

Cyclone Dryer Introduction Location in Japan

Nearly 500 cyclone
dryers are in operation
throughout Japan!



- ① **A社**
北海道稚内市
用途 ホタテウロ製料化 設置時期 平成9年 能力 20t/日
- ② **B社**
北海道雄勝町
用途 ホタテウロ製料化 設置時期 平成24年 能力 7t/日
- ③ **C社**
北海道安平町
用途 豚血液肥料原料化 設置時期 平成14年 能力 3t/日
- ④ **D社**
北海道長万部町
用途 ホタテウロ製料化 設置時期 平成16年 能力 10t/日
- ⑤ **E社**
北海道北見市
用途 イカゴロ ホタテウロ製料化 設置時期 平成19年 能力 60t/日
- ⑥ **F社**
青森県上北郡東北町
用途 下水汚泥減容化 設置時期 平成12年 能力 4t/日
- ⑦ **G社**
福島県相馬市
用途 バルブ汚泥水イライラ燃料 設置時期 平成7年 能力 15t/日
- ⑧ **H社**
茨城県神栖市
用途 汚泥減容化 設置時期 平成15年 能力 50t/日
- ⑨ **I社**
群馬県伊勢崎市
用途 汚泥減容化 設置時期 平成12年 能力 6t/日
- ⑩ **J社**
栃木県真岡市
用途 汚泥減容化 設置時期 平成27年更新(H10) 能力 7t/日
- ⑪ **K社**
東京都千代田区
用途 ホテル厨房肥料原料化 設置時期 平成11年 能力 6t/日
- ⑫ **L社**
神奈川県厚木市
用途 茶葉製肥料原料化 設置時期 平成25年 能力 2t/日
- ⑬ **M社**
神奈川県横浜市長瀬
用途 オイルスラッジ減容化 設置時期 平成11年 能力 20t/日
- ⑭ **N社**
千葉県旭市
用途 豚血液肥料原料化 設置時期 令和3年 能力 5t/日
- ⑮ **O社**
新潟県新潟市
用途 発酵残渣製料化 設置時期 平成21年 能力 10t/日
- ⑯ **P社**
長野県長野市
用途 生ごみ 肥肥料原料化 設置時期 平成18年 能力 10t/日
- ⑰ **Q社**
愛知県安城市
用途 無機スラッジ減容化 設置時期 平成18年 能力 8t/日
- ⑱ **R社**
愛知県みよし市
用途 下水汚泥減容化 設置時期 平成22年 能力 5t/日
- ⑲ **S社**
岐阜県神戸町
用途 農業汚泥減容化 設置時期 平成22年 能力 2t/日
- ⑳ **T社**
大阪府河内町
用途 汚泥・廃液肥料原料化 設置時期 平成15年 能力 50t/日
熊本県水俣市
用途 し尿肥料化 設置時期 平成17年 能力 40t/日
- ㉑ **U社**
兵庫県姫路市
用途 汚泥減容化 設置時期 平成7年 能力 4t/日
- ㉒ **V社**
広島県三次市
用途 汚泥・廃液肥料原料化 設置時期 平成25年 能力 5t/日
- ㉓ **W社**
山口県下関市
用途 ロストミール製料化 設置時期 平成24年更新(H3) 能力 10t/日
- ㉔ **X社**
高知県土佐清水市
用途 魚残滓フィッシュミール化 設置時期 令和3年 能力 5t/日
- ㉕ **Y社**
鳥取県西伯郡大山町
用途 木くず乾燥燃料化 設置時期 平成25年 能力 10t/日
- ㉖ **Z社**
熊本県水俣市
用途 下水汚泥有機肥料化 設置時期 平成29年更新(H41) 能力 10t/日
- ㉗ **AA社**
沖縄県糸満市
用途 生ごみ 肥料原料化 設置時期 平成30年 能力 3t/日



QR code to view
the video.



Cutting Edge Co.,Ltd.

1-9-6, Kaji-Cho, Chiyoda-Ku, Tokyo, 101-0044, JAPAN

<https://cuttingedge-tech.jp/>

sales@ctg-edge.jp

The moment the horizontal type was changed to vertical,
the history of dryer changed dramatically.

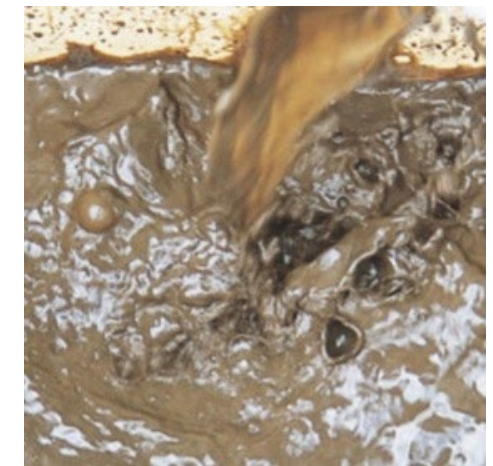
Okadora Cyclone Dryer



Yokohama City where most hotels, shopping centers and manufacturers have installed cyclone dryers



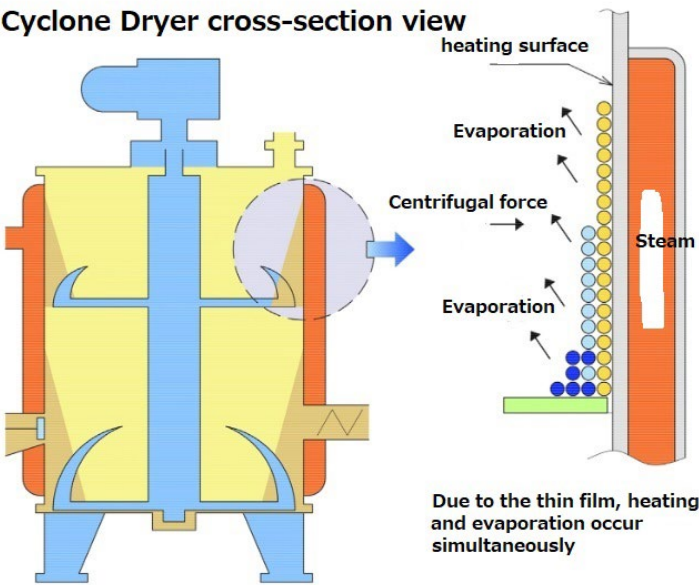
The Okadara Cyclone Dryer is a revolutionary vertical, completely pollution-free drying system that breaks the mold of conventional technology. It is the world's first innovative dryer capable of drying both solids and liquids, such as food waste, seafood products, and industrial sludge.



