D&G

ITALIA

since 1979

INDUSTRIAL WASTE WATER TREATMENT PLANTS

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C&G DEPURAZIONE INDUSTRIALE

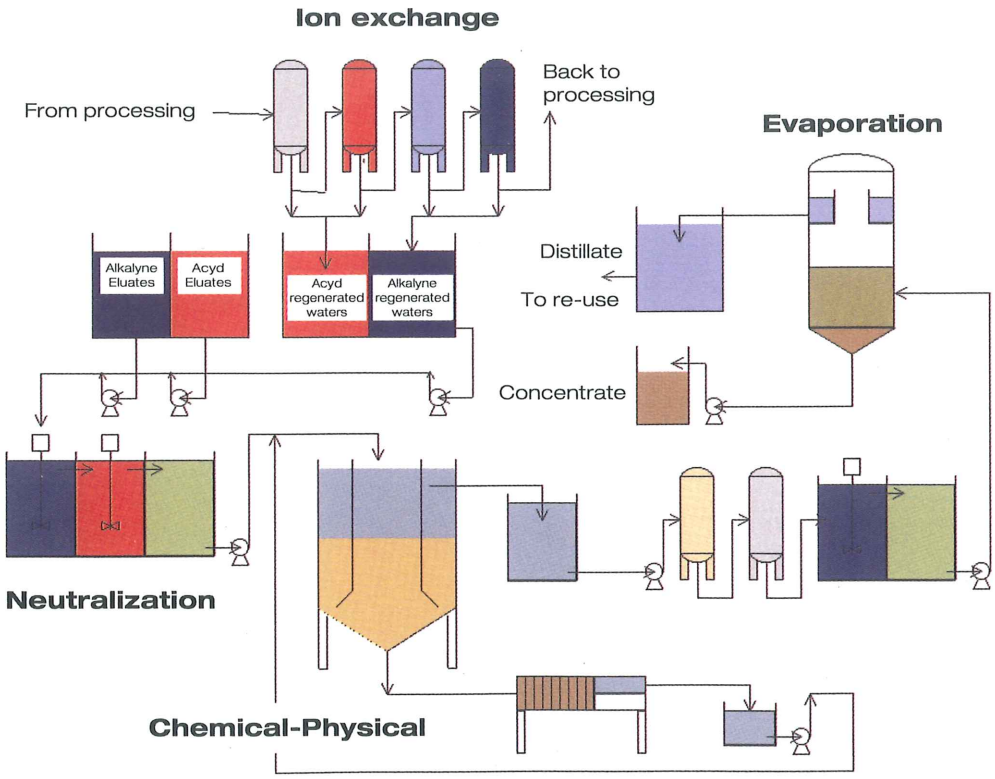
C&G has produced systems for over 30 years for the treatment of waste water from industrial work-processes.

C&G designs, and constructs equipment, installations and evaporators-concentrators in numerous versions depending on specific requirements. As always we offer potentially interested parties a number of services with our technical assistance such as:

- on-the-spot investigation and data gathering concerning the problem to be solved;
- proposal for custom-made solutions;
- tests of the water to be treated, using the lab-machine available in our workshop;
- drafting of a preliminary project and proposals for solutions;
- realization of 'turn-key' jobs;
- after sale assistance;
- up-grading of existing plants.

Wastewater depuration & recovery

Typical example of installation to process industrial wastewaters in a situation for "0-DISCHARGE".



ION EXCHANGE

- Highly resistant columns even at low temperatures;
- maximum levels of automation.

FILTRATION

- Reverse-osmosis or ultra filtration plants;
- capacity from 100 to over 10,000 litres/hr;
- maintenance is reduced to the minimum.

CHEMICAL-PHYSICAL TREATMENT

- Different levels of automated processing;
- manufacturing of the tanks from PE, PP or PVC;
- decanters;
- filter presses;
- automated dosing systems.

VACUUM EVAPORATORS

C&G can help to:

- REDUCE the consumption of water as required by your activity, by treating the effluent and putting water suitable for industrial activity back into the system.
- REDUCE, up to 90%, the costs by simply 'concentrating' those substances which have to be sent for disposal. The concentration, or the reduction of the volume, can reach 20 times the original volume. (For example: 1000 litres: 20 times = 50 litres of concentrate).
- ELIMINATE any risk of incurring sanctions from the Authorities responsible for environmental protection.
- RECOVER raw materials.

