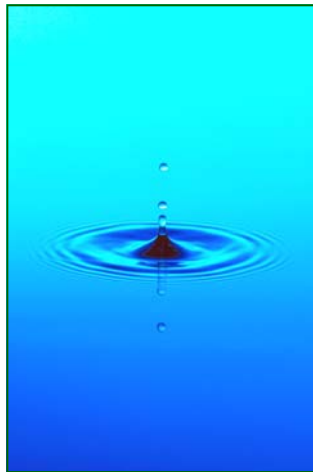


## WATER PURIFICATION

Like beauty, water purity lies in the eye of the beholder; while the domestic consumer would consider tap water to be “**pure**” the AI laboratory technician would regard it as grossly contaminated. Most tap water contains contaminants such as heavy metals, bacteria, endotoxins and various organic salts, all of which can have a detrimental effect on semen quality.

**As approximately 95% of each dose of AI is water, it is vitally important to ensure the purity of water used for preparing AI diluent.**



**Rotech offers a wide range of water purification systems** to meet the individual needs of each AI laboratory, depending on the amount and frequency of water required and the quality of the feed-water to be treated.

Measurement of the hardness or TDS (Total Dissolved Solids) of the tap water is an important starting point. This can be achieved using a simple electronic TDS tester or conductivity meter. TDS measurement dip testers are available from Rotech for TDS measurement.

Knowing how many AI doses are required and how often, will allow you to calculate how much purified water is required and when. This information, along with the feed-water TDS will help you to select the most appropriate water purification system from the Rotech range.

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# WATER PURIFICATION

## WATER PURIFICATION METHODS

The two main methods of water purification used in Rotech systems are **deionisation** and **reverse osmosis**. Both of these methods are employed **together** in two of the systems on offer. **Ultraviolet sterilisation** is used to kill bacteria which can build up in purified water storage tanks in the **TGI-325E system**.

### DEIONISATION:

Deioniser cartridges contain ion exchange resins which are made up of tiny, spherically shaped beads through which the feed-water passes. They function by exchanging hydrogen ions for cationic contaminants and hydroxyl ions for anionic contaminants in the feed-water. This should result in a purified water TDS of almost zero.

After a period of time, cations and anions will have replaced all the active hydrogen and hydroxyl sites in the resin which, in most deioniser cartridges changes colour as this happens. Once all the resin has changed colour the cartridge is exhausted and is discarded.

Deionisation is very effective and will give purified water on demand but it will not remove organic material from the water, so where bacteria removal is a priority reverse osmosis should be the choice.

### REVERSE OSMOSIS:

This is a process by which the feed-water is forced through a semi-permeable membrane, the purified water passing through the membrane whilst the contaminants accumulate in the residual water to be flushed away to drain.

Reverse osmosis will remove about 90% of all inorganic and organic (including bacteria) contaminants from the feed-water and because of this exceptional purifying efficiency reverse osmosis is a very cost-effective technology for water purification in the AI laboratory.

### ULTRAVIOLET LIGHT:

Water from a pressurised storage tank flows around a bulb which emits high intensity ultraviolet radiation. The UV light destroys the genetic material of pathogens such as coliform bacteria which may have built up in the tank water. The bacteria are then effectively neutralised as they are prevented from reproducing.

# WATER PURIFICATION

## WATER PURIFICATION SYSTEMS



TGI Deioniser

### TGI DEIONISER:

An economy water purifier for small-scale On-Farm AI laboratories. This system does not have colour change resin so an electronic TDS dip tester is supplied to check the purified water. This will allow the operator to determine when the cartridge is exhausted.

It is cost effective to use the TGI Deioniser for up to about 10 litres of purified water per week and on feed-water of about 400 TDS or less.

On feed-water of 400 TDS each cartridge will produce approximately 60 litres of purified water.



C-14 Deioniser

### C-14 DEIONISER:

A colour-change resin cartridge will remove the dissolved solids (minerals) from your feed-water. The cartridge is housed in a transparent housing that can be plumbed in directly to your water supply, using a saddle-valve incorporating a tap which can be tee-ed directly to a standard copper pipe. In some instances, this system may be used in conjunction with a simple Reverse Osmosis unit, such as the Mini RO.

An installation kit containing all the necessary tubes and fittings to connect to your water supply is supplied separately.

### MINI REVERSE OSMOSIS UNIT: 2 STAGE WATER PURIFICATION SYSTEM

The Mini RO Unit will remove over 90% of all impurities, both inorganic and organic from the feed-water. This unit will greatly extend the life of any deioniser cartridge if installed up-stream of it on the water line. This is particularly important in very hard water areas where deioniser cartridges are rapidly exhausted.

#### STAGE 1 – CARBON PRE-FILTER

The feed-water firstly passes through a carbon pre-filter in order to remove chlorine which would be damaging to the reverse osmosis membrane.

#### STAGE 2 – REVERSE OSMOSIS

From the carbon pre-filter the water passes through the reverse osmosis membrane which then removes over 90% of impurities from the water. After passing through the reverse osmosis membrane the partially purified water should be passed through a deioniser cartridge, the wastewater from the RO being discarded down the drain. The deioniser will remove any remaining inorganic contaminants from the water.

The Mini RO unit works well in conjunction with all our deioniser systems.



Mini RO Unit

## TGI-325E/RO 1 – 4 STAGE REVERSE OSMOSIS WATER PURIFICATION SYSTEM

Considering its high degree of sophistication this state-of-the-art water purification system is both easy to use and relatively low-cost. Simple maintenance coupled with economical and efficient operation make the 325E the automatic choice for any AI laboratory requiring between 10 and 15 litres or more purified water at any one time.

### STAGE 1 – CARBON PRE-FILTER:

The feed-water is passed through a carbon pre-filter in order to remove chlorine which would otherwise cause damage to the reverse osmosis membrane.

### STAGE 2 – REVERSE OSMOSIS:

The reverse osmosis removes over 90% of all impurities from the water including inorganic contaminants, dissolved organics and bacteria.

### STAGE 3 – ULTRAVIOLET RADIATION

Whilst the purified water is held in the pressurised tank there may be a small build-up of bacteria. When the water is drawn from the tank for use it is firstly passed through an ultraviolet steriliser to kill the bacteria.

### STAGE 4 – DEIONISER

After running from the tank through the UV steriliser the water is given a final “polish” in a deioniser cartridge before being drawn off for use in preparing boar semen diluent.

**The TGI-325E system can be further improved by the addition of a sediment pre-filter upstream of the carbon pre-filter. This is especially important where the feed-water may be of relatively poor quality.**



TGI-325E

## HIGHER CAPACITY WATER PURIFICATION SYSTEMS

For AI laboratories that need relatively large amounts of purified water, the **TGI 25E system** can be upgraded to produce water at a faster rate by changing the Reverse Osmosis Membrane for a higher capacity one, and a larger holding tank can also be added.

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