



# EVALED™ PC

Vacuum heat pump evaporators



Solutions & Technologies



# EVALED™ PC evaporators

The EVALED™ PC Solution is the range of evaporators which uses heat pump for the treatment of many kind of waste waters. This technology has been refined over many years in terms of flexibility, low energy consumption and reliability.



## Main benefits of heat pump:

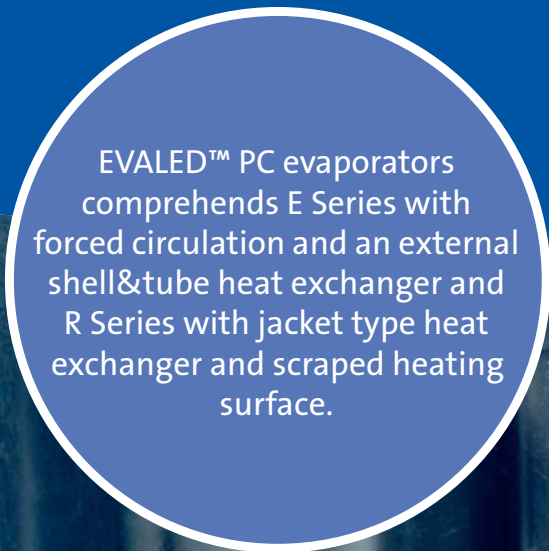
- Significant reduction of COD in the distillate
- High yield and low quantity of concentrate to dispose of
- Control of foaming
- Excellent separation of surfactants
- Total separation of metals
- Consistent distillate quality
- Fully automatic operation
- Low maintenance



The battle against the climate change is a priority for everyone. VWS Italia has a real commitment to reduce CO<sub>2</sub> emissions: we are working to make sure that our technological offering is ever more environmentally sustainable.



CO<sub>2</sub>



EVALED™ PC evaporators comprehends E Series with forced circulation and an external shell&tube heat exchanger and R Series with jacket type heat exchanger and scraped heating surface.





# Materials



VWS Italia, in co-operation with respected materials research centres, selects the most suitable materials for the safe management of aggressive liquids. The resistance to corrosion is the main features of every EVALED™ evaporators, essential when dealing with extremely concentrated liquids.

## Austenitic stainless steel AISI 316L

(Number: 1.4435 – X2 CrNiMo 18-14-3)

Austenitic weakly bound structure, non-hardening, non-magnetic. The low percentage of Carbon in this alloy reduces the risk of intergranular corrosion at high temperatures.

**Uses:** alkaline liquids, acid liquids (pH>4) with a low percentage of chlorides, oil emulsions, liquids from flexographic printing.

## Superduplex stainless steel

(Number: 1.4410 - X2 CrNiMo 25-7-4)

Austenitic-ferritic structure, magnetic. The high percentage of Chrome gives excellent resistance to localised corrosion.

**Uses:** acid liquids (pH>3) with high chloride and metals content, galvanic waste waters, landfill leachate.

## Nickel alloy

(Number: 2.4819 – NiMo 16 Cr15 W)

High flexibility Cr-Ni.Mo steel. The low Carbon content ensures resistance to the formation of carbides at zones exposed to thermal variation. It has excellent resistance to localised corrosion, both in oxidising and reducing environments, even at high temperatures.

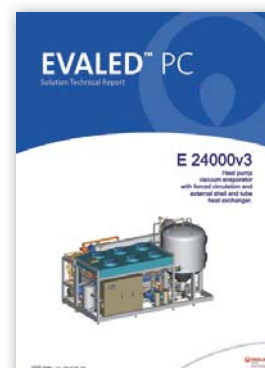
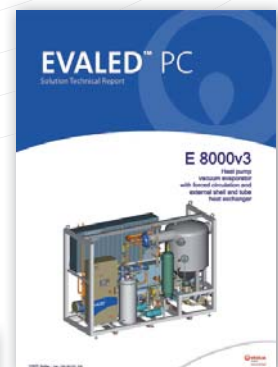
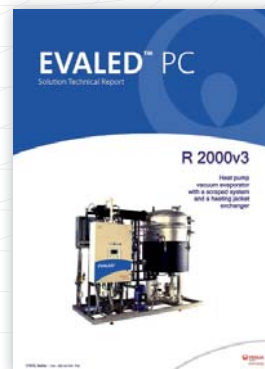
**Uses:** very acid liquids (pH>2) with high content of chlorides, fluorides and metals, anodising waste waters, special applications.

