



No. EL/3.1.10/1(WLU)

प्रधानमुख्य विद्युत अभियंता,

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3. पूर्वतटीय रेलवे, चन्द्रशेखरपुर, भुवनेश्वर-751 023
4. पूर्व रेलवे, फेयर्ली प्लेस, कोलकाता-700 001
5. उत्तर मध्य रेलवे, ब्लाक ए-2, सुबेदारगंज इलाहाबाद- 211 033
6. उत्तररेलवे, बडौदा हाऊस, नई दिल्ली-110 001
7. उत्तर पश्चिम रेलवे जयपुर- 302006
8. उत्तर पूर्व रेलवे गोरखपुर- 273001
9. दक्षिण मध्य रेलवे, रेल निलयम, सिकंदराबाद-500 371
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13. दक्षिण पश्चिम रेलवे हुबली-580020
14. पश्चिम मध्य रेलवे, जबलपुर-482 001
15. पश्चिम रेलवे, चर्चगेट, मुम्बई- 400 020
16. पूर्वोत्तर सीमांत रेलवे, पान्डुपोर्टरोड, मालीगाँव, गुवाहाटी, असम-781012
17. चित्तरंजन रेल इंजन कारखाना, चित्तरंजन- 713 331
18. बनारस रेल इंजन कारखाना वाराणसी. 221004
19. पटियाला रेल इंजन कारखाना पटियाला 147003

Date: As signed

Principle Chief Electrical Engineers,

1. Central Railway, Mumbai, CST-400 001.
2. East Central Railway, Hazipur-844 101.
3. East Coast Railway, Chandrashekharpur, Bhubaneswar-751 016.
4. Eastern Railway, Fairlie Place, Calcutta-700 001.
5. North Central Railway, Block-A, Subedarganj, Allahabad- 211 033.
6. Northern Railway, Baroda House, New Delhi-110 001.
7. North Western Railway, Jaipur- 302 006
8. North Eastern Railway, Gorakhpur-273001
9. South Central Railway, Secunderabad-500 071.
10. South East Central Railway, Bilaspur-495 004.
11. South Eastern Railway, Garden Reach, Kolkata-700 043.
12. Southern Railway, Park Town, Chennai-600 003.
13. South Western Railway, Hubli- 580020
14. West Central Railway, Jabalpur-482 001.
15. Western Railway, Churchgate, Mumbai-400 020
16. North East Frontier Railway, Pandu Port Road, Maligaon, Guwahati, Assam 781012 331
17. Chittaranjan Locomotive Works, Chittaranjan-713
18. Banaras Locomotive Works, Varanasi-221 004
19. Patiala Locomotive Works, Patiala, Punjab- 147003

**Sub:** Issue of revised RDSO FRS no. RDSO/2023/EL/FRS/0034, Rev. 01 dated 13.08.2024 of Water-Less Urinal for Electric Locomotives.

RDSO has revised FRS no. RDSO/2023/EL/FRS/0034 of Waterless Urinal for Electric Locomotives. Copy of the revised FRS no. RDSO/2023/EL/FRS/0034, Rev. 01 is attached herewith for your kind reference and record please.

Revised specification is also uploaded on RDSO website which can be downloaded from following path:

**www.rdsso.indianrailways.gov.in---->Specifications / drawings----> Loco, EMU & Power supply----> list of specification for loco & other ----> Master list of Specification ----> Superstructure, Bogies, Roof Equipments, DBR, Pantographs, VCB, Cabs ----> FRS no. RDSO/2023/EL/FRS/0034, Rev. 01.**

Encl: As above

*Nirdosh*  
14-08-24  
(Nirdosh Kumar Gupta)  
for Director General/Elect

**Copy to:**

1. M/s KKI Power Drives Pvt. Ltd. Ghaziabad
2. M/s Svarn Infratel Pvt. Ltd. Faridabad
3. M/s Delco Switchgears Pvt. Ltd. Ghaziabad
4. M/s Sidhali Industries / Ghaziabad
5. M/s Gospel India Marketing Pvt. Ltd Patiala
6. M/s Brite Metalloy Pvt. Ltd., Kolkata
7. M/s Style Work, Engineering Pvt. Ltd. Barabanki
8. M/s Modern Railtech, Kolkata
9. M/s Vidu Enterprises, Delhi

It is advised to  
submit  
compliance of  
the above  
revised FRS.

