

TRF DTS

DECAY TANK SYSTEM

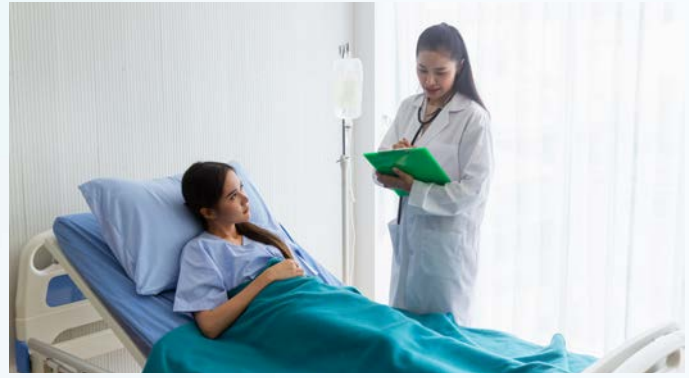
FOR LIQUID RADIOACTIVE WASTE
MANAGEMENT



RADIOACTIVE WASTE MANAGEMENT IN MEDICINE

- › Turn-Key Solutions from concept design to Installation and Commissioning
- › Radiation Safety
 - IAEA, ICRP & Local Regulation Compliance
- › Environmental Care
- › Remote Radioactive Waste Management

When patients are treated with radioactive isotopes, such as ^{131}I metabolic therapy for thyroid cancer or undergo Nuclear Medicine Diagnostic (PET/SPECT) procedures, the radioisotope is primarily eliminated via the patient's urine¹. The urine must be treated as Radioactive Waste, and a Decay Tank System is required.



DTS Key Features

- > The TRF DTS is Reliable & Safe: TRF DTS Decay Tanks are manufactured of Stainless Steel A316 and Self Shielded with lead. Other materials are available.
- > Customizable Tank Dimensions.
- > Minimum Facility Space Requirement.
- > The TRF DTS assures the safe discharge of radioactive waste generated in the Nuclear Medicine Department, automatically, without the direct involvement of Nuclear Medicine department personnel or hospital staff.
- > The TRF DTS can function automatically.
- > All pertinent information is available in the DTS system: Liters & Activity Discharged, Historical Records, Volume & Activity Graphs.
- > The TRF DTS complies with all International and local regulations for Radiation Protection².
- > The Maximum Discharge Value of Radioactivity can be set by the user in the DTS Software, according the local regulations. The DTS does not allow the discharge if the Maximum Discharge value exceeds the value set by the user.
- > Water Saving Technology: The TRF Hot Toilet (special separation toilet) reduces the flush water volume to 0.25 liters or less per flush and significantly reduces the space required for the Decay Tank System components.
- > The TRF DTS is a complete system that includes the connection between the TRF DTS and the TRF Radiation Monitoring System, TRF Hot Toilets and TRF Hot Sinks.
- > Many different TRF DTS models are available and can be customized to the user's needs.

DTS-TRF Added Values

- > TRF provides Consultation Services for Radiation Protection Projects, Medical Physics, Radiotherapy, Nuclear Medicine, Cyclotrons, Radioactive Waste Management and Radiology.
- > TRF provides DTS project management and Radiation Protection reports. DTS Customer Training.
- > DTS Remote and On-Site Maintenance.
- > DTS Quality Assurance & Calibration of the Radiation Sensors.

TRF DTS Integrates:

- > Lead Shielding customized to the Project.
- > Charcoal Filter at the DTS exhaust.
- > Radiation Monitoring System: GM Radiation Detectors provide the activity levels in Bq, inside of each tank and the level of radiation dose ($\mu\text{Sv/h}$) in the facility.
- > Filling level sensors provide the filling level in Liters and in % for each tank.
- > User Management and Password Control with different levels of access and permission.

> DTS Displays:

- Filling level of each tank in Liters and (%).
- Radioactivity level of each tank (Bq.)
- Graphs of filling level (L) and Radioactivity (Bq.) along the time of each tank.
- Remaining time to fill the filler tank (days).
- Decay time for the decaying tank (days).
- The amount of volume (L) and activity (Bq) discharged to the sewer system.
- Expiration date of the DTS calibration.
- Historical Data

> Available Options:

- Emergency Tank.
- Sump Pit Tank / Lift Station.
- Sampling Module (automatic or manual).
- Washing Module (automatic or manual).
- Dilution Module (automatic or manual).
- Waste Recirculation Module.
- Periodic Test of Valves & Pumps.
- Redundant set of filling sensors.
- Facility flooding Sensor.
- Surveillance video camera.
- BMS connection.



¹IAEA (International Atomic Energy Agency). Safety Report Series n°63: Release of Patients after Radionuclide Therapy With contributions from the ICRP (Internal Commission on Radiological Protection). ²IAEA-TECDOC-1000. "Clearance of materials resulting from the use of radionuclides in medicine, industry and research".

