

The Nephrotron logo features the word "nephrotron" in a bold, dark blue, sans-serif font. To the right of the text is a stylized graphic consisting of three curved lines in red, white, and blue, resembling a flame or a signal. The logo is contained within a white, rounded rectangular shape with a dark blue border, set against a dark blue background with a faint image of a dialyzer.

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# Make Dialyzer Reusable

Dialyzers are reprocessed to reuse

The Greyfalcon.org logo features a stylized grey falcon icon above the text "Greyfalcon.org" in a bold, dark blue, sans-serif font. Below the main text is the tagline "accelerate healthcare research" in a smaller, lighter blue, sans-serif font. The logo is contained within a white rectangular box.

**Greyfalcon.org**  
accelerate healthcare research

## Greyfalcon Healthcare Pvt. Ltd.

- Manufacturing dialyzer reprocessors since 2015
- Globally recognized brand with worldwide sales network.
- **UKAS EU ISO 13485 certified company**
- Patents published in Indian journals

## Introduction

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### Dialyzer Reprocessing

- **nephrotron™** is registered trademark of Greyfalcon Healthcare Pvt. Ltd.
- CE certified, **four different models** to choose from, fits every budget and features latest technology.
- **Skilled , trained and certified technicians** for onsite servicing and installation

### Objective

- Make **dialysis a safe, affordable and hygienic** process for technicians, clinical staff and patients.
- **Reduce bio-waste** and impact to environment by reusing dialyzers

## What is reprocessing of dialyzer ?

The reprocessing procedure involves :

- **Rinsing** the dialyzer with RO water.
- **Cleaning** the dialyzer with sterilant
- **Testing** dialyzer membranes
- **Disinfecting** (filling) the dialyzer with sterilant
- Manually ***inspecting, labeling, storing*** the dialyzer before it is reused again



## How old is the reuse practice ?

- Dialyzer reuse has been done safely in the United States since the 1960's
- It evolved considerably during 1980 - 2000
- The reprocessing declined a bit when hospitals started using single use dialyzer
- The reuse rate increased again for medical and economical reasons in the same period.

# Why reuse dialyzers ?

- **The primary reason is economics.**
  - The cost of treatment keeps going up, but the amount of money from treatment doesn't change, gets competitive or fixed. Each dialyzer can be reused upto 15 times, savings from reusing of dialyzer can be used to provide additional services to patients or clinical staff.
- **Patient's immune system works better with reused Dialyzer**
  - With reused dialyzer, patients immune system knows the fibres as it had already touched the blood during previous process, it's no more a stranger to body. With new dialyzer everytime "first-use" reaction can happen when the patient's blood touches dialyzer fibers which are unknown to immune system.
- **Reducing landfill with discarded dialyzer and helping environment**
  - Plenty of raw materials, energy, manpower necessary to manufacture dialyzer get's saved by choosing to be treated with a reprocessed dialyzer, this also helps the environment as it significantly decreases the number of discarded dialyzers that end up as bio-waste or in community landfills.

# Benefits to patients with reused dialyzer

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- Reused dialyzers **reduces hypersensitivity reactions**.
- A patient on new dialyzer may have such a reaction in the first 15–30 mins of treatment with **symptoms like anxiety, itching, and trouble breathing**, which can lead to respiratory failure.
- Few reactions are due to ethylene oxide (ETO), ETO is used to sterilize most new dialyzers. **Chances of reaction is reduced with reused dialyzer** as they are repeatedly cleaned and rinsed. In rare cases, patients may have an anaphylactic reaction to a new dialyzer; this is a severe, sometimes fatal allergy, which may include hives and respiratory failure.
- If renal nurse observes more blood clots in dialyzer during wash, then it means patient is getting insufficient heparin, this data may help in getting correct dosage.
- Some centers reuse dialyzers because they want to remove more middle molecules, such as beta-2-microglobulin ( $\beta$  2 m). Reuse makes it possible for these **centers to afford the costly high-flux dialyzers that do a better job** of removing middle molecules.

Courtesy : 2008 module 7 and References : Twardowski ZJ: Dialyzer reuse—part II: advantages and disadvantages

# Reuse is environment friendly

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- The production, distribution and final disposal of Dialyzers have significant impact on environment, the process emits carbon dioxide and release various chemicals into the atmosphere.
- Though the dialyzer is discarded after every use it is not going out of earth, it's in landfill as another biohazard.
- If a new dialyzer is used for a patient 3 times a week = needs 156 new dialyzers per year, if reused dialyzer are used only 10 dialyzers will be needed per year. If each patient can reduce 146 dialyzer per year, imagine the impact on environment for 1 million patients using reused dialyzer instead of single use.

# How should be a dialyzer reprocessed ... ?

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## Clean with RO water and Sterilant

### Remove blood remains

**Rinse** : Blood remains in the dialyzer at the end of treatment should be flushed out of the fibers using RO water.

**Clean** : Dialyzer fibers soaked in dilute sterilant solution for couple of mins and dialyzer cleaned again with RO water.

