



**FORMECO**

**WATER EVAPORATORS**



## The technology at disposal of industry and environmental protection

### *Objective :*

To resolve efficaciously and definitively the problem of disposal of industrial polluted water, concentrating as much as possible the contaminating product and recovering the water that, distilled, can be reused in the next production cycles.

### *Why ?*

The anti-pollution restrictive rules and an environmental conscience more and more widespread impose a new way to deal with use of natural resources and their disposal. Recycling of raw materials and strong reduction of residue to treat are the last conquest of industrial research for the environmental protection. On treatment of contaminated water, in particular, more and more particular techniques developed, allowing the design of zero discharge plant.

### *How :*

Exploiting the technology of heat pump, of vacuum distillation, of forced circulation heating and of multi-effect heat exchanger, for getting the maximum yield with the lower energy consumption.



**Application fields :**

**Food and Confectionery Industry :**

Recovery and concentration of sugar solutions

**Graphic Arts and photographic labs :**

Concentration of developing and fixing baths  
Concentration of roller rinsing water  
Recovery of inks from the washing water

**Dump sites :**

Treatment of percolation water

**Oenology :**

Concentration of must  
Elimination of sulphate

**Preparation of medical herbs :**

Recovery of solvents utilised for extraction process

**Pharmaceutical, Chemical, Cosmetic Industry :**

Concentration washing liquids

**Galvanic Industry :**

Recovery of metals from washing process  
(Chromium, Nickel, Copper)  
Concentration of polluted baths (degreasing, pickling)

**Rubber Industry :**

Recovery of vulcanisation salts  
Purification of washing water

**Dairy Industry :**

Recovery of proteins from milk whey

**Mechanical Industry :**

Concentration of oily emulsions  
Concentration of liquids from finishing processes  
Concentration of washing baths

**Oil mills :**

Treatment of water from oil presses

**Goldsmith's Industry :**

Concentration of washing and picking process  
Recovery of gold from the residue of the treatment process

**Pressure die-casting :**

Concentration of working liquids (detaching product, glycol, lubricants)

**Food Industry:**

Recovery of food additives from different industrial process liquids

**Cold meats and salami industry :**

Concentration of process broth  
Recovery of greases and gelatine

**Dry cleaner's Plant :**

Recovery and concentration dyes and washing liquids

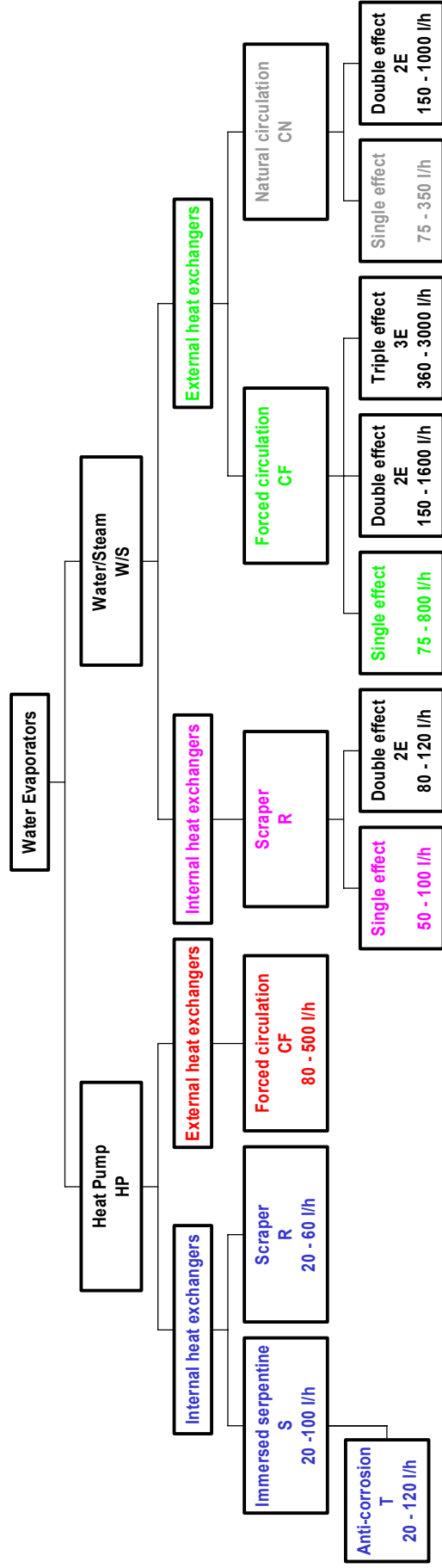
**Thermal Treatment:**

Recovery of tempering salts  
Purification of washing water

**Painting Plant :**

Concentration of oily emulsions  
Recovery of solvents  
Concentration of phosphoric degreasing baths

# Water evaporators



## HEAT PUMP VACUUM EVAPORATORS

The product to distil is sucked into the evaporator exploiting the depression inside the boiler, generated by the vacuum circuit.

