

LEACHATE TREATMENT WITH WEHRLE DIRECT RO

Purpose

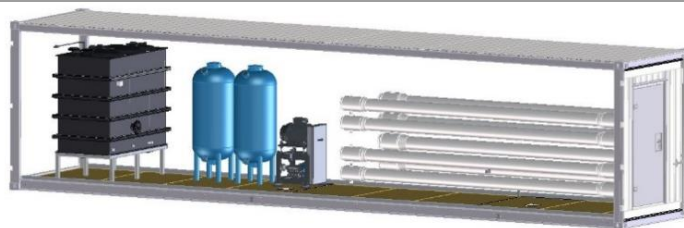
WEHRLE Direct-RO Reverse Osmosis systems separate leachate into a concentrate containing organic substances (BOD, COD), nitrogen compounds (ammonia, organic combined nitrogen), PFC/PFAS, heavy metals and salts – and a high quality, low-saline permeate.

The Direct-RO operates with **spiral wound (SW)**

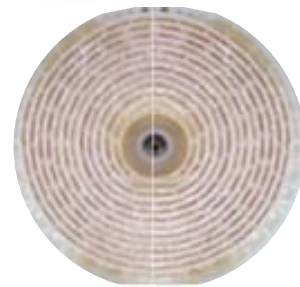
organic membranes in a **Feed & Bleed** configuration at **80 bar**. SW membranes are globally produced in high quantities and offer a good price/performance ratio, also for replacements.

The membranes work with large spacers that have been especially developed for use with difficult effluents to optimize availability and reduce clogging.

Pictures / Graphics



(exemplary picture)



spiral wound membrane

Features

- ▶ Highly flexible 80 bar RO system for variable flow rates and high permeate yield
- ▶ High quality materials and components from brand manufacturers
- ▶ On-board sand filter unit with automated backwashing
- ▶ On-board influent pH adjustment system with anti-foam control
- ▶ Chemically enhanced CIP (“Cleaning-in-Place”) system
- ▶ PLC-automated process control equipped HMI with remote access function

Technical Details

Container color:	RAL 7035 ●
Pressure:	80 bar
Membranes:	organic, spiral wound, 8” modules
Sub-systems:	automatic pH adjustment, foam control, CIP, automatic sand filter
Measured data (online):	pH, conductivity, temperature, pressure, flow
PLC:	Siemens S7
Operation / HMI:	touch panel with graphical user interface, remote access possible via LAN
Safety equipment:	mobile eye shower
Sulfuric acid storage:	S, XL: inside or outside, M: outside only

PRODUCT OVERVIEW

WEHRLE DIRECT-RO

LEACHATE TREATMENT WITH WEHRLE DIRECT-RO

Membranes



WEHRLE uses Spiral Wound membranes:

Space-saving due to horizontal construction and high membrane surface. This allows to fit **3 RO steps within one container.**

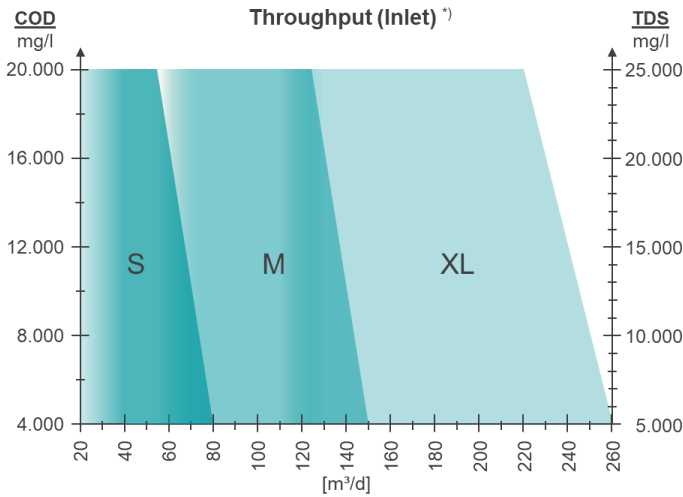
With 80 bar process pressure, **standard equipment & piping** can be used. This **reduces** the plant **operation costs**, especially for membrane replacement.

The **Feed & Bleed** configuration allows to vary the flow rate.

Membrane lifetime expectancies:

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

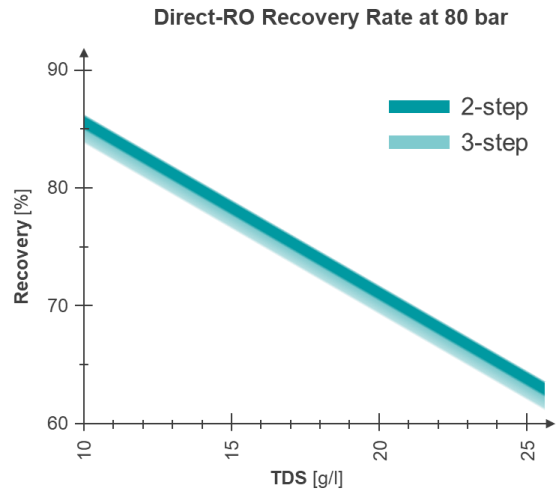
Model Selection / Throughput



S / M: 1 container 40' XL: 2 containers 40'

