

PUBLIC COMPETITION FOR

Waterless & Odourless Toilets

Government of India, Ministry of Railways
Research Designs and Standards Organization

In response to Hon'ble Prime Minister's clarion call for a clean India under the Swachh Bharat Abhiyaan Indian Railways has decided to go in for a public competition for **Waterless Odorless toilets** in trains. The central idea of this competition is to develop such a design which shall not have foul smell and use no water for operation and maintenance.

Submission of Entries:

Last Date of Submission: 31st December 2015, 1700 hrs.

Submission to be mailed to: waterlessodourlesstoilets@rdso.railnet.gov.in

Entries received after the stipulated time shall not be considered for competition. The entries should be marked in the subject line as "ENTRY FOR COMPETITION FOR **WATERLESS ODOURLESS TOILETS**".

Guidelines for submission of entries:

A. Technical details for the Entry Proposal:

1. Present Design, Difficulties being faced in the present Design and Expectations from new Design are given in the enclosed **Annexure "A"**.
2. In the beginning it should have a brief explanation (about half page) of the Design and how it achieves the cleaning of toilets without water and prevent emanation of foul smell.
3. It may include drawings and material details to illustrate the design.
4. It should provide a cost assessment of proposed design for setup and operation
5. It should specify the consumables and power requirement of the proposed design, if any
6. It should specify the assessed life of the designed component
7. It should include plan for disposal of waste and environment impact, if any.

B. General Details for the Entry Proposal:

1. It should be made only in A-4 size.
2. It should be limited to 10 pages with the overall file size not exceeding 5MB.
3. The writeup should either be submitted in Hindi or English
4. The write up to be submitted in clearly readable PDF format with font size equivalent to 12 in the single line spacing in Hindi or in English. In case submission is in other language, it must be submitted with translations in either Hindi or English.
5. The design should be original work of the participant and must not infringe the Intellectual Property Rights of any third party.
6. It could be an individual project or a team project.
7. No reference of the identity of the person(s) submitting should be made in the proposal. If done so, it shall debar the entry from consideration
8. The bio-data, Contact Details (mobile no. , email id etc.), and affiliations of the applicant to be sent separately in mail (not as part of the technical writeup).
9. It is strongly advised not to wait till the closure time for submission of entries. Railways shall not be responsible for late/ non receipt of entries on account of server errors/ traffic.

C. Other Conditions:

1. The final selected design shall become the intellectual property of the Ministry of Railways and the designer shall not have any right over the same.
2. Railways may decide to associate with the proposer for further development of the proposed design.
3. The responsibility to comply with the guidelines and other conditions fully lies with the participant and the Ministry of Railways shall not be liable for any dispute raised by a third party.
4. Any dispute arising out of this competition shall be subject to local jurisdiction of Lucknow.
5. Unsuccessful entries shall be intimated through email and Ministry of Railways shall not have any right over the same.

D. Selection Process and Award:

1. All the entries received by the stipulated date and time and found in order, shall be evaluated by a Jury of distinguished experts from Railways, Industry and Academia/Research field.
2. Five (5) entries, found worth considering for getting more details, shall be shortlisted for final selection. The shortlisted Designers would be required to make a presentation to the Jury.
3. The date, time and venue of the presentation shall be communicated separately to the shortlisted designers.
4. Following prizes will be given to five (5) shortlisted designers;
 - (i) First Prize, Rs. 3 Lakh
 - (ii) Second Prize, Rs. 1.5 Lakh
 - (iii) Three consolation Prizes, Rs.25,000/- each
5. Result of competition is expected to be announced by 28th Feb 2016 & will be intimated to participants through email and published on website : rdso.indianrailways.gov.in;

(Executive Director/ Research)
Research Designs & Standards
Organization, Lucknow

Waterless & Odourless Toilets

1. Key Objective:

Development of waterless & odourless toilets for trains

2. Availability of toilets in Trains:

- 2.1. Railway coaches generally have toilets @ 4 per coach provided at each corner.
- 2.2. Generally, one of the toilets is Western Closet type, while others are Indian pan type.
- 2.3. A drawing of general layout of existing toilet arrangement is attached for understanding at Annexure I.

