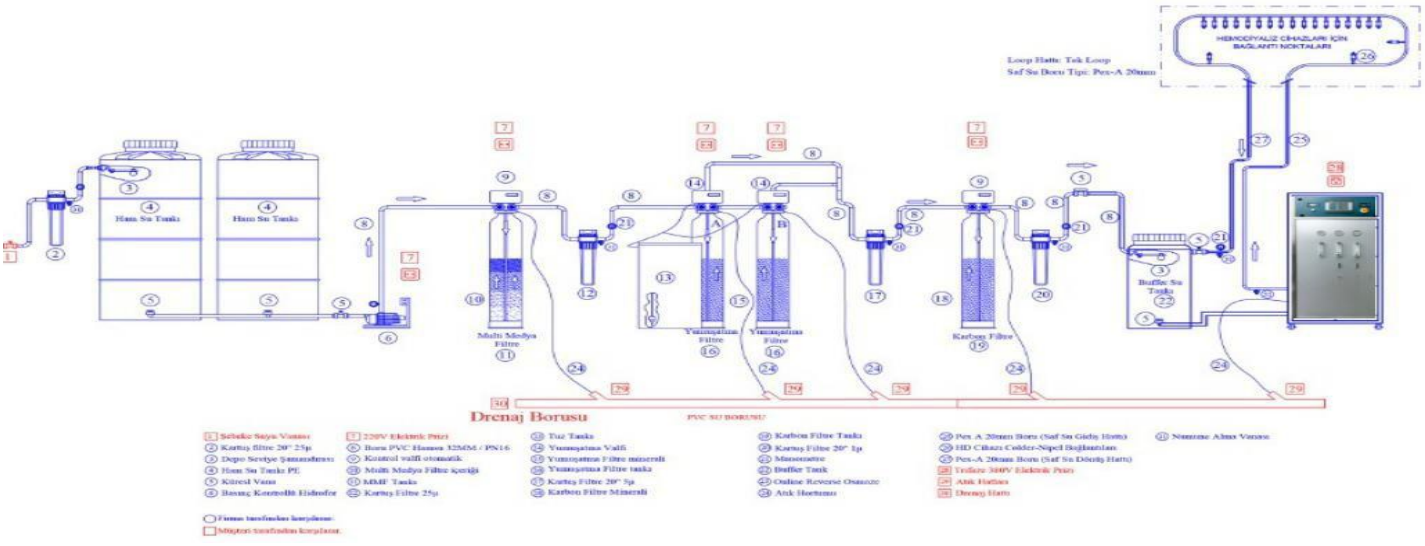
# GLT HD 20+DP DOUBLE PASS RO REVERSE OSMOSIS MODEL

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 **20 machines** running at 800 mL/**1000 L/h** |
| **Permeate Capacity** | Up to 75% |
| **Efficiency/Yield Dimensions** | 180 x 95 x 258 cm |
| (h x w x d) **Weight** (filled) | 300 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<br>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**<br>Minimum inlet flow in liters per hour at maximum outlet capacity and a yieldof75% | **GLT HD 20 Plus + DP**: min. **1000 L/h** |
| **Permeate Connection Inlet** | |
| **Water Connection** | |
| **Drain Water Connection** | DirectPE-Xaconnector25x3.5(feedand return)onthesystem 1”<br>external thread<br>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** | <<br>Min. 5°C/max. 35°C<br>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


**Main Address**
Ehlibeyt Mh., Tekstilciler Cd., No: 35/7,
Çankaya, Ankara

**Istanbul Address**
Girne Mh., Güneşlikli Sk., No: 9/A,
Maltepe, Istanbul
Fax: +90 312 247 50 25

Email: info@galatamedical.com
www.galatamedical.com


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