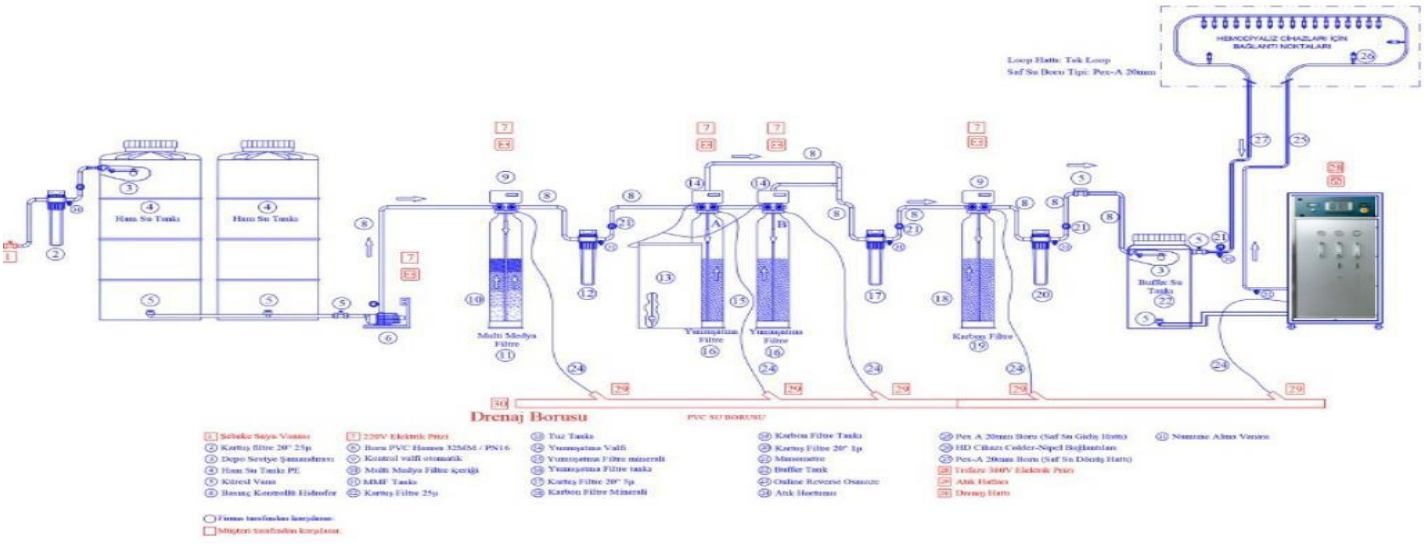
GLT HD 50 + DP DOUBLE PASS RO REVERSE OSMOSIS MODEL

The **GLT Double Pass RO System** series is designed for **large dialysis centers and hospital units that require** maximum safety and reliability. With its **dual-stage purification**, it provides ultrapure water by minimizing risks of bacteria and endotoxins.

Built with **316L stainless steel pumps**, **medical-grade membranes** (**optional), and **automated disinfection**, it ensures long-term performance and full compliance with **ISO 13959 and European Pharmacopoeia standards**. Trusted global components (Grundfos, Clack, Siemens, Rehau) make it the **ideal solution for government tenders and large private providers**.

MAIN FEATURES / DP Series

- Specially designed for **large dialysis centers & hospital units**
- **Double Pass RO design** – dual-stage purification for maximum safety
- **Ultrapure water quality** – protection against bacteria & endotoxins
- **316L stainless steel pumps & piping** – durable and hygienic
- **Medical-grade RO membranes** – reliable for hemodialysis use (**optional)
- **Automated disinfection** – chemical (standard) & **Heat Diesenfection** (**optional)
- **Advanced monitoring** – conductivity, temperature, pressure, and flow
- **Trusted global components** – Grundfos, Clack, Siemens, Atlas, Rehau
- **ISO 13959 & European Pharmacopoeia compliant**
- Ideal for **government tenders & large private dialysis providers**



