

**LEACHATE TREATMENT WITH DIRECT-RO**

**WEHRLE's solution**

DIRECT-RO is an inexpensive basic solution for the treatment of landfill leachate and a 1<sup>st</sup> step into reliable and sustainable leachate treatment from WEHRLE, the technology leader for this application.

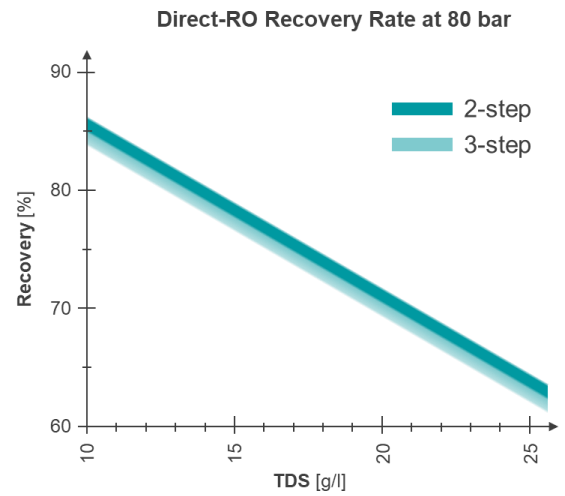
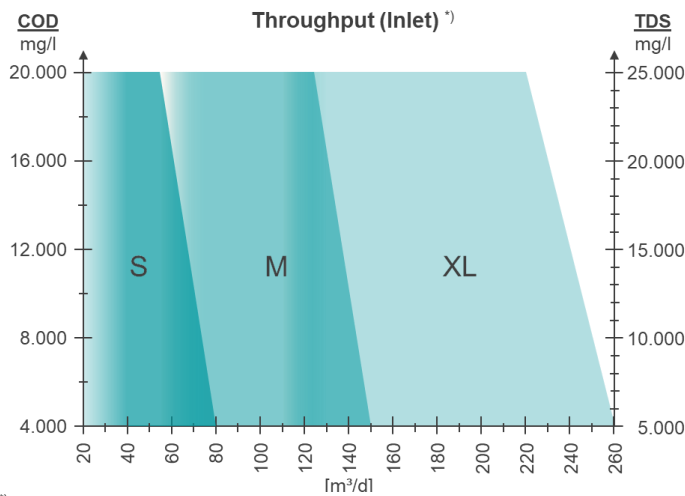
A Reverse Osmosis system separates leachate into high quality / low salinity permeate, that can be safely discharged into the water body or sewage system, and concentrate that needs to be stored or disposed of.

**Simple installation**



**Size selection / Throughput      Recovery rate**

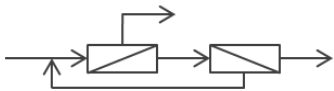
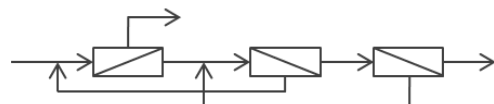
Depending on the flow rate and the parameters of the leachate, select both, the system size and the required flow recovery rate:



<sup>1)</sup> the higher level (COD or TDS) determines the working point

**Selection of steps      Rejection rates expected:      COD      NH<sub>4</sub>-N      TDS**

Select the required Reverse Osmosis stages depending on the limit values to be achieved:

<b>2 steps:</b>		<b>98 %</b>	<b>92 %</b>	<b>98 %</b>
<b>3 steps:</b>		<b>99 %</b>	<b>97.5 %</b>	<b>99.5 %</b>

Optimized recovery rate due to system internal concentrate recirculation

**Energy Technology · Environmental Technology · Manufacturing**

# PRODUCT OVERVIEW

## DIRECT-RO

### LEACHATE TREATMENT WITH DIRECT-RO

Inlet specification limits <sup>1)</sup>		More specifications	
T <sub>feed</sub> :	0 ... 30 °C	Wind load:	Zone 3
T <sub>ambient</sub> :	0 ... 20 °C <sup>2)</sup>	Snow load:	Zone 3
Si:	< 5 mg/l	Earthquake:	Zone 1
Sum of Fe + Mn:	< 5 mg/l	Altitude a. s. l.:	max. 1,000 m
TSS:	< 150 mg/l		

