

DWA

nephro SAFE

HEAT-DISINFECTION AND ULTRAFILTRATION
THROUGH INTO THE DIALYSIS MACHINE

The production of ultrapure permeate and its supply through into the dialysis machine with the same consistent high quality is another innovation which demonstrates DWA's expertise in the development of permeate systems for dialysis. The nephro SAFE system ensures bacterial free permeate through

the combination of continuous ultrafiltration

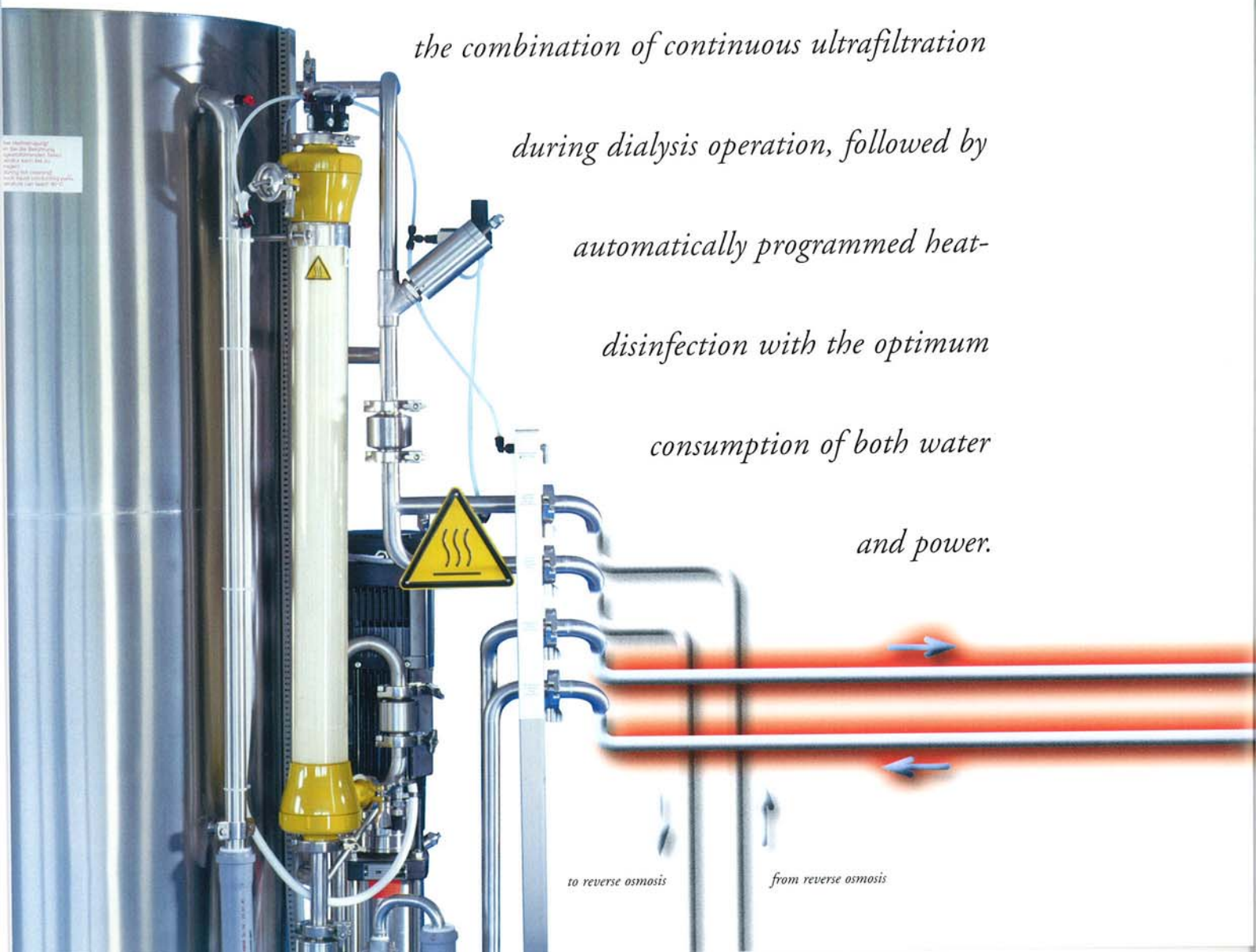
during dialysis operation, followed by

automatically programmed heat-

disinfection with the optimum

consumption of both water

and power.



to reverse osmosis

from reverse osmosis

nephro SAFE

CONTINUOUS ULTRAFILTRATION



The continuous ultrafiltration of the content of the distribution ring during dialysis serves to eliminate any microorganisms, biofilm fragments and endotoxins which may be present in the permeate. They can enter the permeate distribution ring during the coupling and uncoupling of the dialysis machine from the permeate supply or from micro-biologically burdened areas of the dialysis machine. Because of the low molecular weight of

some endotoxins, reverse osmosis processes are not able to retain them completely. Although the pores of reverse osmosis membranes are up to one hundred times smaller, the separation capacity of ultrafiltration membranes is about two orders of magnitude higher for endotoxins (permeability only 0.001 %). The production of ultrapure permeate is therefore possible through a combination of reverse osmosis and ultrafiltration.