The Okadora Cyclone Dryer was developed by petroleum refinery plant design engineer. It is a revolutionary vertical, completely pollution-free drying system that breaks with conventional technology concepts, producing no wastewater and no odor. With nearly 500 units installed in factories, hotels, shopping centers, local governments, and other facilities of major Japanese manufacturers, it is the most reliable dryer in Japan. It is the world's first groundbreaking drying system capable of drying both solid and liquid materials, including food waste, seafood, and sludge discharged from factories.

Cyclone dryer with outstanding thermal efficiency

The most distinctive feature of the Okadora Cyclone Dryer is the cyclone fin, a blade attached to the lower center of the main unit. As the fins rotate, the material to be dried is simultaneously scraped up onto the vertical heating surface and pushed into a thin film on the wall surface. In this process, heavier materials, i.e., those with higher moisture content, are preferentially pushed to the heating surface by the action of centrifugal force. Then, the heated material with lower moisture content moves to the evaporation surface, further promoting moisture evaporation. This process is repeated as needed. The heating surface and the evaporation surface become infinitely equal as the dried material becomes a thin film and contacts the heating surface, and the contact speed with the heating surface is fast, causing turbulent contact at the thin film boundary. The cyclone fins, as the name implies, can also scrape up slurries and other fluid materials and bring them into thin-film contact with the heated surface.



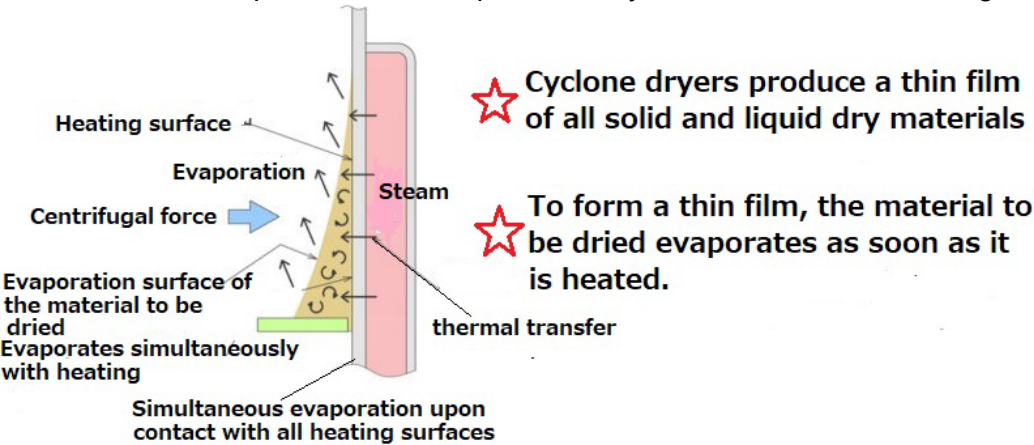
Features of Cyclone dryer

- No waste gas
- No dust
- Very low energy loss
- Converts less than 1/4 of conventional dryers
- Thermal efficiency is 4 times higher than conventional dryers
- No need for sorting or separating foreign materials
- Capable of drying evenly with ultra-low moisture content from 10 to 0.1%.
- Dried material with the required moisture content can be extracted.
- Dried products can be made into high-quality fertilizers and feeds
- High yield of dried products such as food and feed
- Low equipment cost
- Can be installed in any location
- Very easy to maintain and manage
- Easy operation and unmanned operation
- One Okadora dryer can handle all dried products, both liquid and solid

Boil drying is Okadora's patented technology that can simultaneously perform boiling, concentration, drying, and sterilization.

All raw foods such as meat, fish, and vegetables contain cells. If you simply dry these foods, the water will be removed from the cells but they will return to their original raw state. If this dried product is used as fertilizer, it will cause the roots of vegetables in the fields to rot. Traditionally, to produce animal feed or fertilizer, complex processes such as boiling, concentration, and drying had to be carried out in separate machines to destroy the cells in the raw foods. The Okadora Cyclone Dryer has thermal efficiency more than four times that of conventional dryers, so the raw materials fed into it immediately rise to nearly 100° C and boiling begins. This destroys the cells in the raw foods, and they are then simultaneously concentrated, dried, and sterilized inside the cyclone dryer.

In the Okadora dryer, the material to be dried comes into contact with the heating surface at an extremely fast speed of 10 to 30 m/s or more, resulting in a rapid temperature rise rate. However, if the heat transfer is fast but the evaporation rate is slow, the material will simply retain the heat and will not be able to dry. In the Okadora dryer, the material to be dried comes into contact with the heating surface in a thin film as shown in the diagram below, so the evaporation area of the material to be dried is the same as or slightly wider than the heating area. Since evaporation occurs at the same time as heating, the given heat is evaporated and dissipated at the same time, achieving a balance between the heat transfer rate and the heat evaporation and dissipation rate, resulting in extremely efficient drying. With conventional dryers, there is a time lag between heating and evaporation, and the heat retained in the material is not evaporated and dissipated evenly at the same time, resulting in very poor drying efficiency.



In conventional horizontal dryers, the material to be dried is filled up to about half its length, but in horizontal paddle dryers and horizontal disk dryers, water cannot evaporate from the filled area at all, and the material to be dried is only heated and stirred. With a horizontal paddle dryer, only the material to be dried that has been stirred up by the stirrer blades evaporates and dissipates, and evaporation occurs only in the very small surface area where the material is heated and stirred. With a horizontal disk dryer, the heating area is large and so there is good heating power, but the amount of evaporation per surface area of the material to be dried is very small, and the amount of evaporation from stirring is also small, unlike with a paddle dryer. However, with a paddle dryer, the heating area is small, so the drying efficiency is poor no matter how well the evaporation from stirring is. And the biggest drawback of a horizontal dryer is that there is a time lag between heating and evaporation, resulting in very poor drying efficiency.

