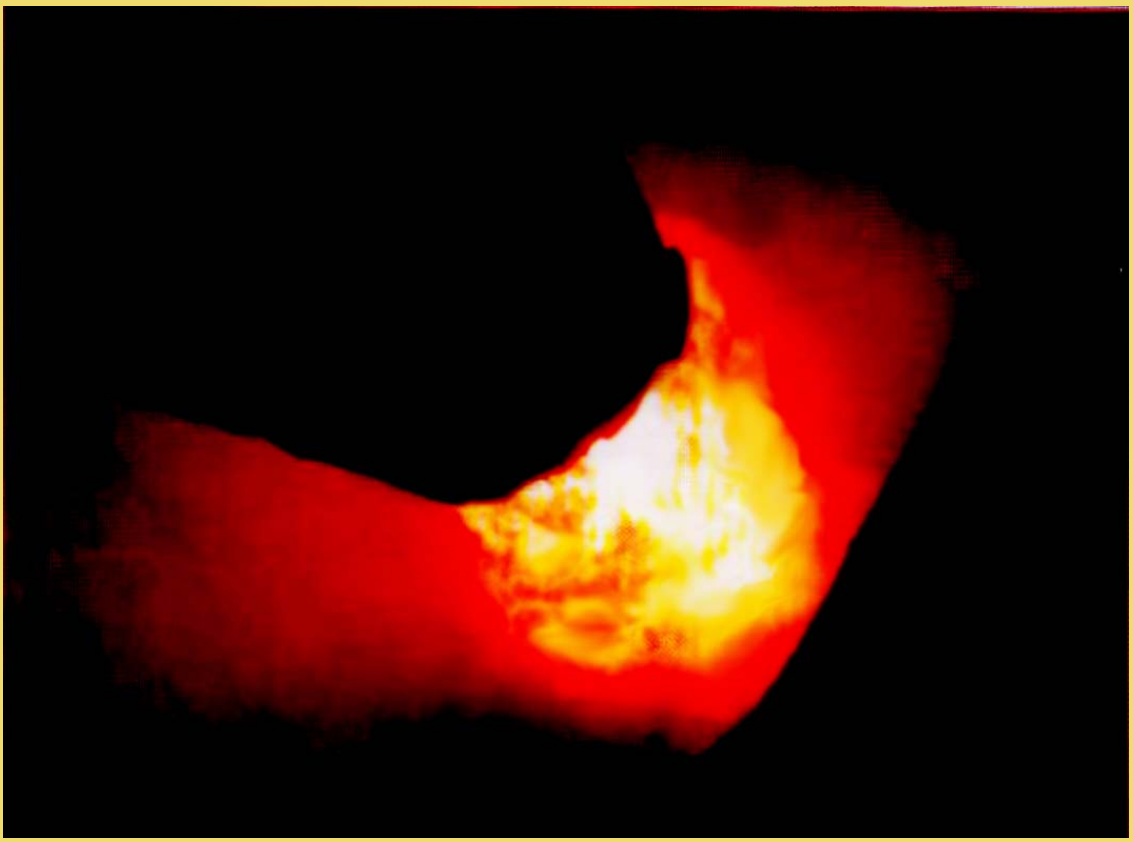
ROTARY KILN

and

DRYER

MADE IN INDONESIA



siko engineering

SIKO's ROTARY KILN and DRYER

Various industries such as mineral industries including cement plant, some kinds of chemical plant, paper and agro industry have been using imported rotary kilns, rotary dryers and related equipments. Now, pt. cemara siko engineering indonesia can provide you with Indonesia made rotary kiln and rotary dryer.

As a pioneer in the manufacturing of rotary kilns and rotary dryers in Indonesia, we proudly offer our products which will best suit your need in increasing productivity and enjoy the benefit of careful attention to energy saving, easy maintenance, prevention of pollution, and competitive price of the products.

We are not only paying our attention to provide new equipment installation of kilns and dryers for your industrial plants, but also can help you in improving any part of your industrial plant by modernization and/or repairing of your kiln, dryer and its system.

More importantly, we provide the related technology regarding system establishing for combustion control, lining method selection, exhaust gas treatment, material handling system before and after kiln and dryer.

Furthermore, we are extending our range of products to rotary cooler, band dryer, stationary furnace including electric heating furnace and other type calciner.