1) exceeding these limits may reduce performance  
 2) for average daily temperatures > 20°C, and to keep the inside container < 35°C, air conditioning should be considered by the client (connections are available as standard)

### Membranes / Plant configuration



DIRECT-RO operates with **spiral wound membranes**, widely used for sea-water desalination and produced in large quantities by various suppliers worldwide. These membranes are very simple and cost effective to work with, membrane replacement is quick and inexpensive.

The **feed & bleed configuration** ensures high circulation velocity in the membranes, avoiding salt deposition and minimizing concentration polarization, which results in fewer chemical cleaning and less chemical consumption.

Expected membrane service life:

1st stage: 1 ... 2 years, 2nd / 3rd stage: 3 ... 4 years

### High flexibility of the system configuration

The basic configuration of the DIRECT-RO contains everything that is necessary for the proper operation of the system. Depending on site requirements, additional options can be selected.

Technical details of the **BASIC CONFIGURATION:**

System pressure:	1 <sup>st</sup> stage, 80 bar 2 <sup>nd</sup> & optional 3 <sup>rd</sup> stage, 20 bar
Membranes:	organic spiral wound in 1m 8" modules, typically 5 per pressure tube
Automatic subsystems:	pH value adjustment, foam regulation, sand filter incl. backwash, auto-adjustment of the permeate yield and cleaning process, in the 1 <sup>st</sup> stage
Measured data (online):	pH value, conductivity, temperature, pressure, flow rate
Process control:	Siemens S7- PLC with Graphical User Interface in a 19" Touch Panel remote control with possible SMS alerting via internet
Safety equipment:	mobile eye shower
Sulphuric acid storage:	inside: S, XL outside: M, XL Compact
Container:	used modified shipping container wall and ceiling insulation coated panels
Transport for container:	loading only possible per crane or forklift chassis without gooseneck, platform only

## LEACHATE TREATMENT WITH DIRECT-RO

**OPTIONS** to supplement the basic configuration:

### **Advanced automation package** containing

- ✓ PLC controlled pressure control valves, CIP valves and cleaner pumps in 2<sup>nd</sup> & 3<sup>rd</sup> steps
- ✓ Advanced PC based process control system
- ✓ maximized permeate recovery at all times
- ✓ automatic CIP, based on process parameters
- ✓ detailed evaluation and long-term recording

### **OPEX reduction package** containing

- ✓ Additional stand-by sandfilter<sup>3)</sup>
- ✓ Degasifier column
- ✓ improves plant availability
- ✓ pH-adjustment of effluent without need for chemicals

3) not available for XL Compact

### **Corrosive environment package** containing

- ✓ All pumps stainless steel
- ✓ Air filter
- ✓ long lasting unit due to reduced corrosion in the container

### **Cold climate package** for average daily ambient temperatures < 0 °C containing

- ✓ Extra heater
- ✓ Container floor insulation
- ✓ keeps temperature in the container above ≈ 5 °C

### **Inlet set package** containing

- ✓ Suction boat and transfer pump
- ✓ Hoses including connections
- ✓ to further facilitate on-site installation

### **High alkalinity package** containing<sup>4)</sup>

- ✓ acid inline and external dosing point
- ✓ Inlet pump
- ✓ for alkalinity values > 7.500 mg CaCO<sub>3</sub> mg/L
- ✓ price on request

4) only available for XL Compact. Pre acidification tank (by client)

### **Basic chemicals package for commissioning & first weeks of operation** (within E.U. only) containing

- ✓ Membrane cleaners
- ✓ Antiscalant
- ✓ Antifoam
- ✓ price on request

### **Spares package for high availability** containing

- ✓ Spare membranes and filters
- ✓ Spare part sets for all pumps
- ✓ Spare probes for essential sensors
- ✓ individual package compiled based on your budget