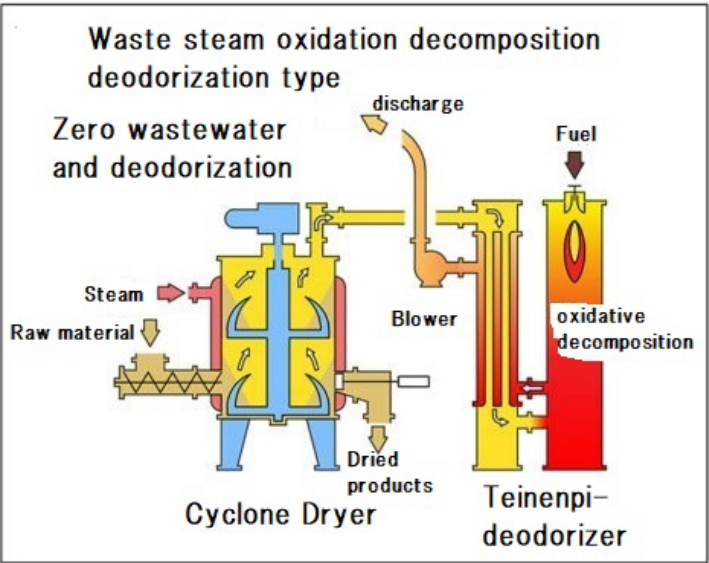
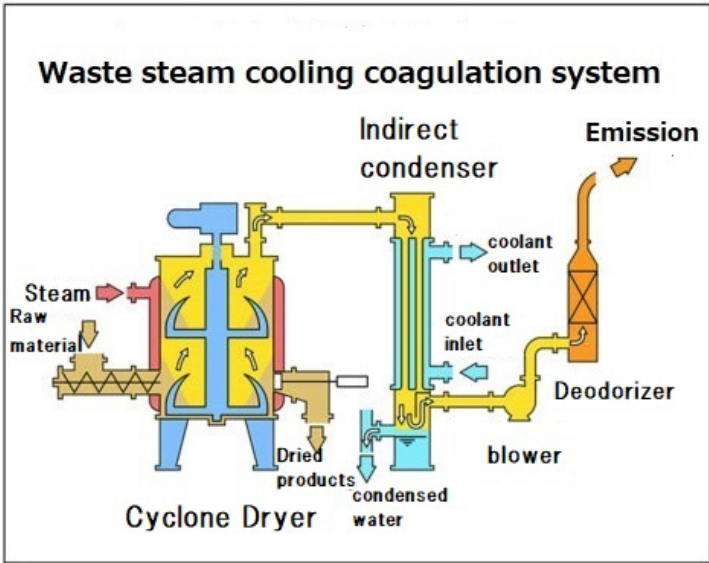
Paddle shape model

There is a time lag between heating and dissipation. Heating is uneven and not uniform throughout.

Disc shape model

Evaporation area is very small and there is a time lag between heating and evaporation. The part filled with heating agitation does not evaporate, only heated.

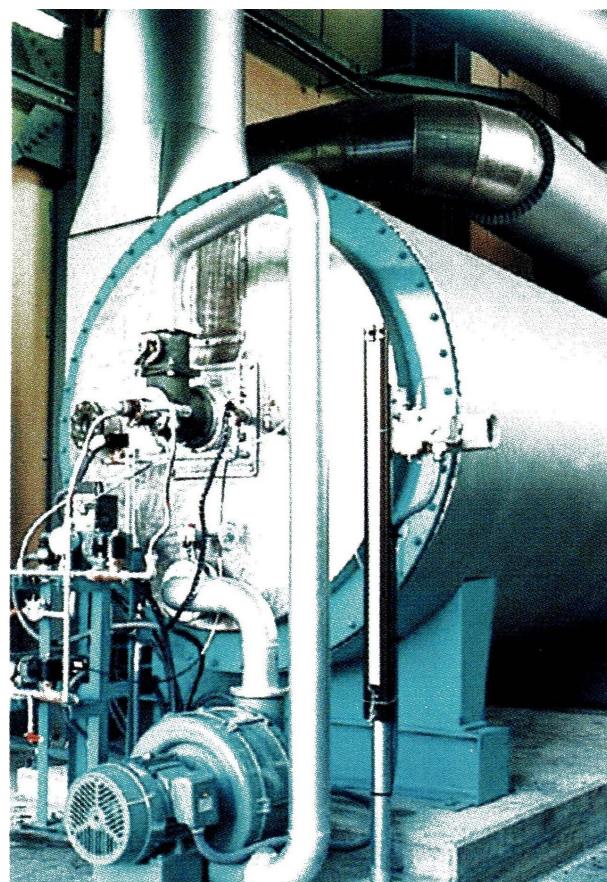
Diffuse evaporation. Evaporation. Heating area is large but contact heating area is small.





A cyclone dryer installed at a food processing manufacturer

Tei-Nenpi can treat wastewater and odors completely pollution-free



The waste steam generated during drying contains odorous components and soluble nitrogen. This waste steam is sent to the Tei-Nenpi deodorizing furnace at nearly 100° C. Here, the direct-fire combustion method completely decomposes the odorous components, BOD, and COD components at a reaction temperature of over 650° C and a residence time of 0.3 seconds, and releases them into the atmosphere as non-polluting water vapor. The greatest feature of the Tei-Nenpi deodorizing furnace is that it fully recovers exhaust heat in three stages. The first is the recovery of the radiation heat of the reaction temperature, the second is the recovery of the radiant heat generated during the reaction, and the third is the indirect heat recovery of the waste heat. This makes it possible to raise the temperature of the waste steam from 500° C to 550° C before it enters the reaction chamber. In other words, the amount of hot oil required to reach a reaction temperature of 650° C only increases by 100° C to 150° C, achieving significant energy savings.

SD-650 Batch input model



QR code to view
the video.