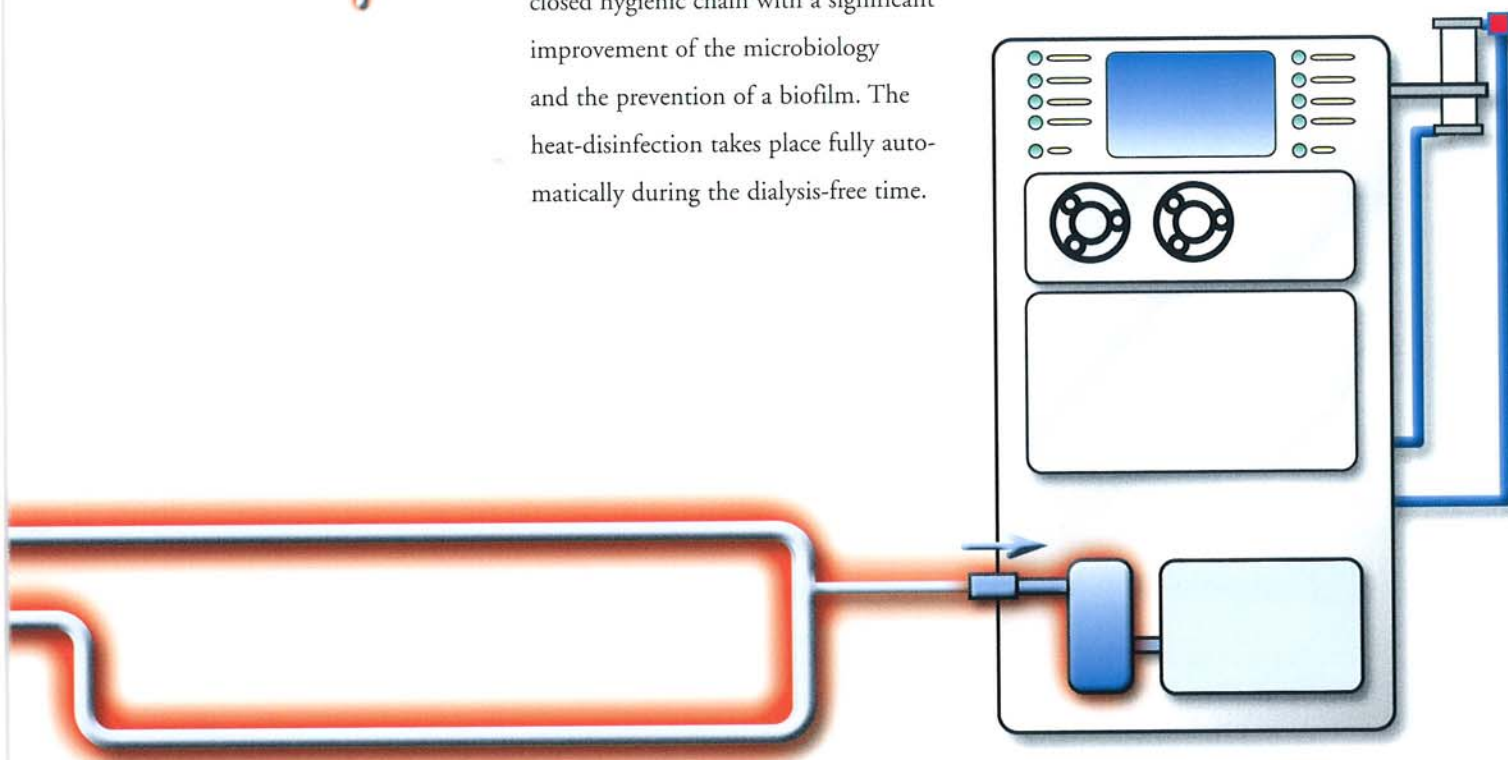
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HEAT-DISINFECTION WITHOUT DEAD ZONES

