recommended spares.
- iv) During overhauling of pressurized flushing systems, if any of the above supplied parts don't fit in size in pre-installed system, then the contractor shall arrange to supply and install suitable parts of similar/suitable make with prior approval of engineer of railways at no additional cost.
- v) Any other spare parts required for overhauling and for proper functioning of Pressurized flushing system that are not included in the above table shall be supplied by the railways and the same to be fitted by the contractor at no additional cost.
- vi) The quantities for individual items indicated above are tentative and are to be supplied by the contractor. The rates for overhauling of each PFS/EPPFS unit item include the cost of respective item/Spares per PFS/EPPFS unit. During execution, any material not utilized as per the specified replacement percentage must be returned and hand over to the railways. If additional material is required beyond the specified replacement percentage, the railway will supply the material.

11. List of items under the scope of contractor

- i) The Contractor must supply all items as mentioned in Annexure-I along with delivery challan for the same.
- ii) The Contractor must attend all the labour portion of work.
- iii) The Contractor must bring all the necessary tools and equipment, consumables as deemed necessary for executing the work as per scope of work.
- iv) In case the air supply to the lavatory is not possible through DV, the contractor must make arrangements to provide direct external supply to individual lavatory for uninterrupted repair works on the system.
- v) In case an electric supply is not available on coach, the contractor must make arrangement for 110 V electric supply to EPPFS panel using battery or power backup for uninterrupted repair works on the system.
- vi) The Contractor must provide PPEs to all his staff.
- vii) The contractor should not mix the components of different coaches and ensure proper markings on them to avoid mixing.
- viii) All the material stripped by the contractor for overhauling will be transported and placed by the contractor at the nominated place provided by the railways.

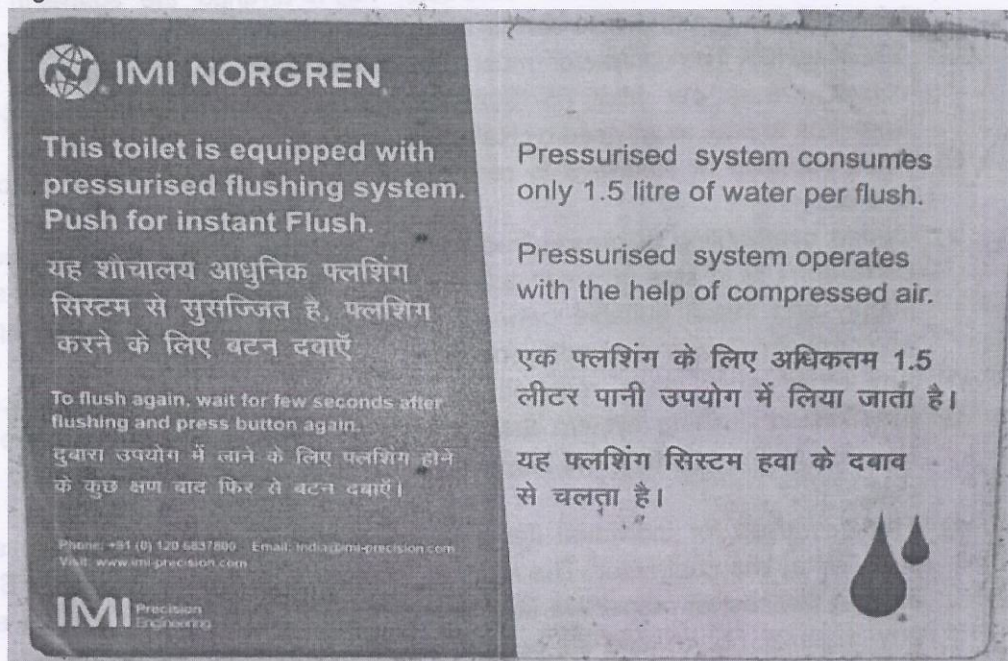
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However, the Material Handling equipment & operator will arrange by contractor, if required.

- ix) The contractor must do necessary modification in plumbing work which is required in PFS/EPFS Stripping, refitting & repositioning of system, if required.
- x) Information Stickers to be Provided as per Item Sr. No. 33. Sample of the same is given below:



12. Guarantee/Warranty of material & workmanship, if any:

- i) **GUARANTEE/WARRANTY PERIOD:** The firm shall give a guarantee/warranty of supplied material and workmanship for 18 months from the date of handing over of coach to the Railways.
- ii) Any defects for poor workmanship or material failure, if found within the warranty period, shall be attended and rectified/ replaced by the contractor free of cost within 72 hrs of intimation.

13. Inspection:

- 13.1. Material Test Report: All the items should be supplied along with RITES Inspection / TPI Test certificate. However, Railway reserves the right to get the items tested after supply by the contractor.
- 13.2. Inspection of work: Firm's representative shall handover the coach back to Railway after completion of work with check sheet [see Annexure-A] duly signed for inspection. Work shall be inspected by concerned SSE or any of the representatives nominated by Dy.CME (Carriage Shop), Kharagpur Workshop, South Eastern Railway. Any deficiencies /defects will be brought to the notice of the contractor which shall be attended by him at his own cost and within the completion period for that coach.

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14. REFERENCES:

- 14.1 Maintenance Schedule for Pressurized Flushing System (PFS) in LHB coaches issued vide letter no ICF/QMS/MDM/File/F015 Date: 19.09.2022
 - 14.2 MCF Spec No. MMDTS-19027 Rev-03
 - 14.3 Coach Alteration Instruction (CAI) for retro fitment of NRV-1/4" in between the Isolating Cock and Air Filter Regulator Lubricator (AFRL) unit of EPPFS (Electro-Pneumatic Pressurized Flushing System) in LHB coaches for preventing water ingress in air brake pipe line issued vide letter no RBL-MD46111-XII (Pt-1), Vol-I on 02/01/2024.
 - 14.4 RDSO Letter No. MC/CB/LF/Anaerobic dated 07.10.2024
 - 14.5 ICF Letter No. MD/FUR/LAV.FIT/101
15. The Contractor shall ensure that normally provision of 04 (four) toilets per LHB Coach, each equipped with an Electro Pneumatic Pressurized Flushing System (EPPFS unit). For all contract's execution purposes in this contract, the standard shall be interpreted as: 1 LHB Coach = 4 Toilets = 4 EPPFS units. However other variants i.e. Coaches with 01 nos. toilets, Coaches with 02 nos. toilets and Coaches with 03 nos. toilets has also been existing in Indian railway and may be allotted for the execution of work under this contract. All maintenance activities shall be carried out in accordance with actual requirement, and compliance will be treated as a mandatory condition under the scope of work.
16. Any other M&P/tools/transportation means etc not mentioned above but specifically required for successful execution of work is deemed to be included in the scope of Contractor.
17. The firm has to work as per instructions of consignee or nominated representative during execution of work.
18. Compliance with Specifications: The contractor must follow the specifications, CAIs, and modifications issued by RDSO, PUs, or any authorized railway authority for the materials used and the work procedures, as mentioned in the Scope of Work.
19. Any other work or portion of work required during execution of above mentioned work, beyond what are mentioned in this scope, but prevails in other relevant guidelines, or deems fit at any point of time for proper execution of the work, shall have to be done by the contractor without any additional financial implication.
20. Any other work, which has not been mentioned here, but necessary for completion of subjected work shall be assumed included in scope of work of Contractor.
21. The Tenderer may visit the Carriage Shop of Kharagpur Workshop, S.E. Railway for assessing the work to be done before submitting the offer.

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