SD-800 Automatic continuous operation type

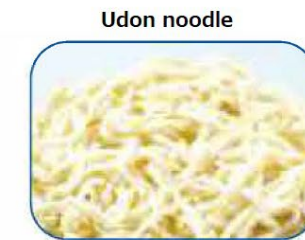
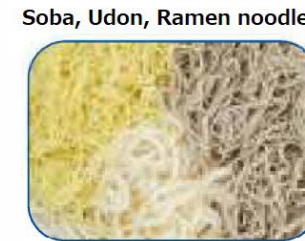
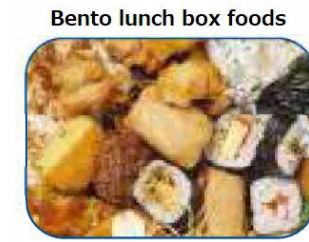
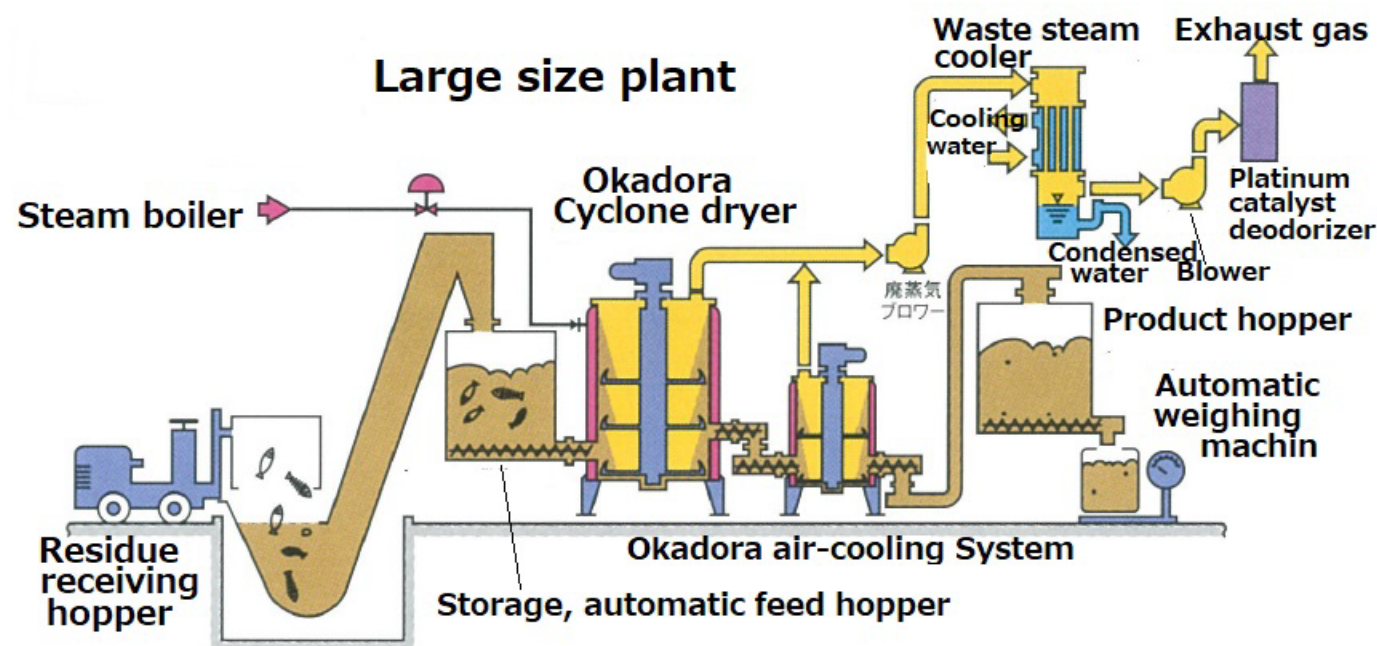
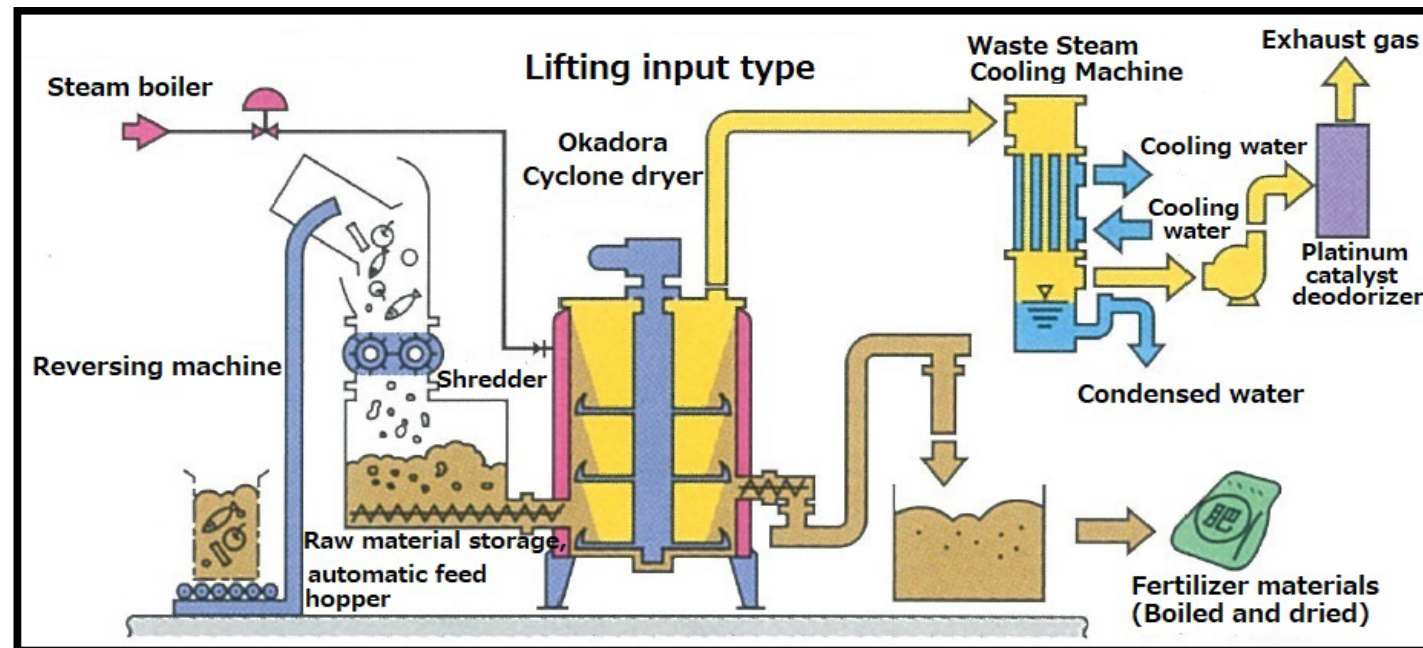
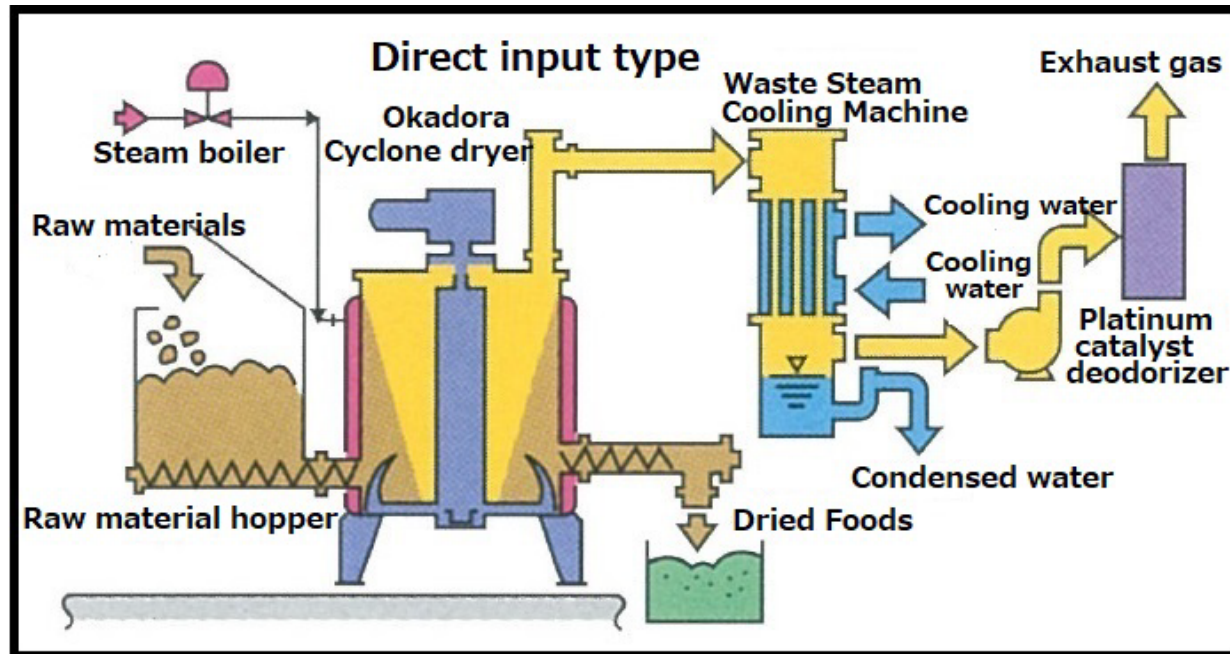