Equipment Networked/Linked to the DTS



TRF HOT TOILET

One of the main features of the **TRF Decay Tank System** is the use of the TRF special separation Hot Toilet. The TRF Hot Toilet allows the system to collect only the urine (where the radioactive waste is concentrated) The TRF Hot Toilet separates radioactive urine from non-radioactive solid waste. The patient solid waste / feces is discharged via the regular sewage system.

- > The TRF Hot Toilet is manufactured of **stainless steel A-316** and is resistant to the absorption of the radioactive urine. The DTS Hot Toilet is designed with 2 sections within the bowl to separate the radioactive waste (urine) from the non-radioactive waste (feces.)
- > The radioactive liquid waste is stored in the TRF DTS Decay Tanks until safe for discharge.
- > The Hot Toilet urine outlet siphon provides 4 mm of lead shielding.
- > The TRF Hot Toilet does not require specialized plumbing. Standard plumbing piping can be used provided there is no leakage of waste.
- > Non-radioactive waste is discharged into the normal waste system directly, i.e. public sewer.
- > Hot Toilet "Flush Volume" for radioactive urine can be adjusted from 0.25 to 1.0 litre.
- > The flush volume for solid waste is a standard 5.0 liter per flush.
- > Connectivity to the TRF Decay Tank System is via LAN (Ethernet socket).

Note: The TRF special Hot Toilet can only be used with, monitored and controlled by the TRF Decay Tank System Control Board and TRF controlling software.



TRF DTS REMOTE MONITOR

- > The TRF Remote Monitor allows for control and monitor of the DTS remotely, from different locations such as the Radiation Protection Office, Nuclear Medicine Department Control Area, Hospital Facility Management and the TRF factory.
- > When used with the (optional)TRF RadyNet software program, the Remote Monitor allows for monitoring and operation of the radiation detectors and monitoring of surveillance camera images.



TRF HOT SINK

The **TRF Decay Tank System (DTS)** incorporates a specially designed Hot Sink. The TRF Hot Sink is designed to collect liquid radioactive waste that is produced in a Hot Lab and send the liquid radioactive waste to the TRF DTS. The liquid radioactive waste is stored in the Decay Tanks until safe for discharge. The TRF DTS Hot Sink is manufactured of **stainless steel grade A-316** and is resistant to the absorption of radioactive liquids / pharmaceuticals.

- > The TRF Hot Sink faucet (tap) is controlled by an infrared sensor and does not require physical contact by the user.
- > The Hot Sink does not require special plumbing materials. Standard plumbing can be used provided there is no leakage of waste.
- > During normal operation, the Decay Tank System Hot Sink will display a green light.
- > In the event of a failure the Hot Sink water inlet will be automatically disabled and the Hot Sink will display a red light.
- > Connectivity to Decay Tank System is by LAN (Ethernet socket.)



GM RADY AREA RADIATION MONITORING

The TRF GM Rady Area Radiation Monitoring system incorporates a sophisticated and dedicated Area Monitor that allows for central control and monitoring, video linkage and wireless capabilities. The TRF GM Rady also offers multiple installation options that can provide for "Flush" mounting to a wall surface without display of cables and connectors.

Main TRF GM Rady Features:

- > Energy Compensated Geiger Müller Detector.
- > Equipped with up to 2 Geiger Müller Detectors.
- > Dose Rate in ($\mu\text{Sv/h}$, mR/h).
- > Measuring Range: 0.1 $\mu\text{ Sv/h}$ - 20 mSv/h.
- > Type of Radiation: Gamma & X-Ray.
- > Wall Mounted.
- > 7" Touch Screen Display.
- > Two programmable threshold levels.
- > Password Protected.
- > Record of measurements and access to Historical Data.
- > Ethernet & Wireless Connectivity.
- > CE Mark and UL Mark



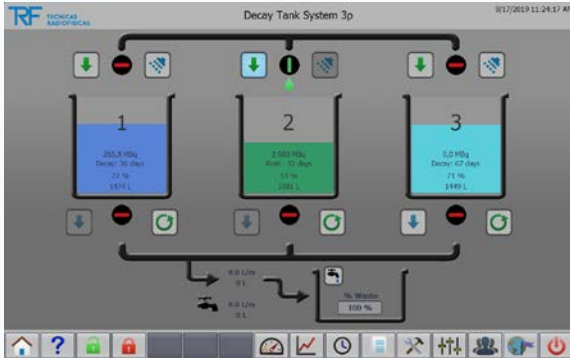
SURVEILLANCE CAMERA

The Surveillance Camera allows for "Remote" visual survey of the Decay Tank System without the need of sending personnel to the DTS location.

