

BIO TANK POSITION		
<u>DIVISION</u>	<u>COACH</u>	<u>BIO POINT</u>
AII	112	336
BKN	206	684
JP	163	560
JU	177	430
<u>TOTAL</u>	658	2010



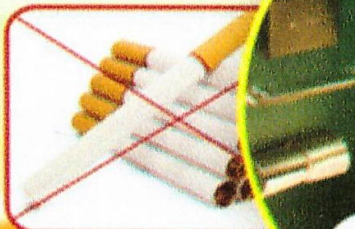
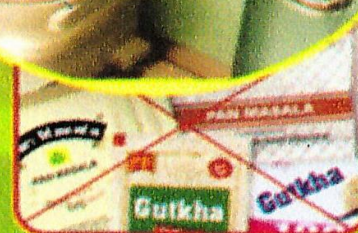


Indian Railways

BIO-TOILETS

**keep Tracks and Railway Premises
free of Human waste**

Please help us NOT CHOKING them.....



**Indian Railways
have a target for
fitment of Bio
Toilets in all
coaches and
thereby zero
discharge of human
waste into the
environment by
2019 - 20.**

**This toilet is based on latest Bio Digester Technology which prevents direct discharge
of human waste to environment and keeps the tracks free of this waste.**

रैल बढ़ते देश बढ़ते

What is Bio-Toilet (Bio-Digester Toilet)?

- **Biological decomposition of Human waste**
- **Bio-Toilet is an innovative technology for disposal of solid human waste in an eco-friendly, economical and hygienic manner.**
- **A Bio-Toilet is a complete waste management solution which reduces solid human waste to Biogas and pure water, with the help of a bacterial Inoculum.**

What is Bio-Toilet (Bio-Digester Toilet)?

The residual water from Bio-Toilet

- Is colorless, odorless and devoid of any solid particles.
- Requires no further treatment / waste management.
- Can be used for irrigation purposes.

IR-DRDO Bio-Toilet System

An environment Friendly Toilet System

Green toilet aims at Zero – defecation on the ground

1. Discharge on track creates environmental problems as well as problem in working to work man.
2. A multi-directional strategy has been implemented for adoption in IR-Passenger Coaches.
3. MOU has been signed with DRDO for joint technology development.
4. The First Rake with bio-toilets developed with DRDO is running in Bundelkhand Express **since 18th January -2011.**
5. **10 more rakes** fitted with DRDO technology toilets have been allotted to NR, NCR, NER, NFR, CR, WR, WCR and SECR.
6. **3056 Coaches have been fitted with 9174 Bio-Toilets in 2014-15.**
7. **Cumulatively approx. 8500 coaches have been fitted with Bio toilet and approx. 25000 Bio-toilet fitted in coaches.(as on 30.09.2015).**

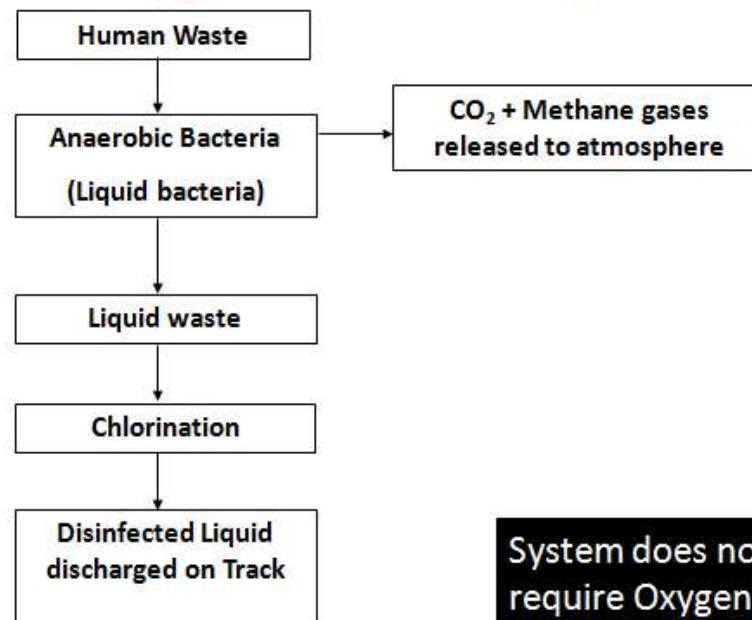
Advantages of IR-DRDO Bio-Digester

1. No bad smell in toilets from the tanks
2. No infestation of Cockroaches & flies
3. Fecal matter in the tank not visible
4. Effluent is free from off odour and solid waste
5. No maintenance required
6. Reduction in harmful organic matter by 90%
7. No requirement of adding bacteria
8. No need of removal of solid waste