The cooling cycle, equipped with a heating pump, is able both to heat the liquid in treatment and to cool the vapours produced during the boiling phase.

### Internal exchangers evaporators

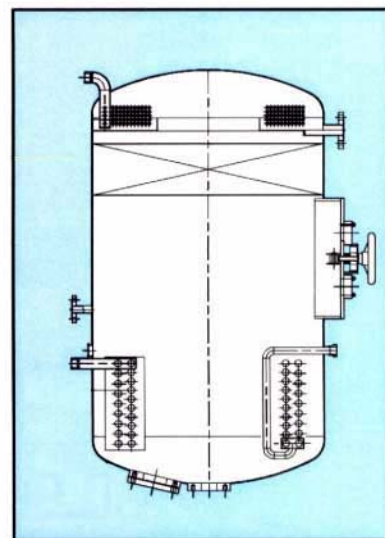
- **low energy consumption**
- **good concentration of the process residue**
- **limited dimensions**

with immersed coil :

- for not encrusting products
- for emulsions of water and oil with concentrations lower than 20%
- typical application in diecasting and industrial degreasing

with heated surface and inner scraper :

- versatile plant for almost any kind of product (excluded aggressive products)
- the scraper supports the thermal exchange and the concentration of the residue
- avoids encrustation on the heating surface



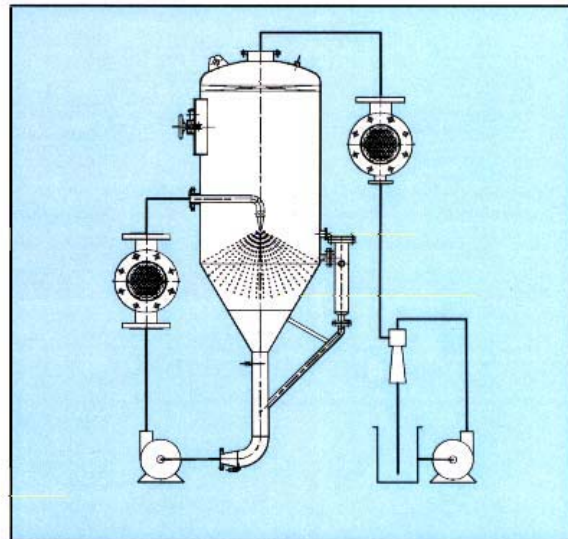
## Forced circulation evaporators with external exchangers

- **big hourly production**
- **low sensitivity to foam formation**
- **limited dimensions**

They are utilised for big daily quantities and they are suitable for :

- concentrations till 20% of suspended solids
- concentrations till 1,25 kg/litre of density

For a higher concentration, they can be combined with an auxiliary plant, after the treatment, equipped with an inner scraper



### **Evaporators heated by hot water or by steam**

The heating is not effectuated by freon, like in heat pump units, but by means of an external jacket crossed by heating water or steam. The vapour condensation is effectuated with air or water condensers.

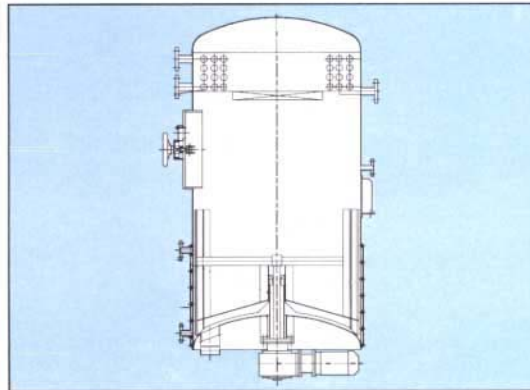
Simple in their manufacture and maintenance, guarantee a high production because of the good thermal exchange water/steam.