1. ROTARY KILN

TYPES OF ROTARY KILN

- **Direct Heating Type**
- **Indirect Heating Type**
- **Batch Type**

Direct Heating Type

Direct heating type rotary kiln can be designed to withstand temperature up to 2000^0C or even higher by selecting special high heat resistant refractories.

Burning and calcining process

The rotary kiln will be used in any industrial plant for burning and calcining process of the following material feed :

- Lime, dolomite clinker, hamotte material, magnesia clinker, magnesium loss.
- Kinds of ore for metallurgical process.
- Ferrite, perlite, iron oxide, titanium oxide, pigment, hot charging flux.
- Activated coal, oil cokes.
- Nickel hydroxide, nickel sulfate, sodium bichromate, electrolysis sediment of copper.
- Artificial light aggregate and special building material.

Temperature operation for processing typical metallurgical materials in the rotary kilns is round 1500^0C by means of fuel oil and/or pulverized coal combustion.

Incinerating

Incinerating process in the kilns is applied to material sludge such as sewage sludge, oil sludge, pulp sludge, industrial sludge, and shells in the sea water drainage at power station.

Range of size

Large size of Siko's rotary kiln is up 4000 mm I.D. and effective length is selected at approx 15-20 times the inner diameter.

Indirect Heating Type

Indirect heating type rotary kiln is provided with furnace assigned at the outside of retort. The burner mounted in a furnace heats up the outside surface of the retort.
When the industries need to burn powdery raw material which does not accept direct contacts with combustion gas, it is most suitable to apply kiln indirect heating type for the plant.
The heating temperature is normally can be raised to 1150^0C by selection of high heat resistant material to retort.
By varying the numbers of burners heated area of retort can be varied. Electric heating can be applied to meet required condition and circumstances.

Maximum heating temperature

In case of indirect heating type of rotary kilns, Maximum heating temperature is up to 1300^0C by using heat resistant cast steel or ceramics.

Heating at pressurized or vacuum condition

Heating at pressurized condition in the kilns which are oxidizing atmosphere with air or neutral atmosphere with nitrogen or carbon dioxide, active atmosphere with hydrogen or argon or carbon dioxide can be carried by using special seating device. Operation of pressurized condition is kept 980 Pa. We also provide batch type rotary kiln, where heating at vacuum condition can be carried out and vacuum condition is kept on 1.3 Pa.

Temperature control

The burning temperature can be controlled constant at the pre-set point by adjusting fuel flow rate to electric heater through an automatic temperature controller with consideration of the sensor points and position. For the requirements of temperature control, it is necessary to know retention time of raw material and retort dimension, and the temperature controlling system is applied as follows :

1. Sensing of temperature at each area by means of thermocouples is fitted on the furnace.
2. Sensing of raw material temperature by means of thermocouples is fitted inside of the retort.
3. Sensing of the retort surface temperature is conducted at each area

Automatic control system

Operation under full automatic control system to cover not only fuel combustion system but also the whole plant process from materials up to product by sequence time become possible with programming.

Fuel type

Type or fuels that can be applied to the kiln burning system are bunker oil, kerosene, gas or electric power.

Batch Type

Batch type rotary kiln is operated after charging raw material by means of feeder and after completing the predetermined retention the time, the material is then discharged from the rotary kiln. Using of batch type rotary kiln in a system enable to adjust the retention time of material and to charge reducing or inactive gas; enable to heat processing hydrogen and argon into the kiln at pressurized operating condition or vacuum condition inside the kiln. Application of batch type in the kiln processing system is increasing with a variety of material requirements.

Various application

SIKO can provide rotary kiln to handle many kind of raw material such as :
Flux for welding, soft ferrite, various ceramics raw material, electrolysis sediment of copper, titanium oxide, iron oxide, special absorbent, activated carbon, various catalyzer, uranium oxide, oil cokes, fluoride, molybdenum oxide, zirconia, lead power, sand for roof, coal distillation, contaminated soil, etc.

KILN CONSTRUCTION

Kiln Shell

Kiln shell is of all-welded design and made of structural steel plate of various thickness. The selection of plate thickness and position of the supports will be determined carefully with a view to attaining sufficient resilience of the kiln shell to take up any stresses caused by mis-alignment of supporting rollers.

The retort of indirect heating rotary kilns is constructed with heat resistant material such as various type of stainless steel, heat resistant cast steel (centrifugal casting), inconel, nickel clad steel or ceramics.