SD-1200 Automatic continuous operation model

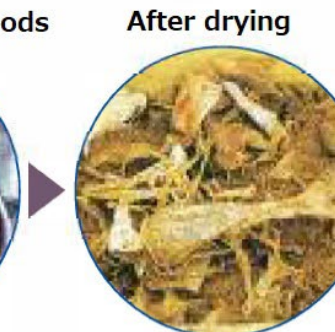


Boiling and drying food waste

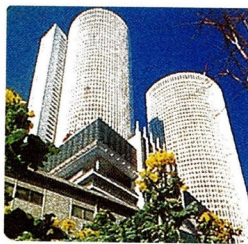
Complete drying of carbohydrate-based food waste, previously thought to be impossible, has been achieved



No need to separate or separate plastic, styrofoam, or other objects



Customers and Line-ups for food waste



JR Central Towers



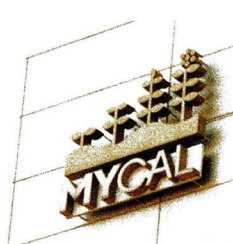
Kei-Yu Hospital



Hotel New Otani in Tokyo



LandMark Tower in Yokohama



Mycal in Akashi



World Gourmet



Super Market JUSCO



Yokohama Media Tower



Keio Department Store in Tokyo



Kitasato Hospital

※処理能力は見掛け比重を0.5とした場合

Model	Processing capacity (Kgs/hour)	Heat transfer surface area (㎡)	Diameters (mm)	Height (mm)	Power (KW)
SD-800Ⅱ	60	2.5	800	1,250	7.5
SD-950Ⅱ	100	4.0	950	1,500	11.0
SD-1200Ⅱ	150	6.0	1,200	1,850	15.0
SD-1500Ⅱ	200	8.0	1,500	2,300	22.0
SD-1750Ⅱ	300	12.0	1,750	2,700	30.0
SD-2000Ⅱ	400	16.0	2,000	3,050	37.0
SD-2250Ⅱ	500	20.0	2,250	3,400	45.0
SD-2250Ⅲ	700	28.0	2,250	4,500	55.0
SD-2500Ⅲ	850	34.0	2,500	5,000	75.0
SD-2800Ⅲ	1,000	43.0	2,800	5,600	90.0

We can manufacture equipment with a processing capacity of up to 20 tons per hour.

QR code to view the video.



Braed factory



Food processing factory



Chicken egg factory (for egg shell)



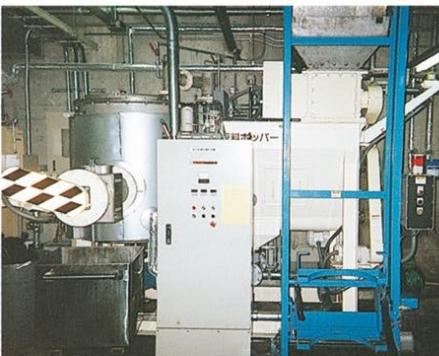
Food processing factory (for food waste)



Milk factory (for milk and juice liquid)



Yokohama Grand Inter-Continental Hotel (for food waste)



Yokohama Land Mark Tower (for food waste)



Local government center (for apple peel waste)



Yokohama Queen's East Shopping Center (for food waste)



Hospital (for food waste)



Hotel New Otani, No1 hotel in Japan



Shooping Center (for food waste)