*Nirdosh*  
14-08-24  
(Nirdosh Kumar Gupta)  
for Director General/Elect



**GOVERNMENT OF INDIA  
MINISTRY OF RAILWAYS**

**Functional Requirement Specification (FRS) of Water-Less Urinal for Electric Locomotives**

**FRS No.: RDSO/2023/EL/FRS/0034 (Rev. 01')  
Issued on: August - 2024**

Approved by	Signature
PED/ PS & EMU	

**RESEARCH DESIGNS AND STANDARDS ORGANISATION  
LUCKNOW-226011**

Prepared by	Checked by	Issued by

## Functional Requirement Specification (FRS) of Water-Less Urinal for Electric Locomotive

### 1. OBJECT:




This FRS covers construction features and technical requirements of Water-Less Urinal module suitable for men & women for Electric Locomotive application.

### 2. GENERAL




- 3.1. IR has always endeavour to provide best in class facilities to the passengers. Provision of superior toilets in trains has been one of the key focus areas of IR. In the same pursuit, it becomes imminent for IR to provide safe and hygienic urinal facility to its LOCO pilots who are the fountain head of the exemplary services offered by IR to its passengers.
- 3.2. Considering the riding shocks and vibrations sustained by the locomotive on run, the robustness of the system with respect to its capability to endure higher vibrations and shocks becomes all the more important.

### 3. Technical requirement:-

- 3.3. Maximum envelope size of water-less urinal module should not be more than 1050 (L) X 600 (W) X 1830 (H) mm.
- 3.4. The sheets used for construction of the waterless urinal unit which will be of stainless steel have a minimum thickness of 1.0 mm.
- 3.5. It should be provided with single WC type bowl which is suitable for use by both man and woman.
- 3.6. Material of bowl should be Stainless steel.
- 3.7. Coating such as high grade epoxy coating, nano coating etc. should be there on bowl so that urine should not stick to bowl.
- 3.8. Any proven technology to prevent odour such as membrane traps, liquid sealant cartridges etc should be there. Naphthalene balls chamber can also be fitted in the bowl.
- 3.9. Discharge of urine should be directly gravitational to the ground through suitable drain pipe arrangement. To drain excess water during washing, an additional hole will be required on the floor of the urinal, which will drain from the main hole i.e. the outlet of the additional hole will have to be connected to the main hole. The location of the main discharge should be such that it does not adversely affect nearby equipment.
- 3.10. There should be UV LED light based sanitization system for sanitizing the bowl. The arrangement of UV light inside the bowl should be such that the entire bowl should be sanitized. The UV Light arrangement should be protected from urine during use and from water or cleaning agent during cleaning. Bowl should be easy to clean whenever needed with toilet cleaner agents.

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- 3.11. Complete system should be work 110 V DC. Operating voltage range is Maximum-138 V Minimum-72 V.
- 3.12. A computerized processing unit should be there to interface with an external micro-processor i.e. locomotive microprocessor for interlocking the permission for usage of toilet only at zero speed. Interlock of Waterless Urinal unit with the locomotive will be done.
- 3.13. The urinal should be fitted with an occupancy sensor that will turn on the exhaust fan and light during use and turn off the light and exhaust fan after use. Apart from this, UV light and perfume dispenser should be work after using the urinal. The frequency of operation shall be optimized with use of Water Less Urinal.
- 3.14. Auto door closer should be provided in Water Less Urinal.
- 3.15. Indication should be given in case the Water Less Urinal door is left open.
- 3.16. Emergency push button should be provided for exit in case of emergency.
- 3.17. Waterless urinal unit should be provision for isolate (electrically/electronically) and integrated with the locomotive by Switch / Push button.
- 3.18. Complete design of urinal cabin should be such that it can with stand the vibration being generated during running and it should be easy to install and dismantle from locomotives. Shock and Vibration test shall be carried out as per IEC-61373 or (latest) on complete unit.
- 3.19. It should be fitted with urinal mat as well as automatic and power supply-based perfume dispenser to reduce the odour and the quantity of perfume should not be less than 300 ml.
- 3.20. It should be fitted with a sensor and power supply-based hand sanitizer dispenser, the quantity of which should not be less than 900 ml.
- 3.21. There should be a provision to keep the door closed from inside while using the urinal.
- 3.22. For convenience of crew following items should also incorporated in product i.e Door Handle, handrail, Door lock, Led Light exhaust fan for proper ventilation etc.
- 3.23. Instructions for use of the waterless urinal and other instructions should be given in radium/reflector/self-illumination on the inside of the unit (on the side the person face while urinating) and on the outside of the door. Instructions should be written in English (**Only for Urination**) and Hindi (केवल पेशाब/मूत्र के लिए) and letter / word font size should be between 80-100.
- 3.24. **Marking:**
- (i) Name of Manufacturer
  - (ii) Month & Year of Manufacture e.g. XX/20XX
  - (iii) Serial Number