3. Design of toilets currently being used on IR:

- 3.1. **Conventional Toilets:** These toilets are open to air and are provided with chute.
- 3.2. **Bio Toilets:** Uses bacterial decomposition of fecal matter. A Sketch of bio toilet is enclosed (**Annexure I**)
- 3.3. **Control Discharge Toilet System (CDTS)** permitting open discharge at train speeds above 30 Kmph only to avoid soiling of station premises. (**Annexure II**)

4. Design of toilets available in the World (as per available information):

4.1. **Vacuum toilets**

Vacuum Toilets use vacuum for transport of toilet waste with water, thus reducing water consumption and Waste is collected in stainless steel retention tanks. Disposal of waste is done at terminals through waste handling systems. The vacuum toilets are considered expensive to retrofit and require lot of terminal infrastructure

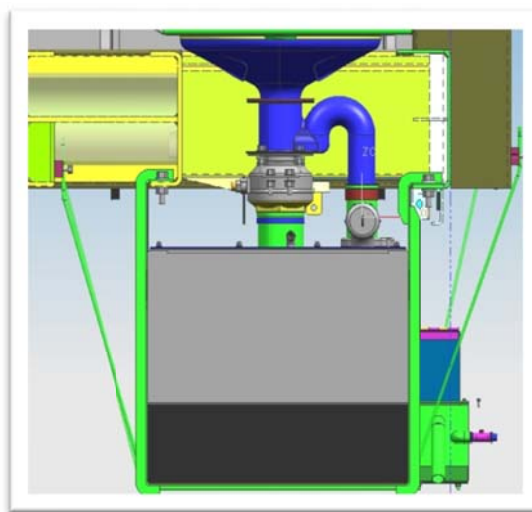
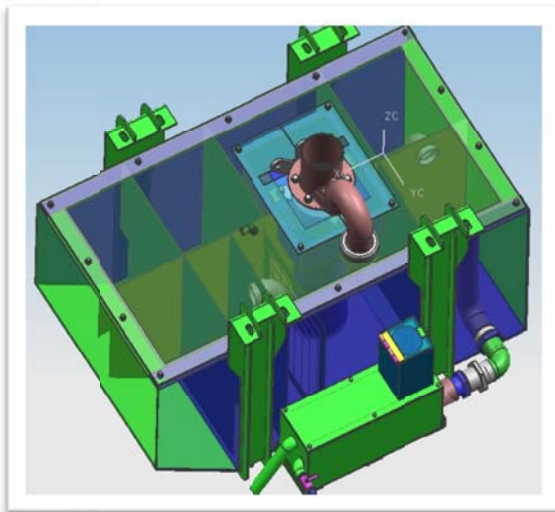
4.2. **ZDTS (Zero discharge toilet system)**

This toilet works on the principle of solid liquid separation with solid portion store-evacuate- transfer and dump into pits for composting and liquid portion filtered, treated, recycled for flushing purpose. These toilets have been developed by a consortium consisting of RDSO, IIT/Kanpur & URBANE Industries, Chennai under TMRS Projects and is being tried out in coach No.SR08224 for a period of almost one year in train No.6031/6032 and train No.6093/6094.

5. Expectations from new design of toilets:

- 5.1. Minimal use of water for operation
- 5.2. Easy to use and maintain
- 5.3. Should be odorless (no foul smell at all)
- 5.4. Zero Discharge (PH neutral liquid discharge as per environment norms)
- 5.5. Overall dimensions and space envelope, presently provided, not to be exceeded
- 5.6. Structure of the toilet should be rugged and rigid. It should survive usage pattern and vibrations due to dynamic forces up to a level of 3g.
- 5.7. Design & layout should be such that it caters to all genders and ethnic groups.
- 5.8. Should be aesthetically pleasing and passenger friendly

Bio-toilet Fitment



CDTS Fitment in LHB Coaches