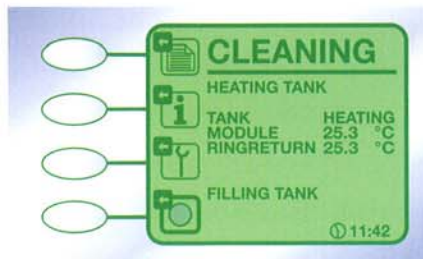
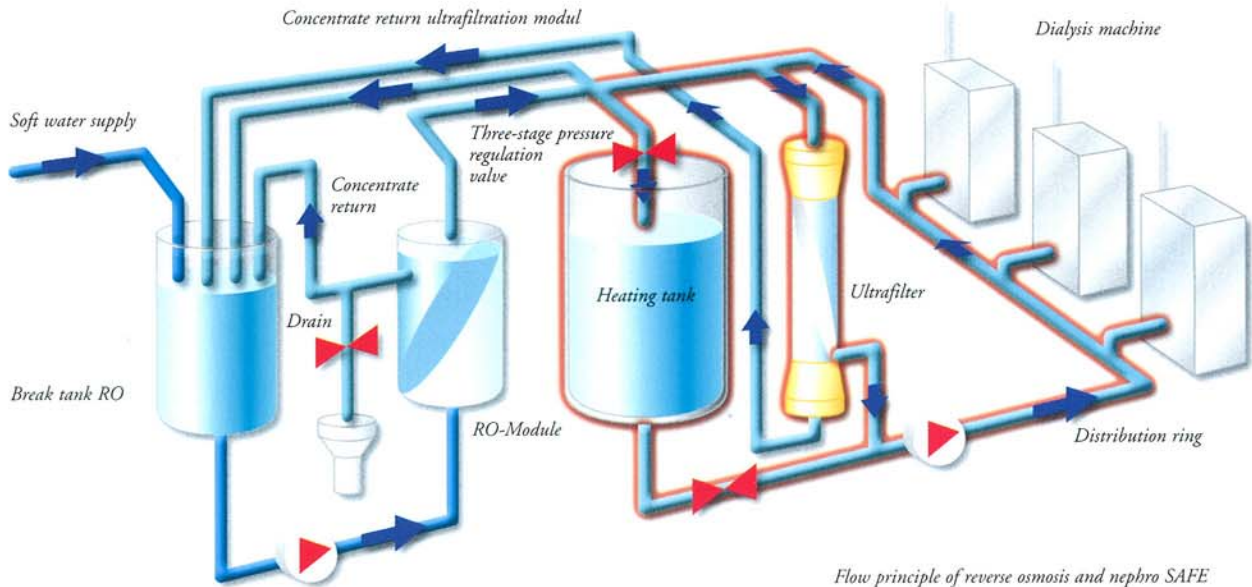


Heat-disinfection using the nephro SAFE disinfests the entire permeate distribution ring, the dialysis machine connection hose and the inlet part of the dialysis machine. The result is a closed hygienic chain with a significant improvement of the microbiology and the prevention of a biofilm. The heat-disinfection takes place fully automatically during the dialysis-free time.

The use of the hot permeate through the dialysis machine ensures savings of both power and water.



THE SYMBIOSIS OF ULTRAFILTRATION AND HEAT-DISINFECTION FOR GUARANTEED ULTRAPURE PERMEATE THROUGH INTO THE DIALYSIS MACHINE



Microprocessor controlled

nephro SAFE

SPECIAL TECHNICAL FEATURES

- ▶ Patented process for ultrafiltration of the permeate
- ▶ High durability life of the ultrafilter through crossflow operation
- ▶ Water savings through concentrate return to the reverse osmosis module
- ▶ Three-stage pressure regulation valve for fully automatic filling of the tank in case of excess permeate
- ▶ 14 kW connection line for standard building fuse
- ▶ Microprocessor controlled
- ▶ Interfaces for printer, data terminal and modem



Ultrafilter (patented) and three-stage pressure regulation valve

nephro SAFE

FUNCTIONAL MATERIALS
AND OPERATION

- ▶ The functional, hygienic design and the use of high quality stainless steel ensures the high reliability and long life of the nephro SAFE.
- ▶ High efficiency thermal insulation and the double-walled structure of the tank ensures low power consumption.
- ▶ The frequency-controlled pressure pump ensures optimum pressure and flow conditions in the distribution ring.



nephro SAFE with integrated ultrafiltration and heating module

nephro SAFE

OPTIMUM HYGIENE

- ▶ The nephro SAFE is manufactured completely from stainless steel which is surface-treated to maintain optimal hygiene to all fluid ways. A completely dead zone-free design is ensured through hygienic clamp connectors.
- ▶ Dead zone-free level measurement in the tank is performed through state-of-the-art liquifants sensors.
- ▶ The temperature in the tank is maintained constantly at > 85 °C. In this way, microbiological contamination of the tank content is eliminated.
- ▶ Integrated dead zone-free sample-taking points permit convenient and safe microbiological analysis of the permeate.