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#### 4. Approval of Design:

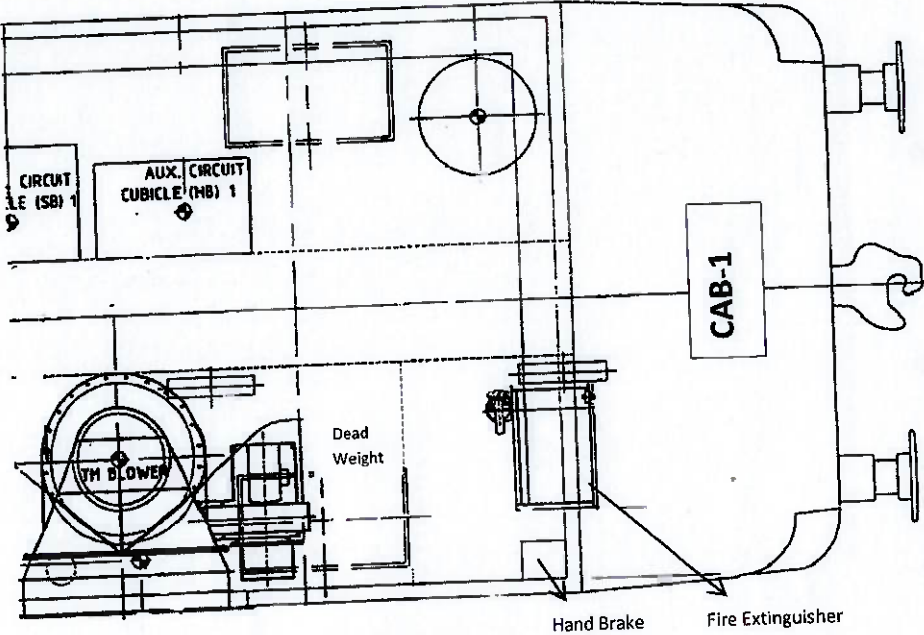
The design shall be developed as per requirement given above. The detailed design shall be submitted for scrutiny and approval before commencing the manufacturing. The supplier's shall be responsible for performance of complete system.

.....XXXXXX.....

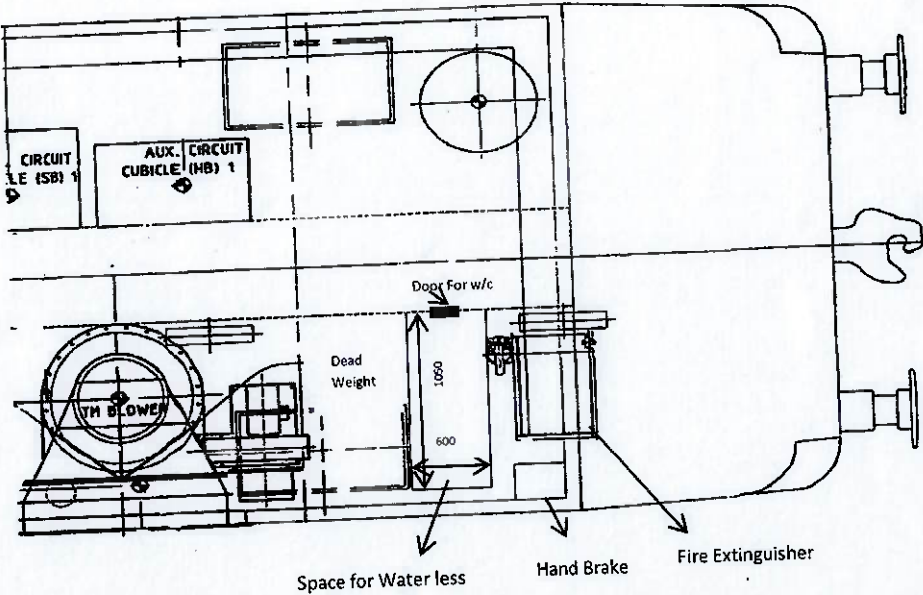
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WAG-9/9H/9HC

All Dimensions in mm



Existing Arrangement



Proposed Location of Water-less Urinal

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