## Test membrane Integrity

### Confirm if dialyzer is safe to reuse

**Bundle volume test** : Ensure that the fibers that carry the blood are open and not clotted. Compare volume of water in dialyzer chambers with actual dialyzer bundle volume.

**Pressure leak test** : Ensure that the fibers that carry the blood are not broken. Fill the dialyzer with air and confirm for any air leak using pressure sensor.

## Disinfect with Sterilant, Label, Store

### Disinfect and store the dialyzer

**Affusion** : Fill the dialyzer with Sterilant solution till the next cycle.

**Label** : Mark the dialyzer with patient info and reprocessing info (date, test result, etc).

**Store** : Store the dialyzer in the rack.

# Available options (pros and cons)

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## Options

### Reprocessing a Dialyzer



DISADVANTAGE

#### Manual Process

- Manual testing of dialyzer fibre after washing is not possible.
- Highly prone to human errors.
- Possible wastage of RO water and sterilant.
- Improper preparation of sterilant solution or Inadequate filling of the dialyzer may lead to chills, nausea, muscle pain and can be life threatening.
- Manual maintaining of records is an overhead.
- Wrong labeling may result in wrong dialyzer usage on patient
- Clinical staff is exposed to sterilant fumes, biohazards and bacteria, it's life threatening for staff as well.



#### Automated Dialyzer Reprocessing Machine

- Efficient & Consistent
- Printed Labels & Computerized records
- Machine tested dialyzer is safe for reuse
- Cost saving on RO water & Sterilant consumption



# Is reuse safe ?

Yes, if hospitals take necessary care and use machines to reprocess.

- A dialyzer must be clearly labeled with the patient's name and only used for the same patient after reprocessing.
- A dialyzer must be tested after reprocessing to make sure it's fibers can work properly.
- A dialyzer must be tested after rinsing at next visit for any traces of disinfectant that may remain.
- Patients must be monitored for any reactions due to reuse.

# nephrotron™

automatic dialyzer reprocessing system



- Simultaneous reprocessing of **TWO** dialyzers
- Android based UI graphics
- **Operate over bluetooth** from distance.
- Reprocessing records in xls file.
- **Inbuilt bundle volume, pressure leak test**

- **Single dialyzer reprocessor**
- Android based UI graphics
- Reprocessing records in xls file.
- **Inbuilt barcode scanner**
- Water proof, polyester label **sticker printer**
- **Inbuilt bundle volume, pressure leak test**

- **Single dialyzer reprocessor**
- Ultra low cost
- **Inbuilt bundle volume, pressure leak test**
- **Premixed Sterilant solution should be provided**
- **In built thermal printer**



- Simultaneous reprocessing of **TWO** dialyzers
- Android based UI graphics
- Inbuilt **voice assistant** for operating
- Records in xls file.
- Inbuilt **barcode scanner**
- Water proof, polyester label **sticker printer**
- **Inbuilt bundle volume, pressure leak test**

- **Single dialyzer reprocessor**
- Android based UI graphics
- Reprocessing records in xls file.
- **Inbuilt bundle volume, pressure leak test**

# nephrotron Diaflo II



Patented Technology  
Application no. **201941007618**  
Published in the Journal Number **36/2020**

- **Simultaneous reprocessing of two dialyzers** - It takes less than eleven minutes to reprocess two dialyzers. Both high flux and low flux dialyzers and hemodia-filters can be reprocessed.
- **Five step process** - Rinses the dialyzers, clean using liquid disinfectant (Hydrogen Peroxide and Peracetic acid), tests the membrane integrity by measuring bundle volume and pressure leak tests and finally filling the dialyzer with liquid disinfectant. Each cycle takes 25ml of disinfectant per dialyzer.
- **In built Barcode scanner and Printer** - The thermal transfer printer prints barcode and dialyzer data on water proof 1x2 label sticker. Stick one of the label to the dialyzer and another in record. The barcode scanner will be used to scan the data for every reuse.
- **Reports on email** - Reprocessing status for each dialyzer is stored automatically in an .xls report and can print over WiFi or emailed to any registered mail ID of hospital staff.
- **Accessories** - Each system is shipped with a dual unit drip tray, a water pressure gauge to measure water pressure.

# nephrotron<sup>®</sup> Diaflo I



- **Single station reprocessing of dialyzers** - It takes less than nine minutes to reprocess a dialyzer. Both high flux and low flux dialyzers and hemodia-filters can be reprocessed.
- **Five step process** - rinses the dialyzers, clean using liquid disinfectant (Hydrogen Peroxide and Peracetic acid), tests the membrane integrity by measuring bundle volume and pressure leak tests and finally affusion, filling the dialyzer with liquid disinfectant. Each cycle takes 25ml of disinfectant per dialyzer
- **In built QR Code scanner** - If there is a QR label on dialyzer then the inbuilt QR code scanner can be used to capture and record dialyzer data.
- **Reports on email** - Reprocessing status for each dialyzer is stored automatically in an .xls report and can print over WiFi or emailed to any registered mail ID of hospital staff.
- **Accessories** - Each system is shipped with a dual unit drip tray, a high definition inbuilt 7 inch Android™ tablet, a water pressure gauge to measure water pressure supplied to the system.