Based on experience, the most suitable material is selected taking into account all characteristic of raw material, calcining temperature, retort dimension and economic of construction.

Kiln Lining

The rotary kilns are normally lined with magnesite or dolomite bricks in the burning zone, high alumina bricks in the transition and cooling zone, and a fire bricks lining in the calcining zone.

Kiln Supports

Tyres, to prevent undue deformation of the kiln shell during operation, made of alloyed steel.
Supporting rollers, made of alloyed steel. Thrust rollers, to take up the axial downward thrust of the rotating kiln via one or two of the tyers.

Kiln Drive

Large kiln will use girth and pinion and made of cast steel, fixed on the kiln shell by steel spring plates, welded tangentially to the kiln and fitted to the gear rime by hinge bolts.
Small kiln will use a chain drive type.
A mechanical variable speed motor or inverter control motor will be installed for speed control.

Kiln Seals

Kiln inlet seal is fitted at the inlet end of rotary kiln. A seal plate in the seal system is required to accommodate any slight radial movement of the kiln wear ring and longitudinal movement of the kiln inlet end. Beside, with this seal the false air entering at the kiln inlet is reduced to a very low value.

2. ROTARY DRYER

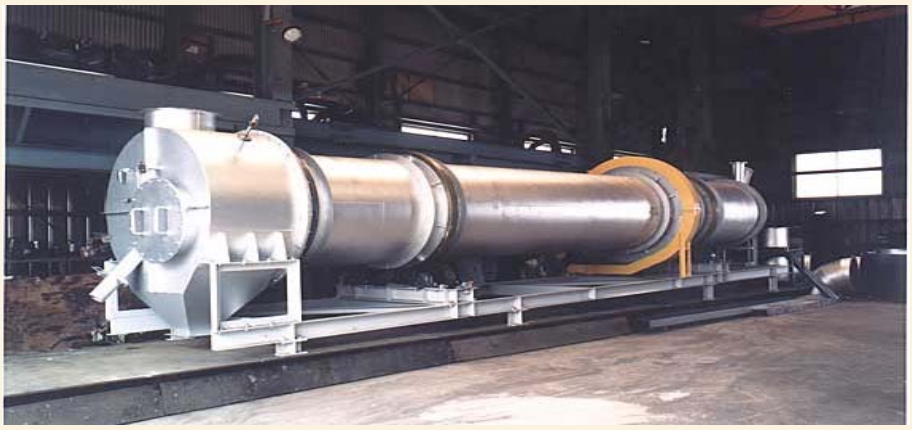
TYPES OF ROTARY DRYERS

- **Direct Heating Type with counter flow**
- **Direct Heating Type with parallel flow**
- **Indirect Heating Type**

The rotary dryer is applicable for wide range moisture a materials in various industrial field.
SIKO has a lot of experience in the system application to various types of plants.

Direct heating Type with Counter Flow

This system apply counter flow of hot gas versus raw material, and the material is in direct contact with gas. Many raw materials in a industry is dried by this system such as mineral ore, metal dust, chemical fertilizer, etc.



Direct heating Type with Parallel Flow

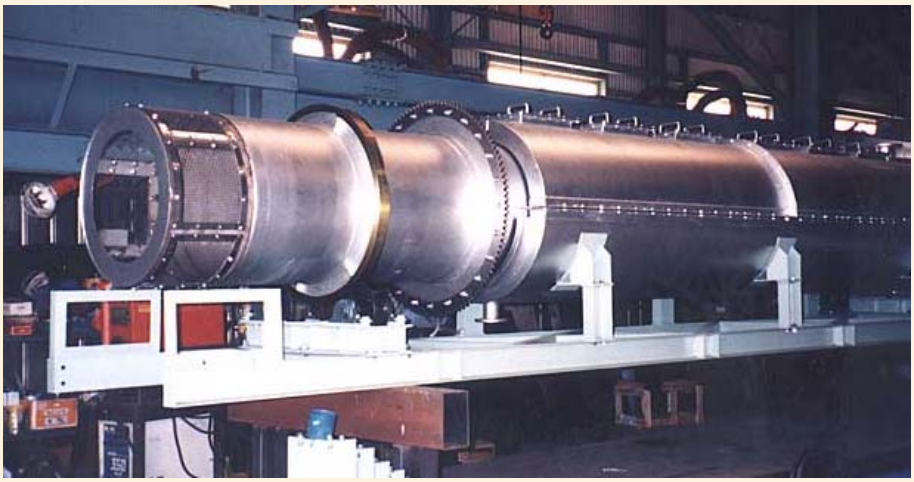
This system apply parallel flow of hot gas and raw material and suitable to dry heat sensitive material which operation temperature is limited and prohibited to exceed it. It is also suitable for adhesive material such as high moisture mineral ore, sludge, etc.
This system will give rise to larger temperature difference between hot gas and raw material, and then rapid vaporization of moisture will prevent excessive heating of material. Adhesive material will be rapidly dried at the inlet. Thus, the sticking of material to the wall and filters can be avoided.

