

# CRYSTALLIZERS

RECOVERY OF CRYSTALLIZED SALTS FROM PROCESS SOLUTIONS



# CRYSTALLIZERS

Crystallizers for industrial process solutions to precipitate inorganic salts (solute) from the solvent (water) by changing the conditions of the initial solution (solubility) either by the variation of **concentration** or **temperature**.

SAITA produces two types of industrial crystallizers. "hot" **CV-series** crystallizers which evaporate water from the initial solution thereby increasing salt concentration and solubility by precipitating salts in the form of crystals.

**CR series "cold"** crystallizers cool the saturated solution to the incipient precipitation temperature which forms crystallized salts.

Crystallizers are generally used in industry for different purposes: to **recover** crystallized solids as a by-product, to **purify** process solutions, or as a way of **concentrating** liquid waste into a dry solid.

## Applications

### Raw material recovery

Process solutions or spent acids are concentrated by evaporating the water contained until the salts precipitate. The separated salts are by-products which can be reused in the same production process or recycled in other industrial applications.

### Decarbonation

In the electroplating industry, crystallizers are used to clean baths containing carbonates which are reducing the efficiency of the bath. Using **CR-series "cold"** decarbonators, carbonates can be continuously removed until the solubility limit is reached, thereby ensuring the stability of the plating process.

### Zero liquid discharge - ZLD

CV series crystallizers are applied to **zero liquid discharge** treatment plants in order to remove pollutants as crystallized salts. In this way only solid waste is disposed.

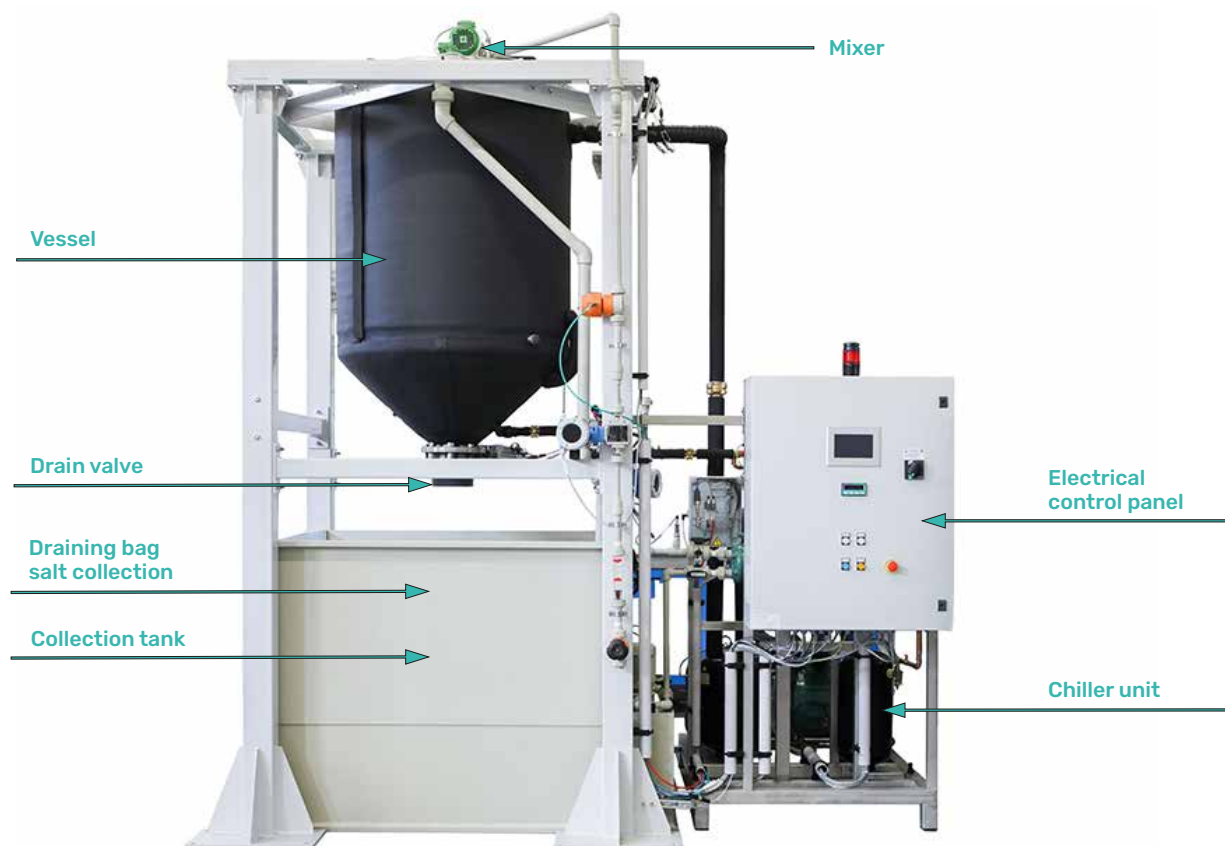


# COLD CRISTALLIZERS - CR Series

**CR Series** “cold” crystallizer systems are designed to cool saturated process solutions, in some cases down to near 0°C. Depending on the solubility curve of the salts contained in the initial solution, lowering the temperature, leads to precipitation of the inorganic salts in the form of crystals. The crystallization process can be continuous or discontinuous depending on the industrial application.

## Specifications

Crystallizers feature a vertical vessel with conical bottom, made of stainless steel or special alloys and featuring an external jacket through which the cooling fluid is fed from: Chiller (**Freon**), cooling tower or dry cooler (**cold water**). A mixer is installed inside the vessel to uniformly mix and cool the solution. Crystallized salts are discharged onto draining bags through timed automatic valve.



## Sectors

- Electroplating
- Metal-wire pickling
- Pharmaceutical
- Chemical industry
- Metal recovery

## Advantages

- Raw material recovery
- Carbonates removal
- Spent acid recovery

# HOT CRISTALLIZERS - CV Series

Crystallization systems which heat the initial solution to evaporate the aqueous fraction and thereby concentrate inorganic salts to their incipient precipitation.

CV series crystallizers can be powered by a heat pump or using steam or hot water for heating, and cold water for condensation.

In most applications evaporation takes place under vacuum at low temperature (< 50°C), although depending on the application the boiling temperature may vary.

## Specifications

**CV-series** crystallizers consist of a vertical vessel with conical bottom, made of stainless steel or special alloys, complete with an external jacket through which the **heating fluid** (Freon, hot water or steam) is fed. A **scraper** shaft with proximity brushes is installed inside the vessel to mix the solution and keep the heat exchanging surface clean. **Vacuum** crystallizers feature a condenser and vacuum creation system with **venturi ejector**.

The discharge of crystallized salts is automatic and timed, using a gate or clapet valve.

The mixture of salts and mother liquid is generally discharged into draining bags.

For large productions of crystallized salts **pusher centrifuges** are recommended to separate the salt from the mother liquid.

## Sectors

- Electroplating
- Pharmaceutical
- Chemical industry
- Rubber industry
- Metals recovery
- Zero liquid discharge

## Applications

- Raw material recovery
- Salts crystallization
- Water recovery
- Disposal of solid sludge
- Zero liquid discharge



## Optionals

- Remote control on PC, tablet or mobile
- Analogic flow meters
- Salt weighing system
- Pusher centrifuge
- Industry 4.0 Ready
- *Special alloys: Superduplex, Titanium, Sanicro28*