Boiling and drying seafood waste



Disposal of dead fish waste in aquaculture farms



Processing of squid entrails



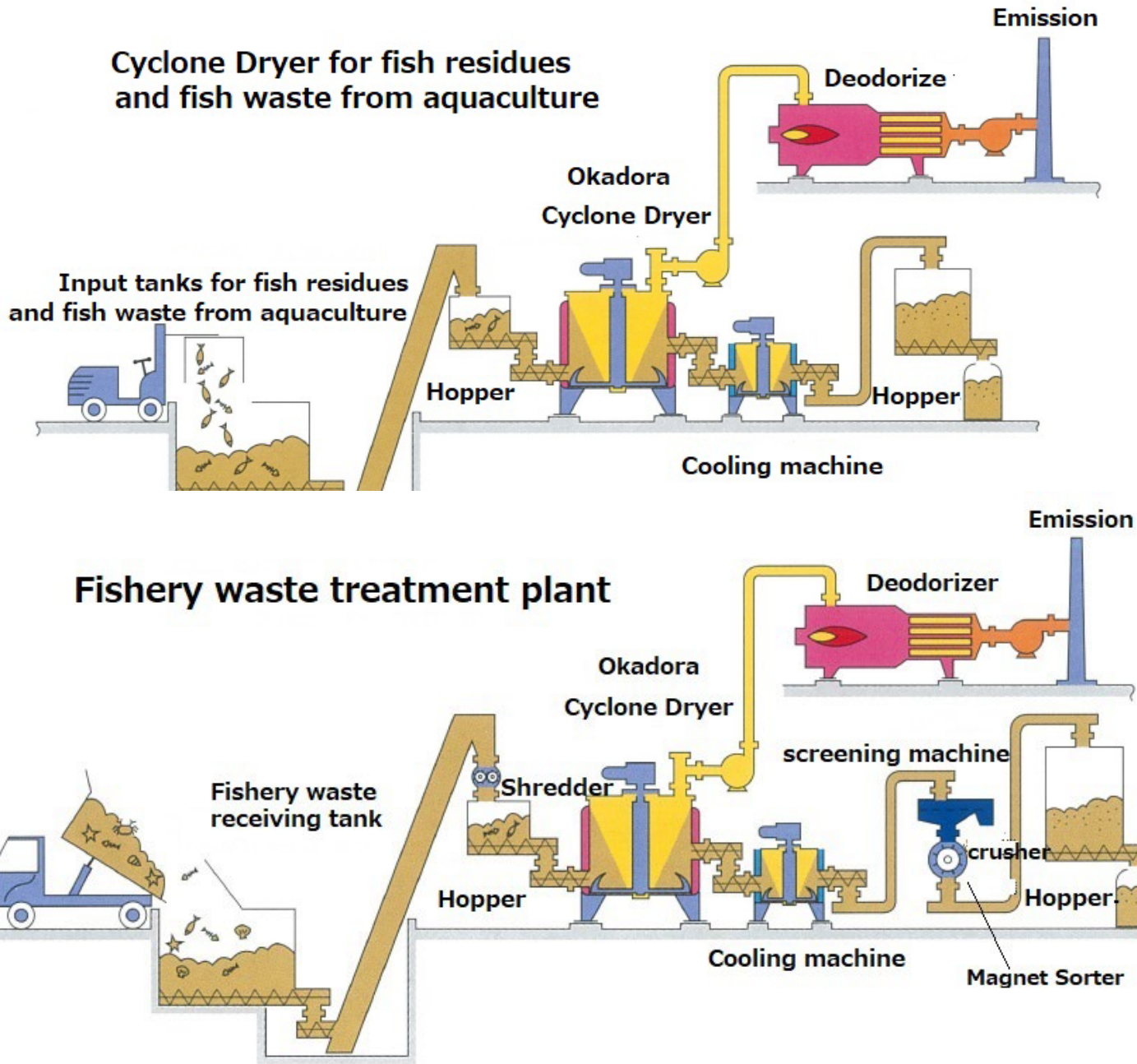
Disposal of marine debris



Processing of seafood residues



Processing scallop intestines



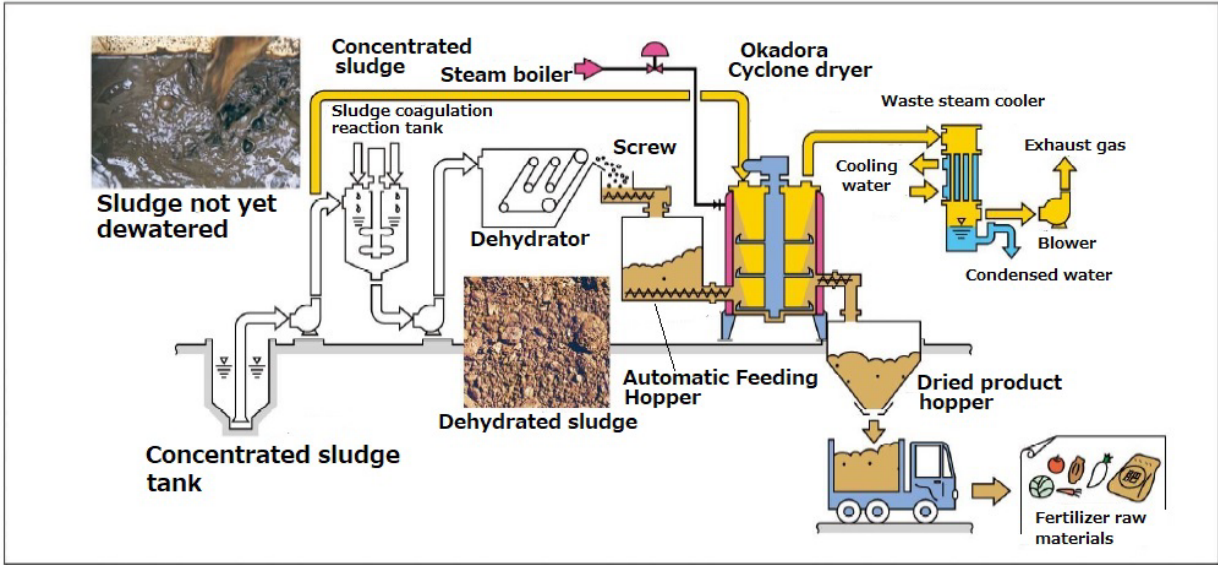
Model	Processing capacity Kg/h	Electric Heating Area (m²)	Diameter X Height (mm)	Power (Kw)
SD-650	25	1.0	650 × 750	3.7
SD-800	35	1.5	800 × 900	5.5
SD-950	50	2.0	950 × 1,100	7.5
SD-1200	75	3.0	1,200 × 1,400	11.0
SD-1500	125	5.0	1,500 × 1,700	15.0
SD-1750	175	7.0	1,750 × 2,000	18.5
SD-2000	225	9.0	2,000 × 2,250	22.0
SD-2250	275	11.0	2,250 × 2,500	37.0
SD-650II	45	1.8	650 × 1,050	5.5
SD-800II	60	2.5	800 × 1,250	7.5
SD-950II	100	4.0	950 × 1,500	11.0
SD-1200II	150	6.0	1,200 × 1,850	15.0
SD-1500II	200	8.0	1,500 × 2,300	22.0
SD-1750II	300	12.0	1,750 × 2,700	30.0
SD-2000II	400	16.0	2,000 × 3,050	37.0
SD-2250II	500	20.0	2,250 × 3,400	45.0
SD-2500II	600	24.0	2,500 × 3,750	55.0
SD-2800II	750	30.0	2,800 × 4,200	75.0

We can manufacture equipment with a processing capacity of up to 300 tons per day.

