

12 minutes walk from Kitakagaya Station of Subway Yotsubashi Line

## COMPANY PROFILE



## KATSURAGI INDUSTRY CO.,LTD.

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## KATSURAGI INDUSTRY CO.,LTD.

# Carving the way to the future with wisdom and creativity.

We, Katsuragi Industry Co., Ltd., have been engaged consistently in design and manufacture of chemical and industrial equipment since our foundation. Over those years, we have been persistently exerting ourselves to polish technologies, improve products, and elevate quality to meet customers' needs. In recent years, while needs are being complicated, requirements for environmental and ecological contribution are growing.

In order to satisfy these needs, we will contribute to environment and work on energy-saving for equipment, with products including dryers as a major line of products as well as those based on evaporation/concentration and crystallization technologies.

We are working in a wide range of areas such as production of chemical products, food, electronics, clothing, and new material, separation/refining of chemicals and materials, as well as wastewater treatment contributing to environment conservation.

For the purpose of meeting such a wide variety of customer' s needs, we all join wisdom in an all-out effort to advance further our products.



**Tetsuro Tsushima**  
Representative Director and President



## Business Area



Food



Electronics



Chemical plants



Fine ceramics



Drugs



Chemicals



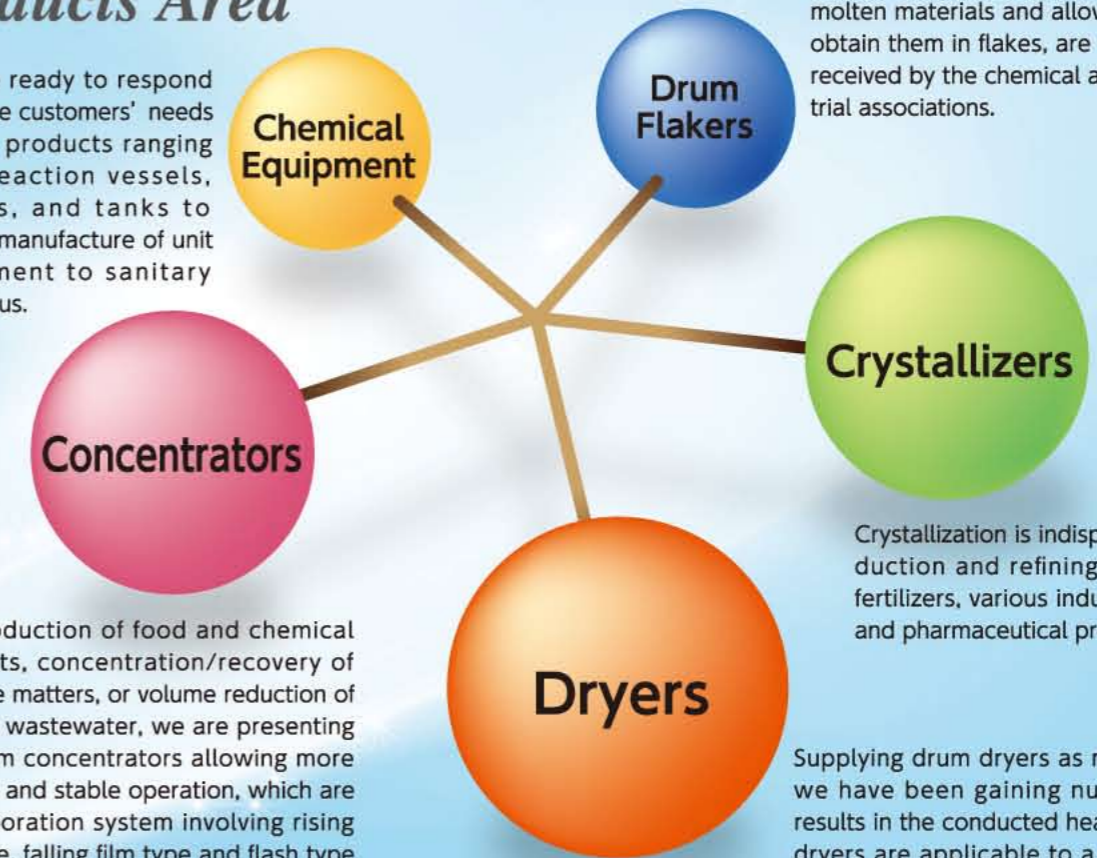
Environmental plants



Chemical products

## Products Area

We are ready to respond to all the customers' needs for the products ranging from reaction vessels, towers, and tanks to design/manufacture of unit equipment to sanitary apparatus.