ADVANTAGES OF C&G EVAPORATORS

- Extremely compact construction
- Fully automatic working cycle, eliminating the need for observation
- Run on any energy source available
- Low energy consumption
- Total absence of fumes or smell
- Constant parameters of the resulting effects
- 24 hour performance
- Custom designed to meet specific requirements

SPECIFIC APPLICATION SECTORS

- Galvanic
- Oily emulsions
- Graphic arts, industrial printing inks
- Wine making
- Pharmaceutical
- Alimentary

EVAPORATOR V-NT Series

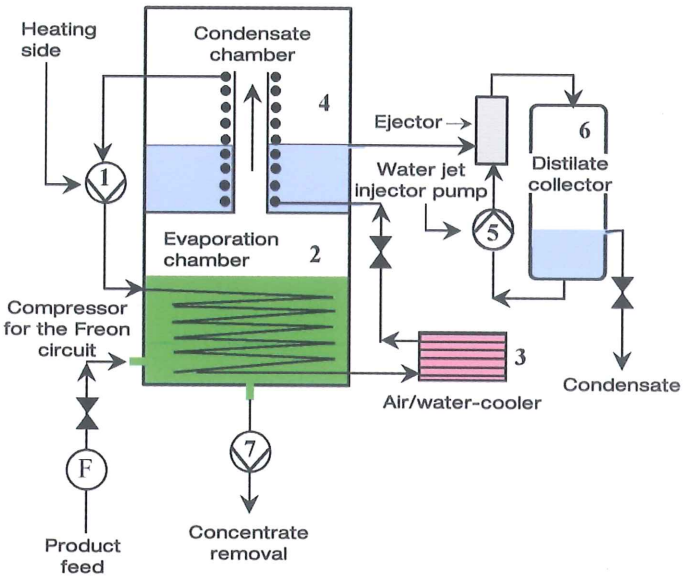
The range of VACUUM evaporators also includes the V-NT series which is able to evaporate up to 20m in 24 hours.

PROCESS DIAGRAM

The **C&G** machine takes advantage of the principle of boiling in a vacuum condition, and is fed by an electric current or other alternative energy source, which, through a refrigerating cycle and relevant heat pump, allows the distillation to take place at low costs.

The diagram shows how the evaporator is composed of:

- a cooling compressor for Refrigerant gas (n. 1)
- a boiling chamber (n. 2)
- a heat exchanger, by air or water (n. 3)
- a condensation chamber (n. 4)
- a pump for the ejector (n. 5)
- a tank for the distillate (n. 6)
- a discharge pump for the concentrated sludge (n. 7)



HOW THE HEAT IS GENERATED

The cooling compressor (n. 1) compresses the refrigerant gas. Thanks to the effect of the compression the gas heats up and reaches the temperature of approx. 60-70°C.

The compressed gas is then pushed into the serpentine coil in the boiling chamber (n. 2) in the VS Series (vertical), or into the side-walls in the ES Series (for ultimate concentration to almost dry condition).

The above serpentine has the function of heat-exchanger. It stays, in fact, in the liquid to be concentrated and releases almost all of the heat generated by the compressed Refrigerant gas.

As soon as the pre-set temperature is reached inside the boiling chamber (n. 2), the liquid starts boiling and we have obtained the first effect of distillation: the liquid to be concentrated has converted from liquid into steam.

Let's now follow the route of the refrigerant gas. After almost all the heat has been released into the boiling chamber (n. 2), the gas needs to lose further heat and this is obtained by passing the refrigerant gas through the heat exchanger (n. 3), which has a through-flow of either air or water.

At this point the refrigerant has released its heat to the liquid to be concentrated and it is then conveyed into the serpentine arranged in the condensation chamber (n. 4). On contact with the cool surface of the serpentine, it will condensate and come back to the liquid form. From the bottom of the condensation chamber it will then be sucked by the ejector (n. 5), and conveyed to the reservoir of the distillate (n. 6). The system of pump and ejector has the double action of both creating a vacuum inside the concentrator up to 700-740 mm Hg, and of creating a pressure of approx. 0.3BAR inside the reservoir (n. 6), which makes it possible for the distillate to be extracted continuously, without breaking the vacuum, and thus without the need of making another vacuum again after the discharge.