## Silicon Carbide (SiC)

Chemically inert material resistant to almost all aggressive substances, usually matched with another chemically inert material, PTFE, a fluoride co-polymer used for coating the inner surfaces of the boiling chamber.

**Uses:** pickling waste waters, galvanic wastewaters, and aggressive liquids.

## EVALED™ PC Technical Reports



# EVALED™ E Series

E series is designed to produce maximum distillate quality with minimum capital and operating costs. Each model is a compact skid-mounted unit, simple, safe and easy to move. Control is by a PLC, including the functions of feed and discharge, therefore allowing automatic operation and minimum supervision. All models are designed for continuous operation, 24hs/day, and require just an electrical supply and compressed air.

E series evaporators operate in a high vacuum condition, with the boiling chamber pressure set at 5-6 kPa (absolute), in order to save the thermal energy produced by the heat pump. In this way the boiling temperature of the waste water is approximately 40°C (104°F) and typical phenomena (scaling, precipitation, corrosion) which may reduce the performance are either eliminated or much reduced.

## E evaporators are particularly suitable for:

- *mechanical industry*
- *aluminium die-casting*
- *landfills and waste disposal*
- *graphic arts*
- *galvanic industry and surface treatments*
- *food & beverage*
- *chemical industry*



## SPECIFICATIONS

### E 700

**Capacity:** 700 l - 185 gal distillate / 24h  
**Specific energy consumption:** 0.17 [kWh/l distillate]  
**Construction:** pre-assembled single module on a stainless steel frame

### E 1400

**Capacity:** 1.400 l - 370 gal distillate / 24h  
**Specific energy consumption:** 0.16 [kWh/l distillate]  
**Construction:** pre-assembled single module on a stainless steel frame

### E 2400

**Capacity:** 2.400 l - 635 gal distillate / 24h  
**Specific energy consumption:** 0.15 [kWh/l distillate]  
**Construction:** pre-assembled single module on a stainless steel frame

### E 4000

**Capacity:** 4.000 l - 1.057 gal distillate / 24h  
**Specific energy consumption:** 0.14 [kWh/l distillate]  
**Construction:** pre-assembled single module on a stainless steel frame

### E 6000

**Capacity:** 6.000 l - 1.586 gal distillate / 24h  
**Specific energy consumption:** 0.16 [kWh/l distillate]  
**Construction:** pre-assembled single module on a stainless steel frame

### E 8000

**Capacity:** 8.000 l - 2.114 gal distillate / 24h  
**Specific energy consumption:** 0.15 [kWh/l distillate]  
**Construction:** pre-assembled single module on a stainless steel frame

### E 12000

**Capacity:** 12.000 l - 3.170 gal distillate / 24h  
**Specific energy consumption:** 0.14 [kWh/l distillate]  
**Construction:** two pre-assembled modules on a stainless steel frame

### E 24000

**Capacity:** 24.000 l - 6.340 gal distillate / 24h  
**Specific energy consumption:** 0.13 [kWh/l distillate]  
**Construction:** three pre-assembled modules on a stainless steel frame