For production of food and chemical products, concentration/recovery of valuable matters, or volume reduction of general wastewater, we are presenting optimum concentrators allowing more efficient and stable operation, which are of evaporation system involving rising film type, falling film type and flash type according to fluid concentration, components and purposes, and ejector system, heat-pump system and multi-effect evaporator system as energy-saving measures.

Drum flakers, which are capable of continuously cooling and solidifying molten materials and allows you to obtain them in flakes, are favorably received by the chemical and industrial associations.

Crystallization is indispensable for production and refining of salt, sugar, fertilizers, various industrial chemicals and pharmaceutical products.

Supplying drum dryers as major products, we have been gaining numerous actual results in the conducted heating drying. Our dryers are applicable to a wide variety of products such as chemical products, pharmaceutical products, food, fine ceramics, and wastewater. Our advanced technological strength and reliability are highly evaluated by various arenas.

## — From before-sale service to after-sale service —

We have test machines for diversified products available to meet customers' needs providing integrated service ranging from data collection/analysis and delivery of full-size facilities to maintenance and consultation for remodeling.

### Inquiry

After confirmation of the details, we will make a planning/give quotation if no test is needed.

### Laboratory test

If properties are unknown, through laboratory test in the scale of beaker, we collect basic data and consider the process to give quotation and make planning.

### Analysis with test machine/planning/quotation

If a test is needed, a sample is need, or a request received from a customer, we conduct tests with our test machines to make a planning and give a quotation.

### After receiving an order

We will take integrated procedures from delivery control, designing, fabrication, installation (by request of the customer), trial operation adjustment, and guidance for operation control, to delivery.

### After-sale service

We are ready to respond to customers' consultation regarding maintenance service, production increase, remodeling, etc.



Rotary evaporator



Test site and various test machines

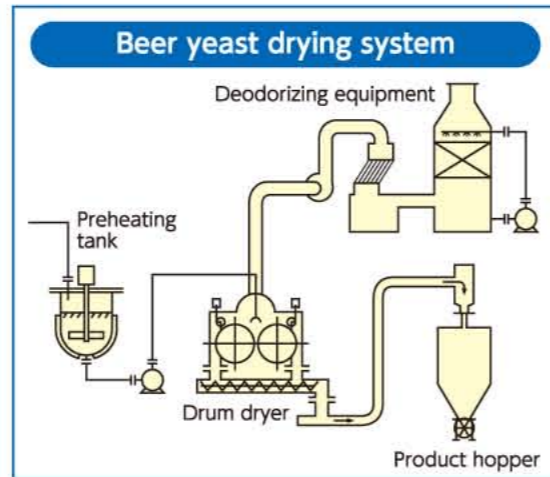
# KATSURAGI's Product Lines boasting of reliability and technologies

Product lines meeting diversified needs, which are supported by the technologies of KATSURAGI. We have been gaining customers' trust by means of quality improvement and after-sale service. We will exert ourselves from a viewpoint of customers to further promote easy-to-use, energy-saving, and labor-saving policy to supply state-of-the-art products to the customers.

## Dryers

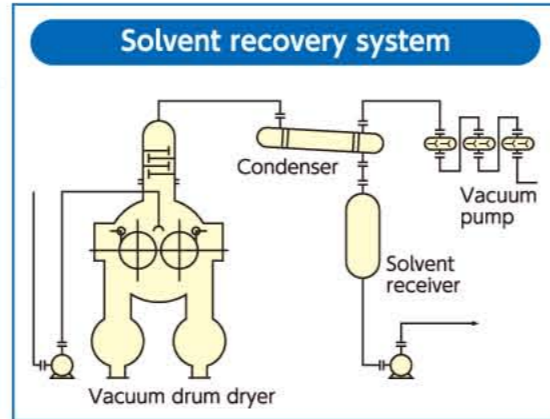
### Drum Dryers

Drum Dryers are of conductive heat transfer type. Heating medium (generally steam) is sent into the rotating drum (cylinder) and liquid material is fed on the heated drum to evaporate and concentrate, and concurrently liquid material is stuck on the drum surface in the form of film, then promptly evaporated and dried. Dried materials are scraped continuously with a stationary knife.