STANDARD TRF DTS MODELS:

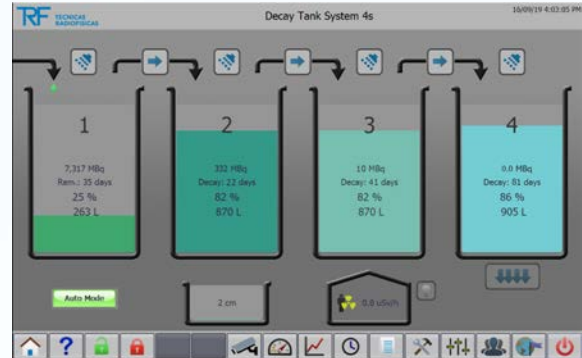
Customized options are available.

DTS-P



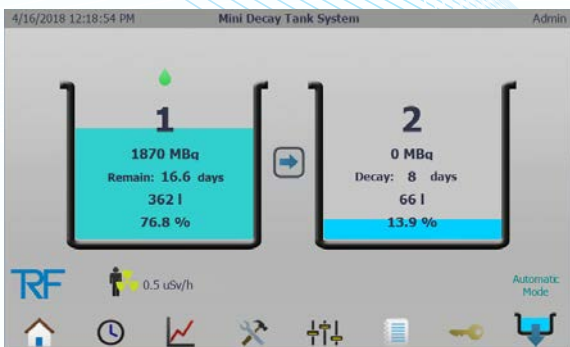
- > Decay Tank System is motorized valve based.
- > Fully Automatic Design.
- > Discharge Dilution: Automatic waste dilution with water by inputting the discharge percentage (%) of the waste desired.
- > Periodic and automatic test of valves and pumps.
- > Tank Washing option is available.
- > Waste Recirculation is available.
- > User & Password Control.
- > Event & Historical Records.
- > Volume (L) and Activity (Bq) Graphs.
- > Remote maintenance is available.

DTS-S



- > Decay Tank System is pump based.
- > Fully Automatic Design.
- > Discharge Dilution: Optional Manual or Automatic waste dilution availability.
- > Tank Washing option is available.
- > User & Password Control.
- > Event & Historical Records.
- > Volume (L) and Activity (Bq) Graphs.
- > Remote maintenance is available.
- > Radiation Detector for the facility integrated into the TRF DTS.

MINI-DTS



- > Decay Tank System is pump based.
- > Fully Automatic Design.
- > Discharge Dilution: Optional Manual waste dilution availability.
- > Option: Tank Washing availability.
- > User & Password Control.
- > Events & Historical Records.
- > Volume (L) and Activity (Bq) Graphs Radiation Detector of the facility integrated in the DTS.
- > Remote maintenance is available.
- > Radiation detector for the facility integrated into the DTS.

DTS-Lab



- > Decay Tank System for Laboratory purposes.
- > Discharge Dilution: Optional manual waste dilution availability.
- > Equipped with filling level sensors and radiation sensors.

DTS Options		DTS-P Parallel	DTS-S Serie	Mini-DTS Serie	DTS-Lab Manual
Waste Management Application.	Metabolic Treatments	✓	✓	✓	×
	Nuclear Medicine Diagnostic (PET&SPECT)	✓	✓	✓	×
	Laboratory	×	×	×	✓
Waste inlet motorized valve/tank.		1	×	×	×
Waste outlet motorized valve/tank: <ul style="list-style-type: none"> • Discharge. • Recirculation. • Dilution. • Samples. 		✓	Optional	×	×
Sump Pump/tank for discharge & waste outlet.		1	2	2	1
Solenoid Valve for cleaning / tank.		1	1	Optional	×
Venting pipe with charcoal filter.		✓	✓	✓	Optional
Automatic sample taking.		✓	Optional	×	×
Manual sample taking.		×	Optional	Optional	Optional
Emergency manual valve for discharge / tank.		1	1	1	Optional
Automatic dilution, i.e. Concentration of waste controlled by the DTS.		✓	Optional	×	×
Manual dilution, i.e. Concentration of waste controlled by manual flow meters.		×	Optional	Optional	✓
Decay Tank GM Radiation Sensor / Tank To determine Activity in the tank (Bq, Bq/L).		1	1	1	1
Pressure sensor / Tank To determine the filling level (L, %).		1	1	1	Optional
Redundant filling Level / Tank battery operated.		1	1	Optional	×
Maximum Level sensor / Tank.		1	1	1	1
Area Radiation Monitor for the Decay Tank room (µSv/h.)		Optional	✓	✓	×
Periodic Motorized Valve Auto-Check.		✓	×	×	×

TRF HOT TOILETS & HOT SINKS

Waste collection points

GM RADY
Area radiation monitor



DTS REMOTE MONITOR

Inside the hospital



LAN
HOSPITAL
NETWORK



Surveillance camera



REMOTE CONNECTION

From outside



DTS

Decay tank system

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