Indirect heating Type

Indirect heating type rotary dryers will be equipped with typically designed heat exchanger type such as multi tube.

ROTARY COOLER

Design of rotary cooler will be done considering the characteristics of raw material to be cooled. According to client's requirement, we can provide water cooling or air cooling system for rotary dryers, or special vertical type cooler.



Direct cooling with Air

Hot raw material is fed into the rotary cooler while cooling air is drawn through the cooler from the material discharge end of the cooler. Raw material moves towards the outlet by mean of the cooler rotation together with the filter attached inside of sheel.
Discharge hot air from cooler can be returned and utilized as the secondary combustion air for kiln burner.
In case the temperature of hot material remains high, the inside portion of feeder is lined with refractories.

Indirect Cooling with Water

Cooling water spray is attached to the outside of rotary cooler sheel that will accelerate the cooling speed and get effectiveness of the cooling of the material.

3. BAND DRYER

The equipment is used to dry moist material by conveying the material on a wire mesh belt with the hot air blown across it.
We can provide you band dryers with high efficiency and continuous operation.

SIKO has a technology to handle fine particle pasted material that should be formed by compressed forming machine prior to feeding it into band dryer.

4. STATIONARY FURNACE

Our stationary furnace offer innovative solution for heat treatment of various material of your industrial plant.

SIKO also can provide electric furnace required by your industrial plant.

If you to know more detail or need a discussion with us about the rotary kiln, rotary dryer, rotary cooler, band dryer, and stationary furnace, or you are going to place a inquiry, please contact us and send the following information :

1. KIND OF INDUSTRY :

2. MATERIAL
   - 2-1) Name of material :
   - 2-2) Chemical composition :
   - 2-3) Specific gravity :
   - 2-4) Bulk density :
   - 2-5) Specific heat :
   - 2-6) Moisture content (wet basis) :
   - 2-7) Particle size :

3. OPERATION
   - 3-1) Capacity (per hour) :
   - 3-2) Temperature :
   - 3-3) Retention time :
   - 3-4) Gas chemical composition :
   - 3-5) Exhaust gas requirement :

4. FUEL
   - 4-1) Kind of fuel :
   - 4-2) Low value of fuel :

5. UTILITIES
   - 5-1) Electric power, voltage and frequency :
   - 5-2) Water source :
   - 5-3) Compressed air :

6. SCOPE OF THE EQUIPMENT AND SERVICES TO BE QUOTED :

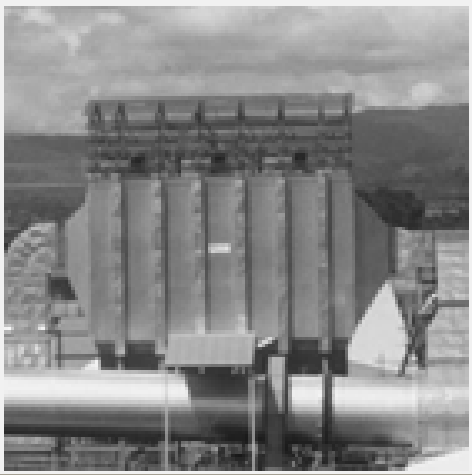
7. LOCATION OF INSTALLATION :

8. OTHER REQUIREMENTS AND SPECIAL CONDITIONS :










pt. cemara siko engineering indonesia

Head Office :
Gedung Mandiri Lantai 4.
Jl. Tanjung Karang No. 3-4A
Jakarta Pusat – 10230
Phone. +6221-3162540
Fax. +6221-3162542
Email : corp@siko.co.id
Website : www.siko.co.id

Project Office :
Jl. Kendal No. 7, Blora
Jakarta Pusat – 10310
Phone. +6221-3907655/56/57