### **Extended warranty package**

In combination with Spares Package Parts only. Subject to wear and media contact are excluded. It only applies when operating the system according to our operating instructions

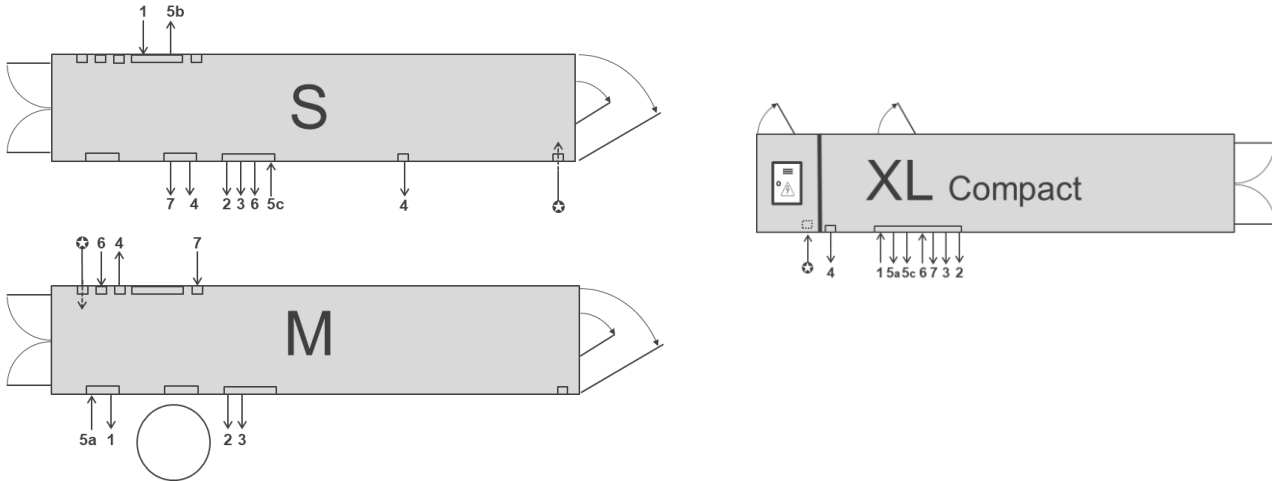
- ✓ price on request

### **CSC certification** for overseas shipments

- ✓ price on request

**LEACHATE TREATMENT WITH DIRECT-RO**

**Layout and positioning of connections and doors**




Coupling types	S	M	XL Compact
1 Raw effluent / inlet:	DN 50	DN 50	DN 50
2 Permeate / outlet:	DN 50	DN 50	DN 50
3 Concentrate / outlet:	DN 50	DN 50	DN 50
4 Overflows / drain:	2x DN 50	DN 50	DN 65
5a Venting pH:	DN 50	DN 65	DN 50
5b Venting H <sub>2</sub> SO <sub>4</sub> :	n/a	n/a	n/a
5c Venting CIP:	DN 50	n/a	DN 50
6 Process water:	DN 50	DN 50	DN 50
7 Backwash water:	DN 50	DN 65	DN 50
⊛ Electrics:	Terminal in switch cabinet, main switch, electrical equipment for connecting the transfer pump included		

**Supplies by client**

Electrics:	3~/N/PE 400V / 50 Hz <sup>4)</sup>		
	S	M	XL
Main power switch:	160 A	250 A	400 A
Process water:	3 bar		
Chemicals: <sup>5)</sup>	max.98% H <sub>2</sub> SO <sub>4</sub> , NaOH <sup>6)</sup> , anti-scalant, anti-foam <sup>6)</sup> , membrane cleaner		

<sup>4)</sup> 380 V and/or 60 Hz systems on request  
<sup>5)</sup> depending on requested discharge level  
<sup>6)</sup> if required

**Further notes**

 [Watch product video](#)

For more information or individual upgrades please contact us

Subject to change without notice