### **Evaporators with inner exchanger and scraper**

- **strong concentration of the process residue**

They are utilised for treating big daily quantities with encrusting products.

The scraper supports the thermal exchange and the concentration of the process residue, avoiding in the same time any encrustation on the heating surface



## Evaporators with external exchangers

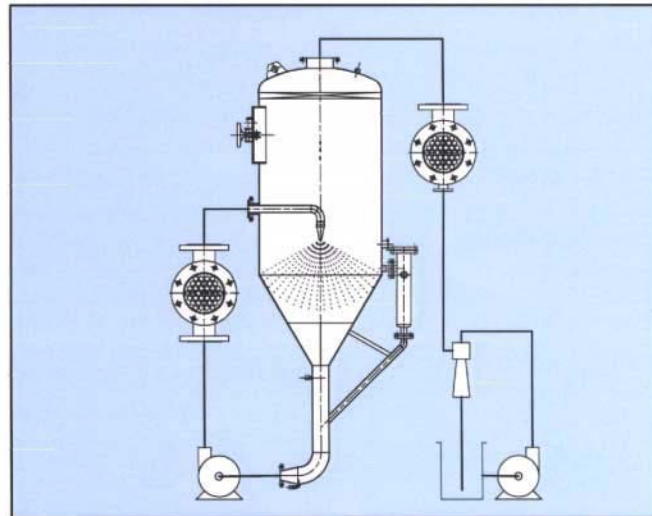
- for big daily quantities with a limited dimensions plant
- for products with foam formation

They exploit an external energy source.

They are utilised for treating big daily quantities, they are suitable for :

- concentrations till 20% of suspended solids
- concentrations till 1,25 kg/litre of density

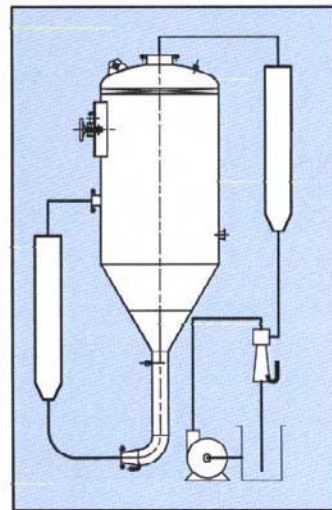
For a higher concentration, they can be combined with an auxiliary plant, after the treatment, equipped with inner scraper



## Natural circulation evaporators

- **Suitable for very aggressive liquids**

They are built with special material and they are suitable for treating water which contains Hydrochloric, Hydrofluoric, Sulphuric Acid, and other particularly aggressive products. Typical application in galvanisation and in galvanic treatment in generally (recovery of pickling baths).



## Multiple effect evaporators

- **for a great energetic saving, with big quantities to treat**

In this kind of plant heating water or steam are utilised for making the liquid to evaporate in the first expansion chamber. The produced steam is exploited, by a heat exchanger, for making the liquid to evaporate in the second evaporation chamber. This procedure, which can be repeated for a third effect, is possible because the vacuum generated in the second expansion chamber is stronger than the vacuum generated in the first one.

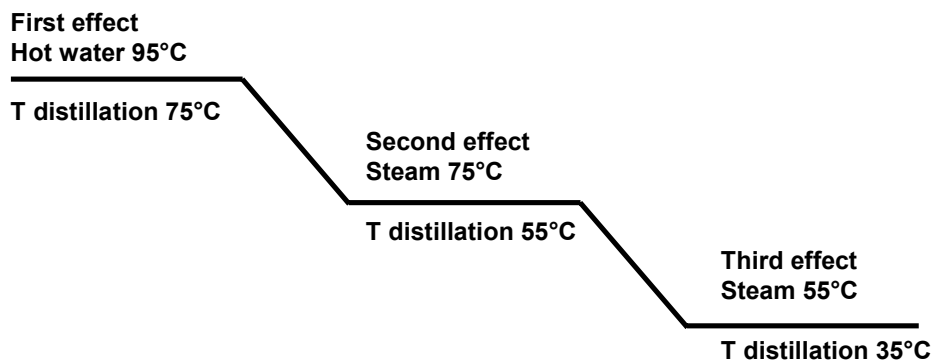


They are utilised for treating big daily quantities, they are suitable for :

- concentrations till 20% of suspended solids
- concentrations till 1,25 kg/litre of density

The distilled product goes out sterilised from the process ; particularly suitable for food and pharmaceutical productions.