The system can be run either non-stop or at time intervals, and is fully automatic due to a series of safety devices which intervene with light-signals in the case of malfunctioning.

The compressor for the Refrigerant gas is sealed and auto-lubricating and its duration is equal or longer to that of the life of a house-refrigerator of an air-conditioner.

EVAPORATORS WITH HEAT-PUMP

V-NT Series and V-SN28 Series
EVAPORATOR WITH SUBMERGED COIL-SERPENTINE

Vertical development evaporators with automatic discharge.
This is the most commonly applied evaporator. The machine works using a refrigerating system with a heat-pump under vacuum. Application of the cooling circuit and the heat-pump cycle allows a low energy cost when compared to the quality of the distillate, for capacities ranging from 250 to 20,000 litres over 24 hours.

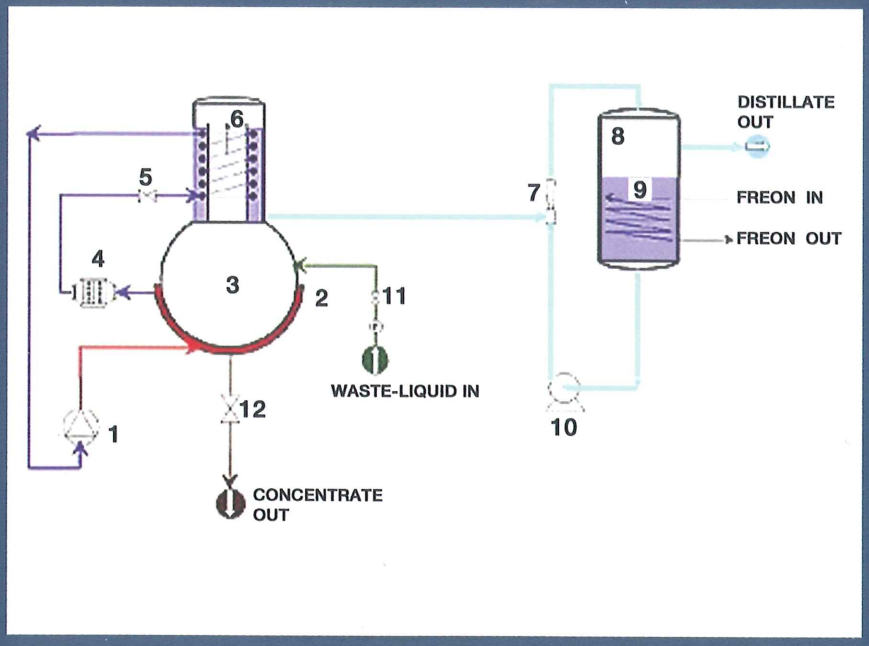
- *Power supply*: electric energy or alternative energy sources
- *Limit of concentration*: liquid concentrate discharge with relative density