Benefits of Green Toilet Sytem

- Environment friendly
- Preventing damages to track from Corrosion
- Improved Aesthetics at Railway Stations

Working of Anaerobic System



System does not
require Oxygen and
also does not require
regular cleaning

Brief about bacteria – anaerobic

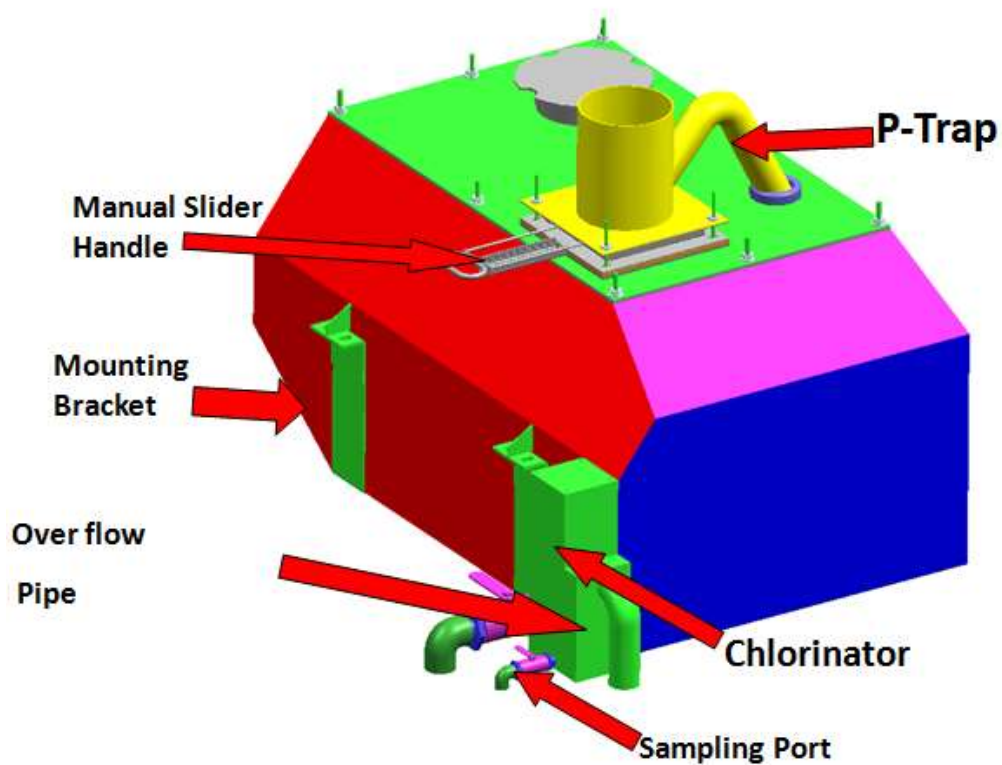
Anaerobic bacteria:

- Can process doubling its population **within 6 to 8 hrs**
- Dominates and decompose matter in to liquid and gases
- Can be kept for **3-4 months** at ambient temperature
- Can withstand **sub zero** temperature as well as **upto 60** degree centigrade **but charging of Inoculum should be done not less than 5°C Temperature.**
- Cold temperature would not affect the inside processing because:
Anaerobic process is exothermic in nature thus, in cold regions heat will be available inside the chamber because of chemical process.