For a higher concentration, they can be combined with an auxiliary plant, after the treatment, equipped with inner scraper



**Amortisation calculation of a Formeco Evaporator :**



Hypothesis : model WT 170 HP CF

yearly volume to treat	litres / year	1.250.000
disposal cost per litre	EURO / litre	0,077
<b>total disposal cost</b>	<b>EURO / year</b>	<b>96.835,66</b>
volume of residue to dispose (5%)	litres	62.500
residual disposal cost per litre	EURO	0,154
<b>total residual disposal cost</b>	<b>EURO</b>	<b>9.683,56</b>
<b>cost of the plant</b>	<b>EURO</b>	<b>67.139,39</b>
energetic cost per litre (kWh/litre 0,18)	EURO / kWh	0,077
total energetic cost	EURO / year	16.558,89
<b>plant running cost</b>	<b>EURO / year</b>	<b>26.242,46</b>
<b>total yearly saving</b>	<b>EURO / year</b>	<b>70.593,20</b>
<b>amortisation period</b>	<b>year</b>	<b>1</b>

### **Conclusions :**

The installation of a Formeco Evaporator allows to resolve the problem of polluted water treatment with an investment characterised by a short amortisation time and low maintenance costs.

The re-utilisation of distilled product in the washing cycle allows moreover a big save which avoids to the user to deal with the problem of the drain water control, which verifies hardness of saltness water.

The elimination of big volumes of water to treat avoids moreover any logistic problem related to their stock and transport and relative expenses.

The choice of a Formeco evaporator is the right solution for a large number of users, in different production fields, always favourable in comparison with the disposal of big quantities of waste water to specialised Companies and, for many applications, also more profitable than other technologies (chemical-physical treatment units).

The range of Formeco units includes a serie of plant which, for characteristics and dimensions, meets the different requirements of a large number of users, from the small factory to the big Company.



## **Who we are :**

FORMECO designs and produces :

- Solvent Recovery Systems,
- Water Evaporators,
- Acid Recycling Units

Formeco has been producing solvent recovery systems, waste water treatment apparatus and acids recovery units since 1977, manufacturing in two production factories, located in Northern Italy and Canada (4000 sq. m indoor - 10000 sq. M outdoor); installing more than 26.000 machines throughout the world, Formeco keeps the world-wide leadership position on this field.

Common in all Formeco units is quality, workmanship and dedication to total customer satisfaction. Each Formeco machine is tested and tuned at the factory to give customers the ultimate performance and trouble-free operation.

Formeco examines customer's problems and simulates the recycling process with his waste by means of pilot test units. If the right plant is not included in the existing production line, Formeco builds a specific apparatus for the customer.

Formeco facilities : a chemical laboratory for analysis, a R. & D. design and project technical department, a complete range of pilot units for industrial tests.

Formeco provides : each unit with Conformity Certificates issued by the most important European Countries delivered with a detailed instruction booklet in customer's language and the sureness of a full warranty.

Formeco offers : the assurance of a technical service network throughout World ; a telephone line is at customer's disposal with skilled technicians who speak your language.

Producing systems for the treatment of solvents, water and acid, Formeco offers a complete solution to the industry pollution problems, contributing to the environmental protection.

## **Our services, our production :**

### **Service activity**

Project and design of polluted liquids treatment systems  
Management of "turnkey" supplies  
Assistance and maintenance on existing units

### **Production activities**

Water evaporators  
Reverse osmosis plant  
Crystallizers  
Ionic exchange units  
Solvent distillers  
Inorganic acid recycling units  
Azeotropic vacuum distillers  
Filtration systems

**Where we are localised:**

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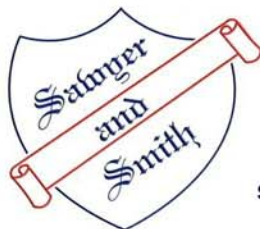
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Contact information update:

We have begun the long arduous process of moving our office.  
Please continue to direct mail to:

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All phone contact to:  
423.289.6894

All other email and website information remains the same. You can contact us at any of the existing web addresses. Email is received remotely and responded to more quickly and efficiently than a phone message. If you call the office, please leave a thorough message INCLUDING your email address so that we can send you the required information as soon as possible.

Thank You.