EVAPORATOR ES SERIES

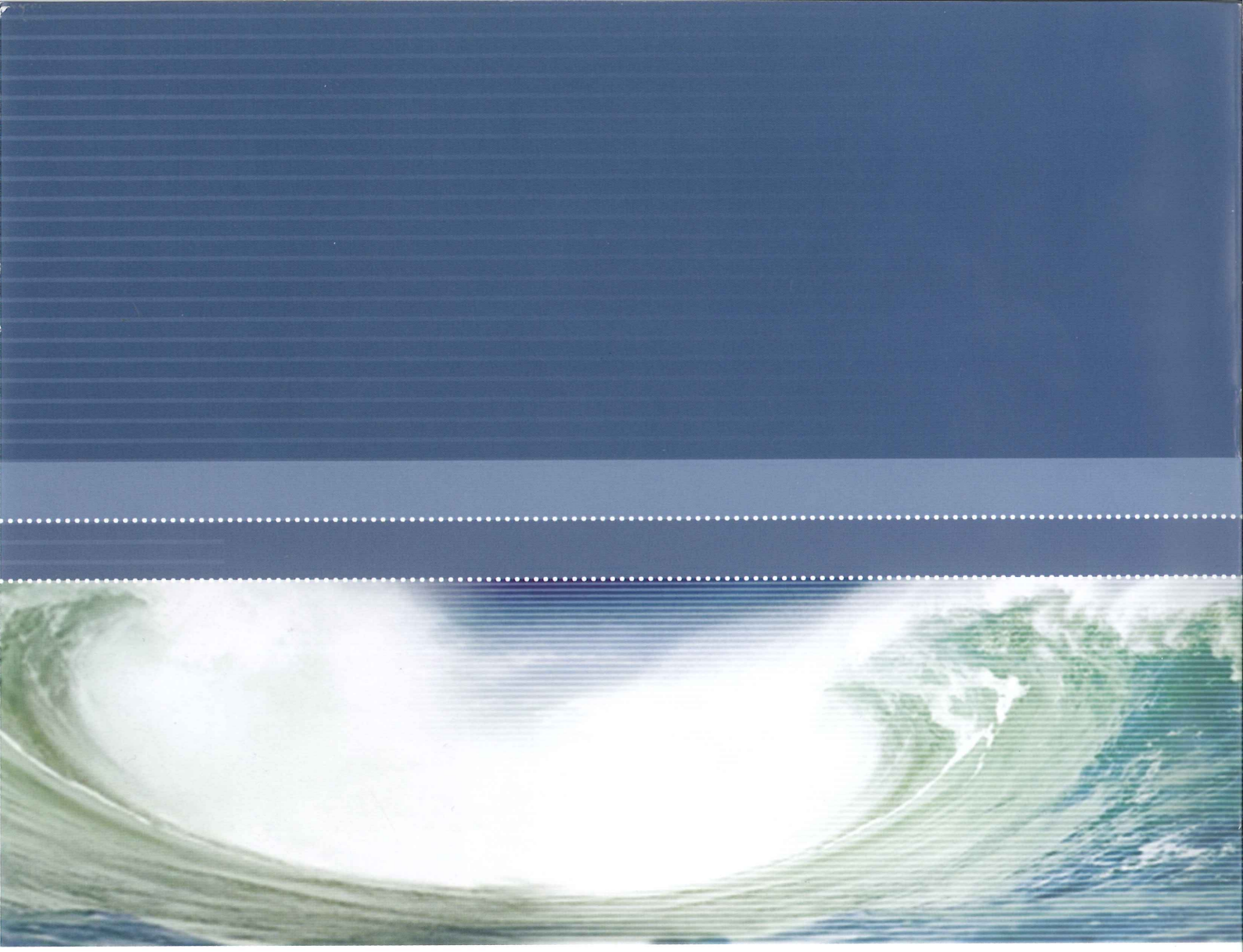
Horizontally arranged boiler
Manual discharging

The physical concept of evaporation is always that of a vacuum heat-pump. This type of evaporator makes it possible to arrive at very high concentrations. Discharge of the concentrate is by hand. The evaporator consists of a boiler arranged horizontally and equipped with an outer shell to allow for the heat exchange.

- *Production capacity of distillate*: from 200 to1,000 litres in 24 hours.
- *Power supply*: electric or alternative energy source.
- *Limit of concentration*: concentrated discharge as wet sediment or crystals, at the suction capacity limit of traditional pumps.
- *Energy cost*: one third more than that of the evaporator with submerged coil.



1. Compressor
2. Heat-exchanger shell
3. Boiling vessel
4. Undercooler for refrigerant
5. Thermostatic expansion valve
6. Condensation chamber
7. Ejector
8. Reservoir for accumulating distillate
9. Vacuum-distillate pump
10. Electrovalve for feeding product
11. Hand operated valve for discharging concentrate



DFR SYSTEMS SRL

Str. Drumul Taberei 46, Bl. OS2, Ap. 23
Bucuresti sect. 6, ROMANIA
Tel. : 0744.301.431, 021.413.40.91
Fax : 021.413.40.91, 021.413.14.39
www.dfr.ro, www.myuv.ro