### Vacuum Drum Dryer

Vacuum drum dryer has the mechanism of the general atmospheric drum dryers, which is incorporated in the vacuum chamber, allowing continuous operation under the functional reduced pressure.



### Heat Recovery Drum Dryer

Heat recovery drum dryer was developed for energy saving. Generally exhaust air (vapor) from the dryer is discharged into the atmosphere. However, in this drum dryer, from such exhaust air, heat is recovered through scrubber condenser and heat recovery system. With such recovered heat, pre-concentration is carried out.



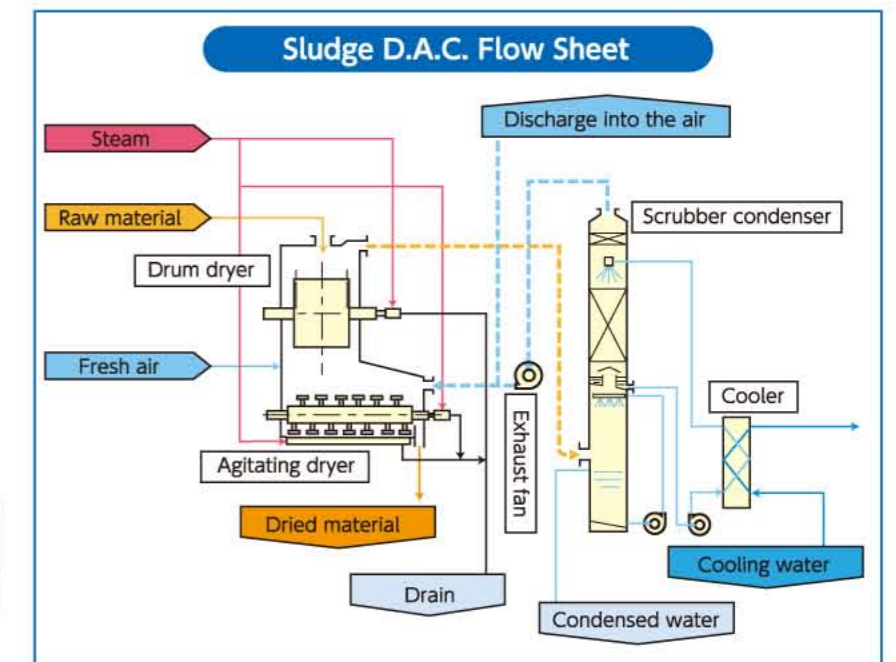
### Double Cone Dryer

Double Cone Dryer, which is a conducted heat transferring rotary dryer of batch operation, mainly suited for vacuum drying of sludge form materials. The main body is a tumbler with a jacket mounted, in which raw material is fed to the extent of 30 - 50% of the total capacity, and agitated and dispersed repeatedly by rotation to dry.



### Sludge Dryer (D.A.C.)

Sludge Dryer (D.A.C.) is an innovative dryer, making the best use of advantages of the Drum Dryer and Agitating Dryer. This has solved the problems in association with the conventional sludge dryers, creating no lump and discharging no odor.



### Vacuum Agitating Dryer

Vacuum Agitating Dryers, which are of conducted-heat transferring system, are generally of batch operation under vacuum. The body is in cylindrical or channel (U) form with a jacket mounted and equipped with uniaxial agitator having ribbon vanes or puddle vanes. There are models as having dual-axial agitator in the body of "U" form according to the properties of the treated material.