Boiling and drying sludge

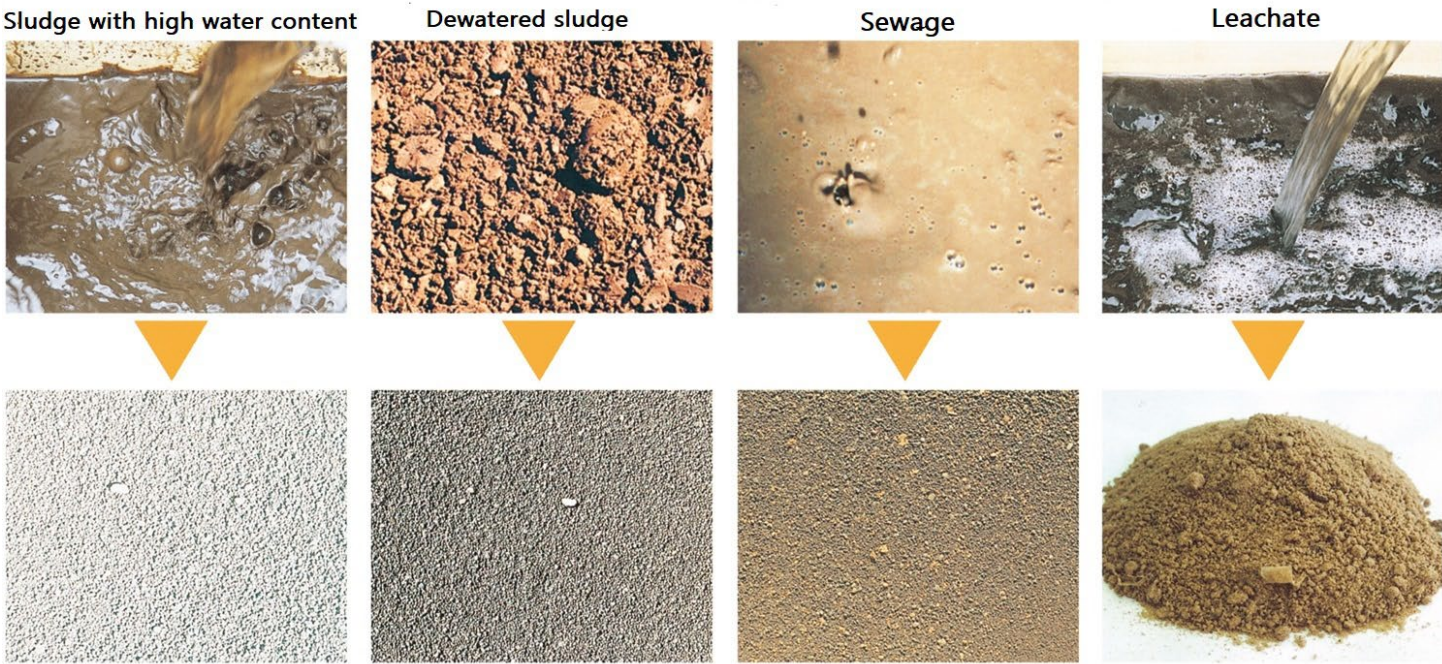
It is possible to freely adjust the moisture content of liquid sludge (moisture content 98%) or dewatered sludge (moisture content 85%) to the desired moisture content and dry it.

The excess sludge generated by activated sludge wastewater treatment contains all the cells of bio-bacteria. If this sludge is fermented with the usual moisture adjustment, it will mature after 2 to 4 months and can be used as fermented fertilizer. If this sludge is boiled and dried with an Okadara cyclone dryer, the cell tissue is destroyed, and if the moisture is adjusted to 40 to 50% and then fermented, it can mature in just 6 to 8 days. Also, if sludge that has been dried to 10% moisture with a conventional hot air dryer is soaked in water, it will return to sludge again, and if used as fertilizer, it will cause the roots of food to rot. If it is boiled and dried with a cyclone dryer, the cells are completely destroyed, so it will not return to sludge even if it is submerged in water, and it can be used as an optimal fertilizer.



Model	Processing capacity Kg/h	Electric Heating Area (㎡)	Diameter X Height (mm)	Power (Kw)
SD-650	25	1.0	650 × 750	3.7
SD-800	35	1.5	800 × 900	5.5
SD-950	50	2.0	950 × 1,100	7.5
SD-1200	75	3.0	1,200 × 1,400	11.0
SD-1500	125	5.0	1,500 × 1,700	15.0
SD-1750	175	7.0	1,750 × 2,000	18.5
SD-2000	225	9.0	2,000 × 2,250	22.0
SD-2250	275	11.0	2,250 × 2,500	37.0
SD-650II	45	1.8	650 × 1,050	5.5
SD-800II	60	2.5	800 × 1,250	7.5
SD-950II	100	4.0	950 × 1,500	11.0
SD-1200II	150	6.0	1,200 × 1,850	15.0
SD-1500II	200	8.0	1,500 × 2,300	22.0
SD-1750II	300	12.0	1,750 × 2,700	30.0
SD-2000II	400	16.0	2,000 × 3,050	37.0
SD-2250II	500	20.0	2,250 × 3,400	45.0
SD-2500II	600	24.0	2,500 × 3,750	55.0
SD-2800II	750	30.0	2,800 × 4,200	75.0

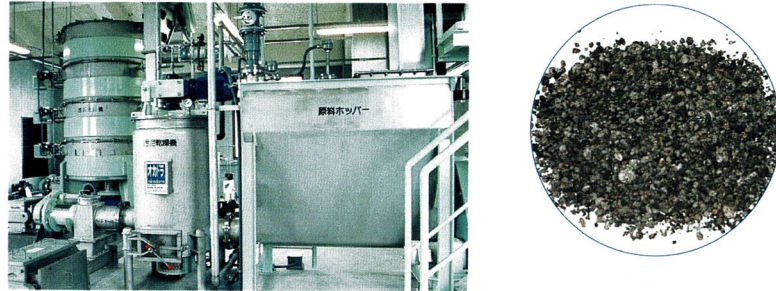
We can manufacture equipment with a processing capacity of up to 300 tons per day.