# nephrotron<sup>®</sup>

## Duo S



- **Simultaneous reprocessing of two dialyzers** - It takes less than eleven minutes to reprocess two dialyzers. Both high flux and low flux dialyzers and hemodia-filters can be reprocessed.
- **Five step process** - Rinses the dialyzers, clean using liquid disinfectant (Hydrogen Peroxide and Peracetic acid), tests the membrane integrity by measuring bundle volume and pressure leak tests and finally affusion, filling the dialyzer with liquid disinfectant. Each cycle takes 25ml of disinfectant per dialyzer.
- **Ultra Hygienic** - Operate the machine over Bluetooth (BLE) from an acceptable distance for ultra hygienic experience also reduce exposure to chemicals.
- **Reports on email** - Reprocessing status for each dialyzer is stored automatically in an .xls report and can print over WiFi or emailed to any registered mail ID of hospital staff.
- **Accessories** - Each system is shipped with a dual unit drip tray, a high definition inbuilt 7 inch Android™ tablet, a water pressure gauge to measure water pressure supplied to the system.

# nephrotron PremixD



- **NOTE :** Disinfectant should be premixed externally, the chemical will be drawn from the container at inbuilt pressure and flow.

- **One button operation** - With just one button press, it takes less than seven minutes to reprocess one dialyzer. Both high flux and low flux dialyzers and hemodia-filters can be reprocessed.
- **Five step process** - rinses the dialyzers, clean using liquid disinfectant (Hydrogen Peroxide and Peracetic acid), tests the membrane integrity by measuring bundle volume and pressure leak tests and finally affusion, filling the dialyzer with liquid disinfectant. Each cycle takes 25ml of disinfectant per dialyzer
- **In built Conductivity sensor** - As the chemical is prepared manually, the machine ensures the chemical has the required conductivity. The machine stops and reports with an alarm to user if the chemical isn't premixed as per the required standards.
- **Dialyzer membrane integrity tests** - Bundle volume is visible on the level scale for manual read. The Pressure leak test is reported on the OLED display.
- **Accessories** - Each system is shipped with a dual unit drip tray, a water pressure gauge to measure water pressure supplied to the system.

The logo for Nephrotron, featuring the word "nephrotron" in a lowercase, sans-serif font. The "o" is stylized with a red and blue arc above it. The entire logo is enclosed in a white oval with a red and blue border.

[www.nephrotron.com](http://www.nephrotron.com)

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Manufactured by :

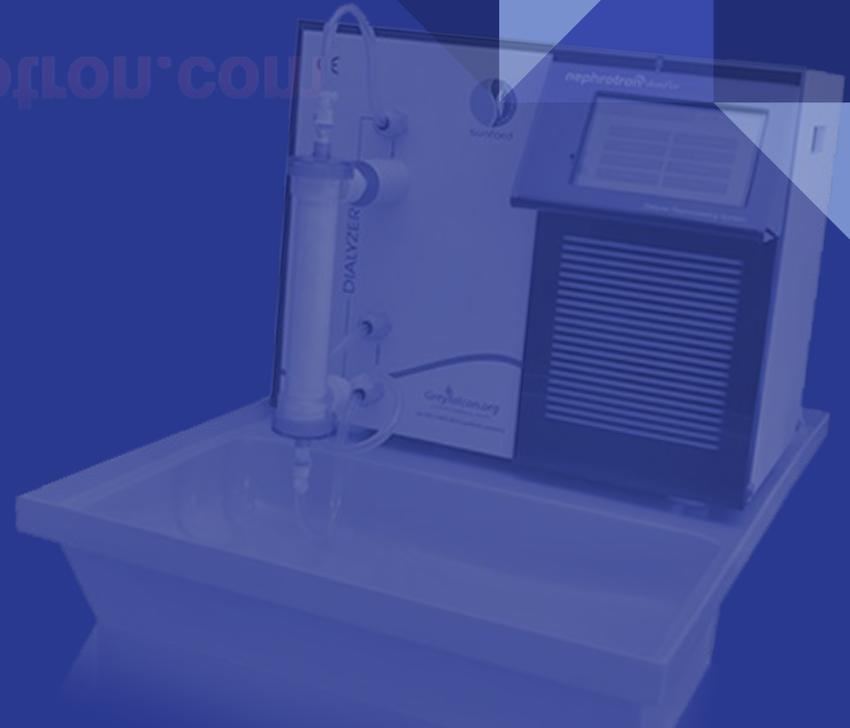
**Greyfalcon Healthcare Pvt. Ltd.**

No 75/7, 20th Main, Near ISKCON Temple

Rajajinagar, Bangalore 560010 INDIA

Phone : +91 9342816997

[research@greyfalcon.org](mailto:research@greyfalcon.org) | [sales@nephrotron.com](mailto:sales@nephrotron.com)

The logo for Greyfalcon.org, featuring a stylized blue bird icon above the text "Greyfalcon.org" in a bold, sans-serif font. Below it, the tagline "accelerate healthcare research" is written in a smaller, lowercase font.

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