^{*)} the higher level (COD or TDS) determines the working point

Recovery rate



Model Selection / Steps

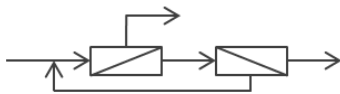
Rejection rates:

COD

NH₄-N

TDS

2

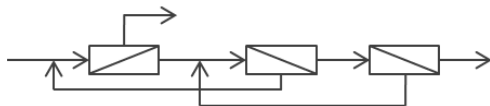


99 %

98 %

99 %

3



99.9 %

99.7 %

99.9 %

Internal concentrate recirculation optimizes recovery rate

Inlet Specification Limits^{**)}

Feed Temperature: 0 ... 30 °C

Si: < 5 mg/l

Sum of Fe + Mn: < 50 mg/l

TSS: < 150 mg/l

More specifications

Wind load: Zone 3

Snow load: Zone 3

Earthquake: Zone 1

H. a. s. l: max. 1,000 m

^{**)} exceeding these limits may reduce performance

Packages / Options

Advanced Automation Package containing

- ▶ PLC controlled pressure control valves
- ▶ PLC controlled CIP valves and cleaner pumps
- ▶ Advanced PC based process control system
- ✓ maximized permeate recovery at all times
- ✓ automatic CIP, based on process parameters
- ✓ in-depth evaluation, long-term recording of process data

OPEX Reduction Package containing

- ▶ Additional stand-by sandfilter
- ▶ Degassifier column
- ✓ improves plant availability
- ✓ pH-adjustment of effluent without need for chemicals

Hazardous Environment Package containing

- ▶ PE lining of container inside
- ▶ Air filter
- ✓ improved corrosion protection and system longevity
- ✓ reduces corrosive and odorous substances in the container ambient air

Hot Climate Package for average daily ambient temperatures > 20 °C containing

- ▶ Air condition
- ✓ to keep the inside container temperature below 35 °C

Cold Climate Package for average daily ambient temperatures < 0 °C containing

- ▶ Extra heater
- ▶ Container floor insulation
- ▶ Insulated external piping box
- ✓ to keep the inside container temperature above 5 °C
- ✓ reduce icing of external connections of the container

Basic Chemicals Package (within E.U. only) containing

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

2-year Spares Package 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 (only in combination with 2-year Spares Package): price on request

CSC Certification for overseas shipments: price on request

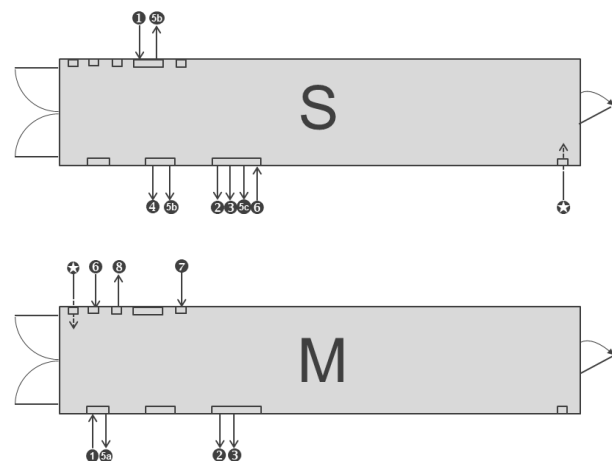
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Supplies by Client

Electrics:	3~/N/PE 400V / 50 Hz ¹⁾		
Installed Power ²⁾	S	M	XL
2-step:	50 (61) kW	77 (88) kW	125 (139) kW
3-step:	55 (65) kW	89 (100) kW	145 (158) kW
Main power switch:	160 A	250 A	400 A
Process water:	Ø 500 l/d, Max. 10 m ³ /d, 3 bar		
Chemicals: ³⁾	max.75% H ₂ SO ₄ , NaOH (if required), anti-scalant, anti-foam (if required), membrane		

Sketches

Connections:



Coupling Types

	S	M	XL
① Raw effluent / inlet:	DN 40	DN 40	t.b.d.
② Permeate / outlet:	DN 40	DN 40	t.b.d.
③ Concentrate / outlet:	DN 40	DN 40	t.b.d.
④ Overflows:	2x DN 50	DN 50	t.b.d.
⑤a Venting:	n/a	DN 80	t.b.d.
⑤b Venting:	DN 50	n/a	t.b.d.
⑤c Venting:	n/a	DN 40	t.b.d.
⑥ Process water:	DN 40	DN 40	t.b.d.
⑦ Backwash water:	n/a	DN 65	t.b.d.
⑧ Tank drain:	n/a	DN 50	t.b.d.
⚡ Electrics:	Terminal in switch cabinet, main switch, electrical equipment for connecting the transfer pump included		

Further Notes

For more information or individual upgrades please contact us!

1) consumption depending on effluent type; 380 V and/or 60 Hz systems on request
 2) values in brackets include all options
 3) depending on requested discharge level

Subject to change without notice!