Vacuum Dryer for Solvent Recovery



## Cooling Solidification System (Drum Flaker)

### Drum Flaker

In cooling and solidifying the molten materials, Drum Flaker is capable of continuously flaking them, allowing easy re-solubilization and improvement of working environment compared with pulverized products. In addition, measuring and bag-packaging is easy, enabling automatization.



## Chemical Equipments



# Crystallizers

Since ancient times before Christ, salt which is indispensable to the human beings has been produced from sea water. However, there are many problems arising to reproduce successfully and gain steadily even crystals in purity, particle size, and shape.

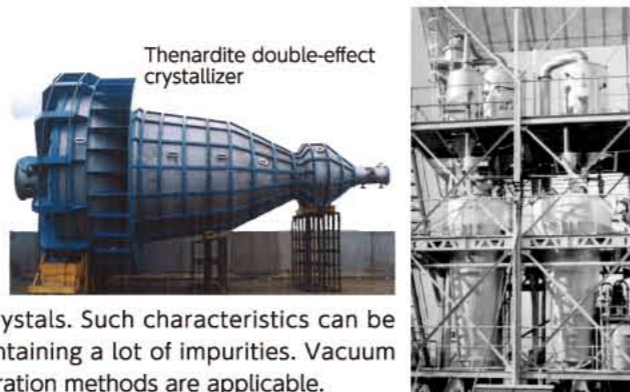
Based on experience and results gained over a long period of time, we select appropriate types of systems according to the properties of the material handled and requests from the users, and build up systems to supply optimum facilities.

Crystallization methods are in wide variety, such as reaction, cooling, concentration, etc. and there are batch type, continuous type, and semi-batch type available according to the throughput and application.

Let us introduce you our typical crystallizers as follows:

## Reverse Conical (CEC) Crystallizer

This is referred to as the classified fluidizing-layer crystallizer and is also called reverse conical one for its shape. Making good use of the principle that the larger the crystals are, the more rapid the falling velocity is, the shape is made in the form of reverse cone, allowing classification of the crystals while fluidizing them. In consequence crystals with sharp particle size distribution can be produced. Its characteristic structure allows you to obtain large and highly purified crystals. Such characteristics can be utilized in recovering valuable matters from waste fluid containing a lot of impurities. Vacuum cooling, indirect cooling, reaction, as well as vacuum concentration methods are applicable.



## DTB (Draft tube & baffle) Crystallizer

This is a typical model of mixing tank crystallizer. Draft tube is mounted inside, allowing crystals which are growing to be sent efficiently to the evaporation surface with highest supersaturation. When crystals are grown, fine crystals are classified at the classification legs to be extracted.

Product particle size is smaller than that produced with the fluidizing layer type, while more stable operation can be achieved compared with the reverse conical type. In addition, for small-scaled evaporation concentration, vacuum cooling, or reaction method, no outside circulation is needed.



Ammonium chloride cooling crystallizer

## Jacket Scraping-Cooling Crystallizer

This Crystallizer is used mainly for the materials of which solubilities are substantially reduced due to fall in temperature as in the case of Glauber's salt. For the materials of which crystals are apt to stick on the cooled surface, scraping vanes using reinforced Teflon are provided. This type is suited to the small-scale production because of limited cooling area. However, throughput can be increased by introducing multi-stage continuous system or arranging the batch tanks installed. This system, which is of course used for recovery of valuable matters, can display its power in recovery of mother liquor.



Glauber's salt-separation crystallizer

## Slurry Concentration Crystallizer

This crystallizer is of a structure in which supernatant liquid not containing crystals is separated, and precipitated crystals can be concentrated in the crystallizer. Thus, when precipitated volume in one bath is extremely small, this can display its power.

In particular, when solute accumulated as impurities in the surface treatment line is precipitated by using temperature difference or through reaction to recover treated fluid, size of the crystallizer can be reduced, allowing substantial labor saving.