Information about IR-DRDO Bio-digester Tank

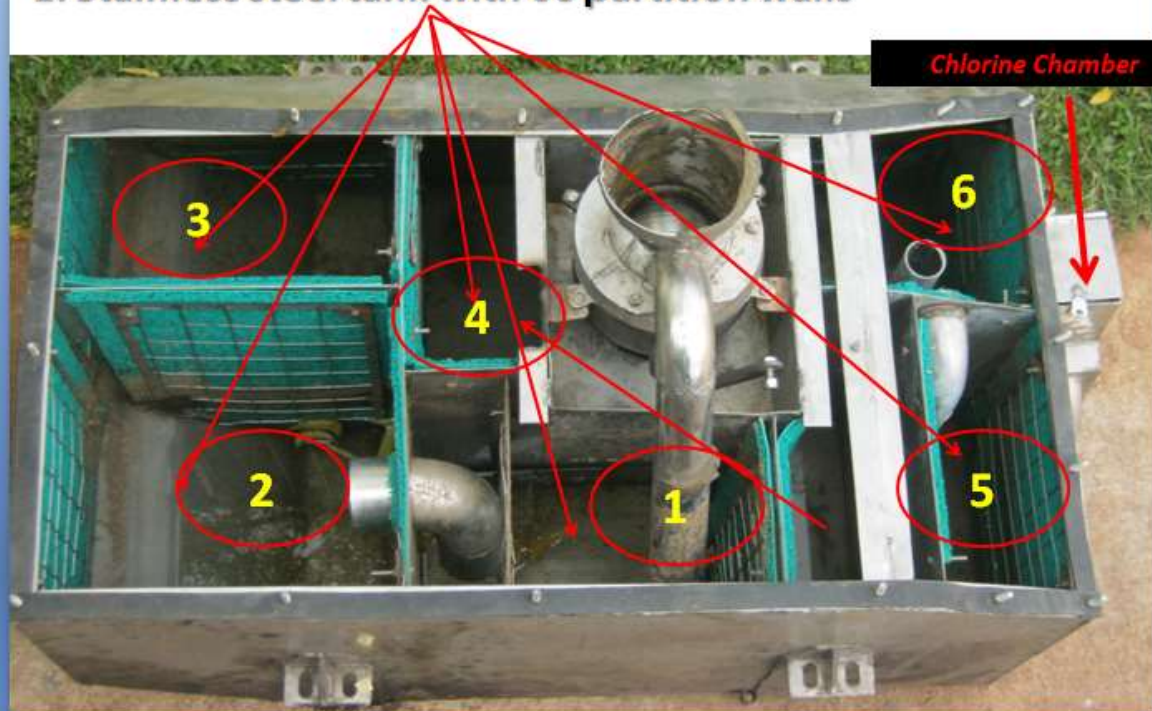
1. Length - 1150 mm
2. Width - 720 mm
3. Height – 540 mm
4. Total Volume of Tank – 400 lt.
5. Effective Volume of Tank – 300 lt.
6. Empty Tank weight – 110 Kg.
7. Full Tank Weight – 410 Kg.
8. Height from Rail level – 225 mm



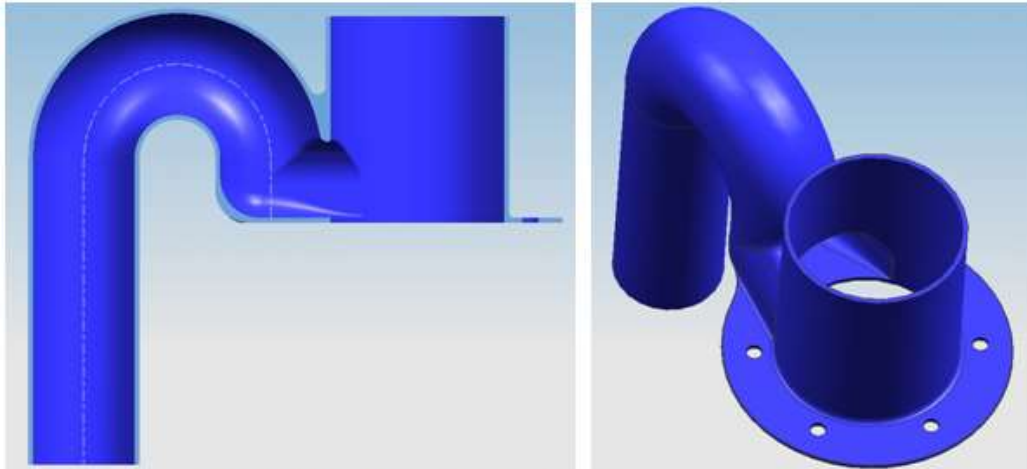


Main parts of the Bio digester tank

1. Stainless steel tank with 06 partition walls



P-Trap Design



P-Trap to RDSO drawing no. 14055

- P-trap has been made of **100 mm interface** diameter with improved flow at bend area.
- **Retaining capacity** of liquid is almost **one liter only**.
- Material has been defined **AISI -316** investment casting only.

Provision of S-Trap by NWR



- Item no. 3.3 of 14th JWG-Feb. 2015 directed to undertake trial with S-trap on **10 coaches**.
- Provision already made in 02 AC coaches & same is running successfully in JP-MYS Exp. for almost **05 months**.
- Further **10** coaches have been fitted (total 25 coaches) till Sep.2015.
- After analysing performance in 17th JWG SEP.2015, fitment of S-Trap has been extended upto 100 Coaches.

Provision of S-Trap by NWR

Continue...

- Provision of SS Mesh to avoid Choking of



Air Suction for reducing foul smell by NWR

Suction chute provided in toilet side wall to get continuous evacuation of foul smell during train running.



- Suction air speed measured using anemometer is 1.6 to 3.3 m/sec at 100 kmph train speed.
- Side panel electric exhaust fan - 3.4m/sec.
- Suction from near the source of foul smell.

Bio toilets with Ball Valve



View of End panel of coach



Fitted with four Bio digester tank



Fitted with conventional toilet

View of draft gear



Fitted with four Bio digester tank



Fitted with conventional toilet

View of air hoses



Fitted with four Bio digester tank



Fitted with conventional toilet