Clamp connector made of stainless steel



Hygienic level measurement using liquifants sensors

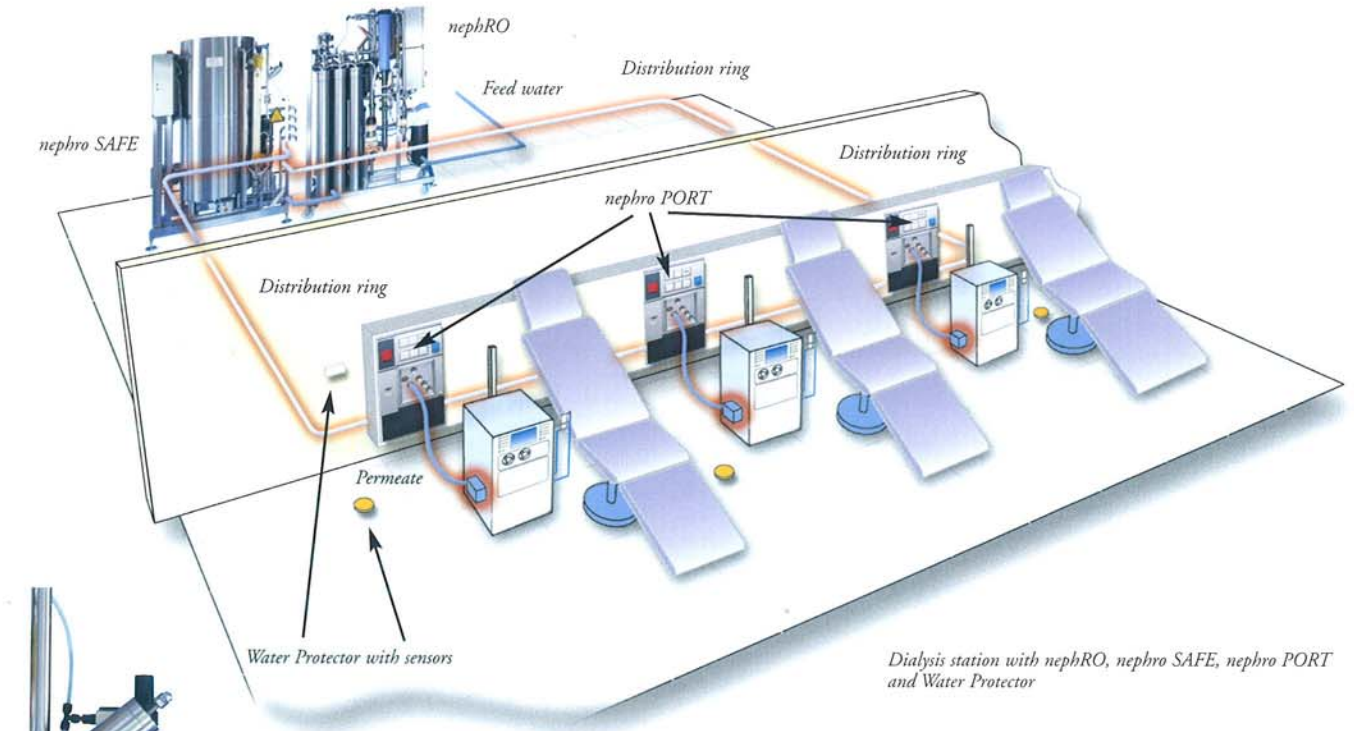
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MICROBIOLOGICAL STUDY

“No microorganisms or only a minimum number at the most were detected. Because of the regular thermal disinfection of the distribution ring system through the nephro SAFE system, permeate with very good microbiological quality was made available at all sampling points tested.”

*Dr. Porsch, Head of the Hygienic Department, Dr. Limbach Association of Laboratories
15 February 2001*

TECHNICAL DATA



Model	Item	Specification
nephro SAFE		
Components	Dimensions (W x H x D)	790 x 1950 x 1450
	Weight (empty/full)	approx. 350/850 kg
Heating element	Power	12 kW
Tank (= hot tank)	Contents	480 litre
Pump	Power consumption	2 kW
Temperature during heat-disinfection		> 80 °C
Electrical connections	Mains plug	CEE plug, 5-pin, 32 A
	Mains voltage	400 V, 3 phase, 50 Hz
	Protection	25 A safety fuse, K characteristics
Electrical safety	Type of protection against electrical shock	Protection Class 1
	Overvoltage Category II	
	Protection against the penetration of liquids	Splash Water Protection (IPX 4)

Manufactured to MPG (Medizinproduktegesetz)

Technical changes reserved

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