Aluminum hydroxide-separation crystallizer

# Concentrators

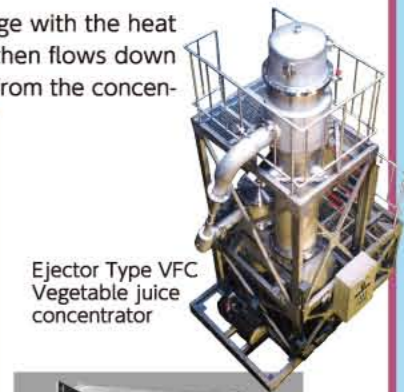
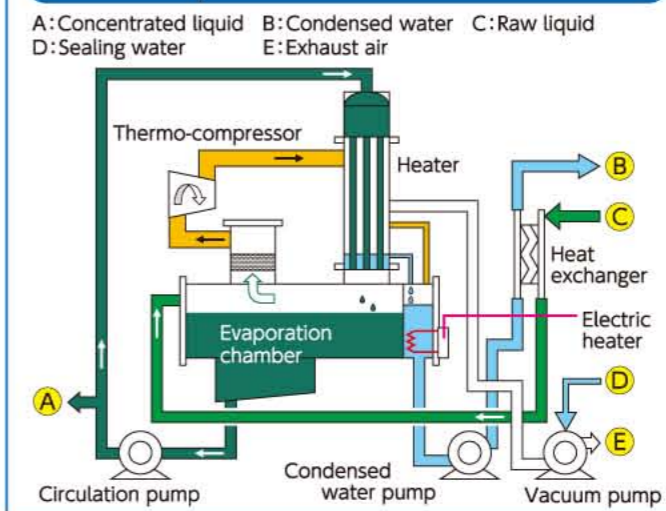
Concentrators have been existing since early times, and a wide variety of types have been devised according to the application. There are Jacket Type, Calandria Type, Flash Type, Rising-Film Type, Falling-Film Type, etc. according to types of evaporators or evaporation methods, and Plate Type, Vertical Tube Type, Horizontal Tube Type, etc. according to the shapes of heating component. Large-scale systems include Multi-stage Flash Type, Multi-effect Type according to the facilities.

In order to optimize concentration operation carried out in preprocessing of crystallization, we select optimum evaporation system for the properties of the fluid. We are designing and supplying concentrators according to the purposes such as production of food and chemicals, concentration/recovery of valuable matters, volume reduction of general wastewater, as well as properties of fluid.

## VFC Concentrator

Heater is of vertical tube type, in which liquid is caused to flow down for heat exchange with the heat source provided outside the tubes. Liquid is boiled and evaporated inside the tubes, then flows down into the concentration tank in high-speed dual-phased stream. Fluid component is sent from the concentration tank to the upper part of evaporator with circulation pump. Evaporated steam contacts the liquid surface and mist is separated and led to condenser to take out condensed water, of which steam separating-efficiency is high and water quality is superior. This system is suited to the bubbling liquids and organic component-containing liquid such as juice.

### Thermo-compression VFC Concentrator Flow Sheet



Ejector Type VFC Vegetable juice concentrator



Heat Pump VFC Concentrator

## FFC Concentrator

Evaporator itself is of a simple structure with only a vessel. Fluid circulated by the circulation pump is heated with the outside heater, and when it enters the evaporator, it is subjected to flash evaporation. Generally circulation liquid is fed to cause swirling flow. This system, which is relatively universal, somewhat falls behind other methods of evaporation in heat efficiency and power consumption. This is suited for the liquids, which become slurry or highly viscous as a result of precipitation of crystals.



Ejector FFC Type Plating-related Effluent Concentrator

## VRC Concentrator

Heater is of vertical tube type, boiling and agitating the liquid in the tube with the heat source (steam, hot water, etc.) outside the tube. The liquid flows upwards with the vapor generated strikes against the upper baffle board, and non-evaporated liquid returns into the heater through outside return line and circulation pump. This system is of a simple and compact structure and its evaporator's height is controlled at low level. This is of multi-purpose type, being suited for evaporation and concentration of general wastewater and desalination system.



Ejector VRC General Wastewater Concentrator

## Coil Concentrator

This is rotary coil concentrator, in which coiled pipe is rotated in the concentration tank to send steam in the pipe. By rotating the coil formed based on the special knowhow, liquid of high density and high viscosity can be extremely smoothly concentrated without scaling.