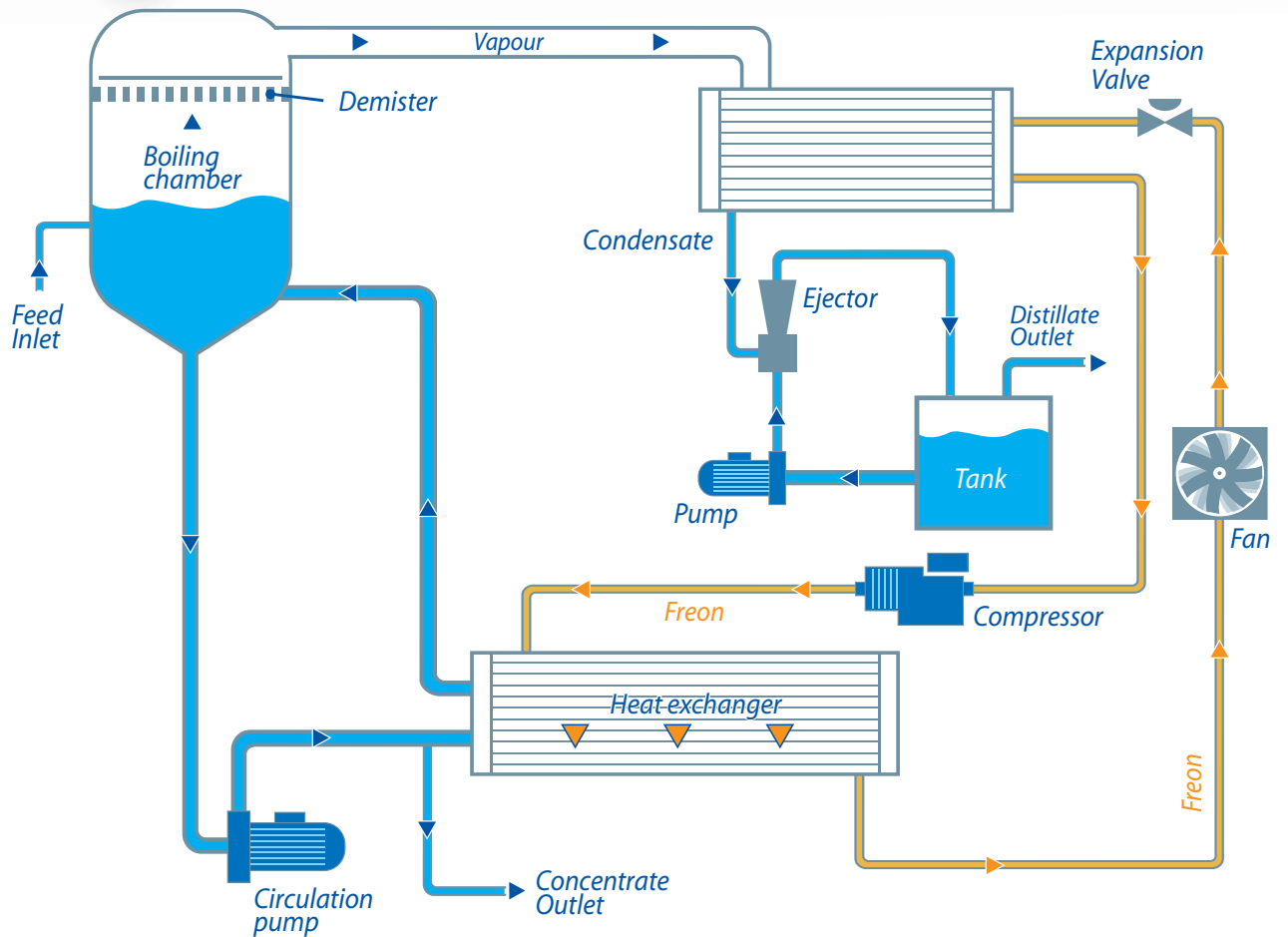
### E 48000

**Capacity:** 48.000 l - 12.682 gal distillate / 24h  
**Specific energy consumption:** 0.14 [kWh/l distillate]  
**Construction:** four pre-assembled modules on a stainless steel frame





Process diagram



# EVALED™ R Series

In the R series the exchanger of heat is via a conical jacket at the base of the boiling chamber, while the inner heating surface is continuously cleaned by scrapers, which also act to stir the concentrate. This configuration is designed to produce a concentrate with a high final concentration and a distillate with low conductivity.

## R Series is particularly suitable where:

- *the waste water has a high initial content of dissolved or suspended solids*
- *the waste water is already pre-concentrated*
- *the daily volumes are relatively small*
- *the distillate has to be of the highest quality*
- *the concentrate has to be recycled*

## R Series is the best solution for:

- *waste disposal*
- *graphic arts*
- *chemical industry*
- *galvanic industry*



## SPECIFICATIONS

R series varies from 150 to 2.000 l of distillate per day and is supplied with several different concentrate discharge systems. It operates under vacuum at 5kPa and a boiling temperature of approximately 40° C (104° F). The evaporation process is controlled by a PLC so that the evaporator requires a minimum of supervision and automatically manages the functions of waste water feed and discharge of concentrate and distillate.