TECHNICAL DATA

Definition/Water quality	**Drinking water (water for human consumption**	**Feed water for reverse osmosis**	**Dialysis water/permeate (water for diluting concentrated Haemodialysis solutions)**		
		GLT			
Directive	98/83/EC	98/83/EC + procedural limit values	ISO 13959	European Pharmacopoeia	Recommendation applied to hygiene.
Chemical/physical parameters [ppm]					
Sodium (Na)	200	200	70	50	50
Potassium (K)		-.-	8	2	2
Calcium (Ca)		Total hardness	2	2	2
Magnesium (Mg)		< 1°dH or < 1.79°f	4	2	4
Boron (B)	1.0	1			
Barium (Ba)		0.7	0.1		0.1
Beryllium (Be)		0.004	0.0004		0.0004
Ammonium (NH_4)	0.5	0.1		0.2	0.2
Aluminium (Al)	0.2	< 0.01	0.01	0.01	0.01
Metals					
– Copper (Cu)	2	1	0.1	-.-	0.1
– Arsenic (As)	0.01	0.01	0.005	-.-	0.005
– Lead (Pb)	0.01	0.01	0.005	-.-	0.005
– Silver (Ag)	-.- 0.05	0.1	0.005	-.-	0.005
– Chromium (Cr)	0.01	0.05	0.014	-.-	0.014
– Selenium (Se)	0.005	0.01	0.09	-.-	0.01
– Stibium (Sb)	0.001	0.005	0.006	-.- 0.001	0.005
– Mercury (Hg)	0.02	0.001	0.0002	-.-	0.0002
– Nickel (Ni)	-.- 0.2	0.02	-.-	-.-	-.-
– Tin (Sn)	0.005	-.-	-.-	-.-	-.-
– Iron (Fe)	-.- 0.05	< 0.1	-.- 0.001	-.- 0.1	-.- 0.001
– Cadmium(Cd)	0.010	0.005	0.1	-.-	0.1
– Zinc (Zn)	-.-	5.0	-.-	-.-	-.-
– Manganese (Mn)		< 0.01	-.- 0.002	-.- 0.1	-.-
– Uranium (U)		0.01	0.1		-.-
– Thallium (Ti)		-.-			
or the sum of heavy metals					
Cyanide (CN)	0.05	0.05			0.02
Chlorine (Cl_2)		**Total chlorine: 0.0**	0.1	0.1	0.1
1.2-dichlorethane	0.0030				
Chloramine					0.1
Chloride (Cl)	250	250		50	50
Fluoride (F)	1. May	1. May	0.2	0.2	0.2
Sulphate (SO_4)	250	240	100	50	50

Definition/Water quality	Drinking water (water for humans consumption)	**Feed water for Reverse Osmosis** *GLT HD* RO REVERSE OSMOSIS	**Dialysis water/permeate** (water for diluting concentrated Hemodialysis solutions)		
Directive	98/83/EC	98/83/EC + procedural limit values	ISO 13959	European Pharmacopoeia	Recommendation applied hygiene
Nitrate (NO3)	50	10	2 (as N)	2	2
Nitrite (NO2)	0.5	0.5			
Polycyclic aromatic hydrocarbons	0.00010	0.0001			
Benzene	0.0010	**0.001**			
Bromate	0.010	**0.01**			
Tetrachlorethene and trichlorethene	0.010	**0.005**			
Trihalogenmethane	0.050	**0.05**			
Vinyl chloride	0.00050	**0.0005**			
Silicic acid (SIO_2)		**< 10**			
pH value	6.5 – 9.5	**6.5 – 9.0**			
Temperature		**6 – 30 °C**			
Spec. conductivity	2500 µS/cm at 20 °C	**< 1000 µS/cm at 20 °C**			
Silting index $SDI_{(15)}$ Clouding (NTU)	NTU < 1	**SDI (15 min) < 5 (GLT RO) < 3 (GLT RO)** As per ASTM 4189			
Microbiological parameters					
Total germ count] [CFU/ml]	< 100 (22 ±2 °C, 44 ± 4h) < 100 (36 ±1 °C, 44 ± 4h)	< 100 (22 °C) < 100 (36 °C)	< 100 (action at 50%) (17–23 °C, 7d)	$< 10^2$ (30–35 °C, 5 d)	< 100 acc.to RKI (22 ± 2 °C, 3–7 d)
Enterococci	0 CFU/100ml	0 CFU/100ml			
E.-Coli/ coliform	0 CFU/100ml	0 CFU/100ml			
Endotoxins [EU/ml]			<0, 25 (action at 50%)	< 0.25	<0.25

a "Guideline for applied hygiene in dialysis units", ISBN 978-3-00-044348-0, 2013

Note:

Directive 98/83/EC and ISO 13959 specify limit values for rare substances that are not listed here; these can be looked up in the original publications. Compared to earlier publications, no information regarding phosphate is provided.