Sludge boil-dry odorless composting system

No bad odor, and can mature at 1/10 the speed of conventional composting system

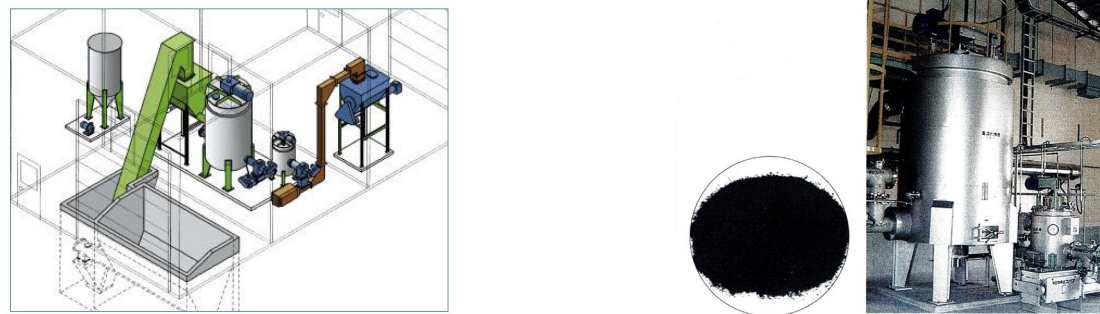
By boiling and drying the sludge, the moisture is removed while destroying the cellular tissue of the raw materials, and the moisture content of the entire cell is uniformly reduced to 40-50%. This completes what is previously known as primary fermentation, which is anaerobic fermentation accompanied by a foul odor, and secondary fermentation, which is a transition from anaerobic fermentation to aerobic fermentation. After this, the actual fermentation process, maturation, can be carried out immediately, so there is no foul odor, and the fermentation period required previously was shortened to just 7-10 days, one-tenth of the previous time from 60-70 days, and the fermentation area was also reduced to one-thirtieth.



Livestock manure direct carbonization system

An ultra-high-speed carbonization system that allows sludge and livestock manure to be fed directly into the carbonizer, resulting in odorless, pollution-free processing without wastewater.

Strongly odorous sludge and livestock manure can be directly fed into the Okadora Carbonizer for ultra-high speed carbonization. The odorous components and dissolved nitrogen components contained in the organic gases generated during carbonization are sent to a hot air generating deodorizing furnace, where they are decomposed by high-temperature oxidation into a harmless state, used as a heat source for the carbonizer, and then released into the atmosphere.

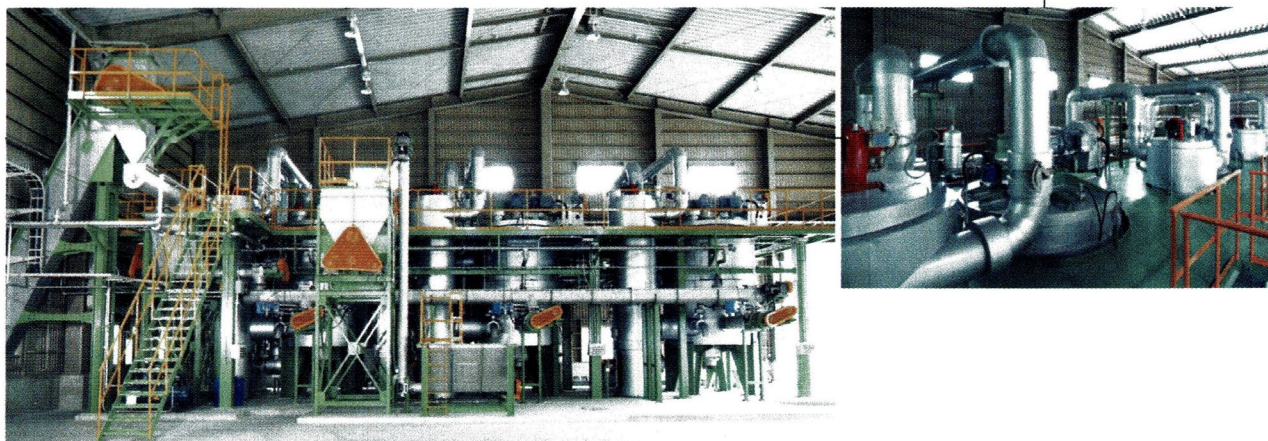


Human waste and sludge drying system

Even raw human waste can be dried at high speed!

A super drying plant for all types of waste

The Okadora Super Heat Dryer boils and dries all kinds of waste that are normally difficult to process, such as raw human waste, sludge, waste acid, waste alkaline liquid, and food waste. The waste steam generated during drying is sent to the Tei-Nenpi deodorizing device, where odors and harmful substances are decomposed by high-temperature oxidation, so no wastewater or odors are discharged.



Ultra-high-speed carbonizer

A plant capable of ultra-high speed carbonization in 40 to 60 minutes without generating dioxins

The carbonizer has a completely sealed structure, and the outer periphery is a jacket with hot air at 600° C. Cyclone fins attached to the center of the inside rotate, rapidly heating and carbonizing the material in 40 to 60 minutes. Because the inside of the carbonizer is oxygen-free (less than 1%), no oxidation reaction occurs even when PVC and other materials are heated to 400 to 500° C. Therefore, the chlorine bound to PVC and the hydrogen bound to benzene are separated and gasified and sent to the hot air generator/deodorizer. There is no oxygen (carbon monoxide) involved in the route to this point, so no oxidation reaction occurs. When the material enters the hot air generator/deodorizer, which has reached a temperature of over 800° C in this state, complete combustion occurs instantly, so no carbon monoxide is generated. At the same time, there is no incineration ash to act as a catalyst, so almost no dioxin is generated.



Waste Oil Refiner System

Waste oil and crude refined oil can be refined into Special A heavy oil with ultra-high efficiency

The refined oil can be used as it is as fuel for small once-through boilers, ships, greenhouses, etc. As it is an ultra-compact unit, it can be easily installed alongside a crude refined oil manufacturing plant.



Oil conversion system

Compared to incineration, carbon dioxide emissions are 20 times lower