### R 150

**Capacity:** 150 l - 40 gal distillate / 24h  
**Specific energy consumption:** 0.32 [kWh/l distillate]  
**Construction:** pre-assembled single module on a stainless steel frame

### R 500

**Capacity:** 500 l - 132 gal distillate / 24h  
**Specific energy consumption:** 0.26 [kWh/l distillate]  
**Construction:** pre-assembled single module on a stainless steel frame

### R 1000

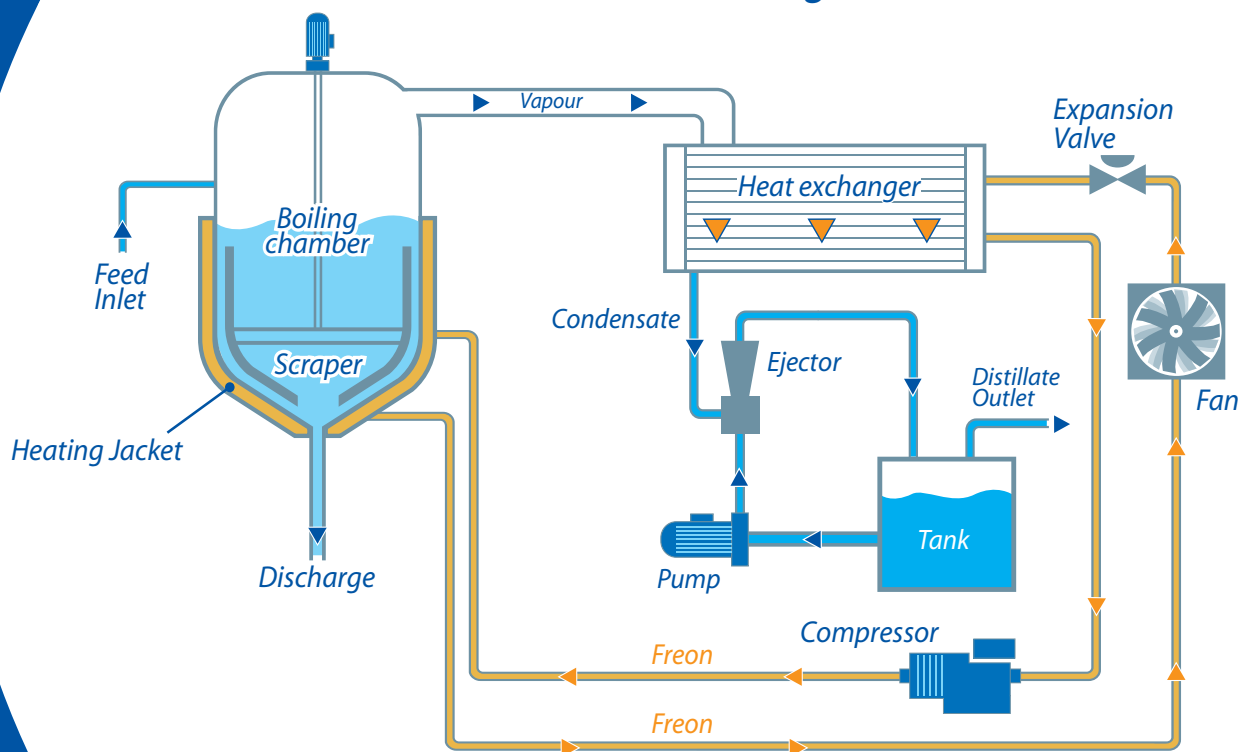
**Capacity:** 1.000 l - 265 gal distillate / 24h  
**Specific energy consumption:** 0.13 [kWh/l distillate]  
**Construction:** pre-assembled single module on a stainless steel frame

### R 2000

**Capacity:** 2.000 l - 529 gal distillate / 24h  
**Specific energy consumption:** 0.13 [kWh/l distillate]  
**Construction:** pre-assembled single module on a stainless steel frame



Process diagram







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