Specifications

Hemodialysis Device	Up to 50 machines running at 800 mL/h per 2000 L/h
Permeate Capacity	Up to 75%
Efficiency/Yield Dimensions	180 x 95 x 258 cm
(h x w x d) **Weight** (filled)	400 kg
Concentrate Pressure	Max. 25 BAR

Electrical Supply

Electrical Supply/Three-phase	380 V 3/N/PE, 50 Hz, 8 kW
Overcurrent Protection	32 A tripping characteristic (depending on voltage/version) D or K or similar recommended (due to high starting currents)
Socket	380 V: hardwired
Type of Protection Against Electric Shock	Protection Class I Type
Applied Parts Classification	B
Degree of Ingress Protection Against Liquids	Drip-proof
Leakage Currents	According to EN 60601-1 II
Overvoltage Category	II III b
Material Group	Continuous operation (standby)
Operating Mode	

Product Water Quality

Bacteria (CFU) and Endotoxins (EU)	*>99%*
Product water quality depends on the inlet water quality	>96%

Feed Pressure	Dynamic 2–6 BAR
Minimum Inlet Minimum inlet flow in liters per hour at maximum outlet capacity and a yieldof75%	**GLT HD 50 Plus + DP**: min. **2500 L/h**
Permeate Connection Inlet	
Water Connection	
Drain Water Connection	DirectPE-Xaconnector25x3.5(feedand return)onthesystem 1” external thread DN 32 (HT pipe)

Operating Conditions

Water Hardness	<1.0 °dH
Iron	<0.1
Manganese	<0.1
Chloride Silicate	<100
Total Chlorine	<25 mg/L
Feed Water Conductivity	0.1 mg/L
Total Salt Content	<2500 uS/cm
pH	1500 mg/L
Silt Density	6–8
Feed Water Temperature	< Min. 5°C/max. 35°C Ambient pressure: 700–1150 hPa
Ambient Temperature Range	+5°C to +35°C
Relative Humidity	Up to 80% at 20°C (non-condensing)

Transport and Storage Conditions

Storage Temperature Range	+5°C to +40°C (protect from freezing)
Storage Time	Storage time of preserved system: maximum 12
Atmospheric Pressure	Ambient pressure: 500–1150 hPa
Relative Humidity	Up to 80% at 20°C (non-condensing)

Filling volumes of preservative / antifreeze

Number of modules	Sodium metabisulfite [gr]	MgCl [gr]	Glycerin 86% for -5°C [litres]	Glycerin 86% for -9°C [litres]	Glycerin 86% for -17°C [litres]	Total volume of liquid for RO [litres]
1	450	30	9.0	12.8	18.0	90
2	550	35	11.0	15.7	22.0	110
3	650	40	13.0	18.5	26.0	130
4	750	45	15.0	21.5	30.0	150
5	850	50	17.0	24.5	34.0	170
6	950	55	19.0	27.5	38.0	190

Preservation using sodium metabisulfite

- If biofouling of the membrane is not to be expected and if the membrane is to be protected for storage, a solution with 0.5 wt./vol.% Sodium metabisulfite can be used.
  9.5% wt./vol.% glycerin must be added to guarantee frost protection down to -5 °C.
- It is helpful to produce a basic solution with sodium metabisulfite in a 20-fold concentration and to fill the supply tank with this basic solution.

Stabilization

- 200 – 350 mg/l magnesium chloride (in the form of MgCl2) must be added to maintain membrane stability if this solution is to be stored for longer than one month.
- Let the preservative solution circulate through the membrane. Recirculate the solution through the mixing tank for one hour. The temperature must not exceed 35 °C.
- It is helpful here, too, to produce a basic solution with MgCl2 in a 20-fold concentration and to fill the supply tank with this basic solution.

OPERATING INDICATIONS

GLT systems consistently deliver **ultrapure water**, minimizing risks from sodium, potassium, calcium, aluminium, heavy metals, chlorine, and endotoxins. This makes GLT the trusted solution for patient safety.

Note:
(optional) These features are not included in the standard version and are available only upon demand.
(customized by project)

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GLT™
Dialysis RO Systems

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