

TYCO





▲ Message

We always try to think of new ways to fulfill the user's needs.
Our goal is to grow as a company that takes the needs of its clients seriously.

Yasutoshi Tsukumo
President

▲ Business Philosophy

To be trusted by our clients, to become an irreplaceable part of the casting industry, and to create a pleasant environment for our employees

▲ Our Characteristics

We separated from the parent company and became independent in February of 2001 with our base located in the Chugoku area. We mainly specialize in manufacturing, purchasing and selling various types of heat-resistant and refractory molding materials for foundries. We also suggest, design, produce and install various types of manufacturing equipment for foundries. In addition to our main line of business which includes manufacturing and selling casting materials and equipment, we also tackle environmental issues by offering recycling services and providing equipment that protects the environment.

We are expanding our business abroad, mainly in Asian countries, and building an integrated system of production, sales and technological development through partnerships with metal casting manufacturers. By providing complete manufacturing support, all of our employees strive to gain more trust from the regional communities and from our clients. We count on your continuous support in the future.

▲ Professional Conduct Guidelines

Speed	Respond quickly and use an immediate practical approach
Attack	Be bold and take the initiative
Frank	Share information and be outspoken
Enterprise	Keep an independent and progressive spirit

▲ Corporate Profile

Corporate Name	Tsuchiyoshi Industry Co., Ltd.
Representative	Yasutoshi Tsukumo / President
Established	November 28, 2000
Capital	JPY 80,000,000
Headquarters Address	Hiroden Mitsui Sumitomo Kaijo Bldg. 8F, 9-9 Nishi-Tokaichimachi, Naka-ku, Hiroshima city, Hiroshima Prefecture
Main Products	Silica sand, resin-coated sand, shell cores, bentonite, coke and other casting materials, and casting equipment
Annual Account Settlement	February 20
Main Banks	Hiroshima Bank Honkawa Branch, Iyo Bank Hiroshima Branch, Shoko Chukin Bank Hiroshima Branch

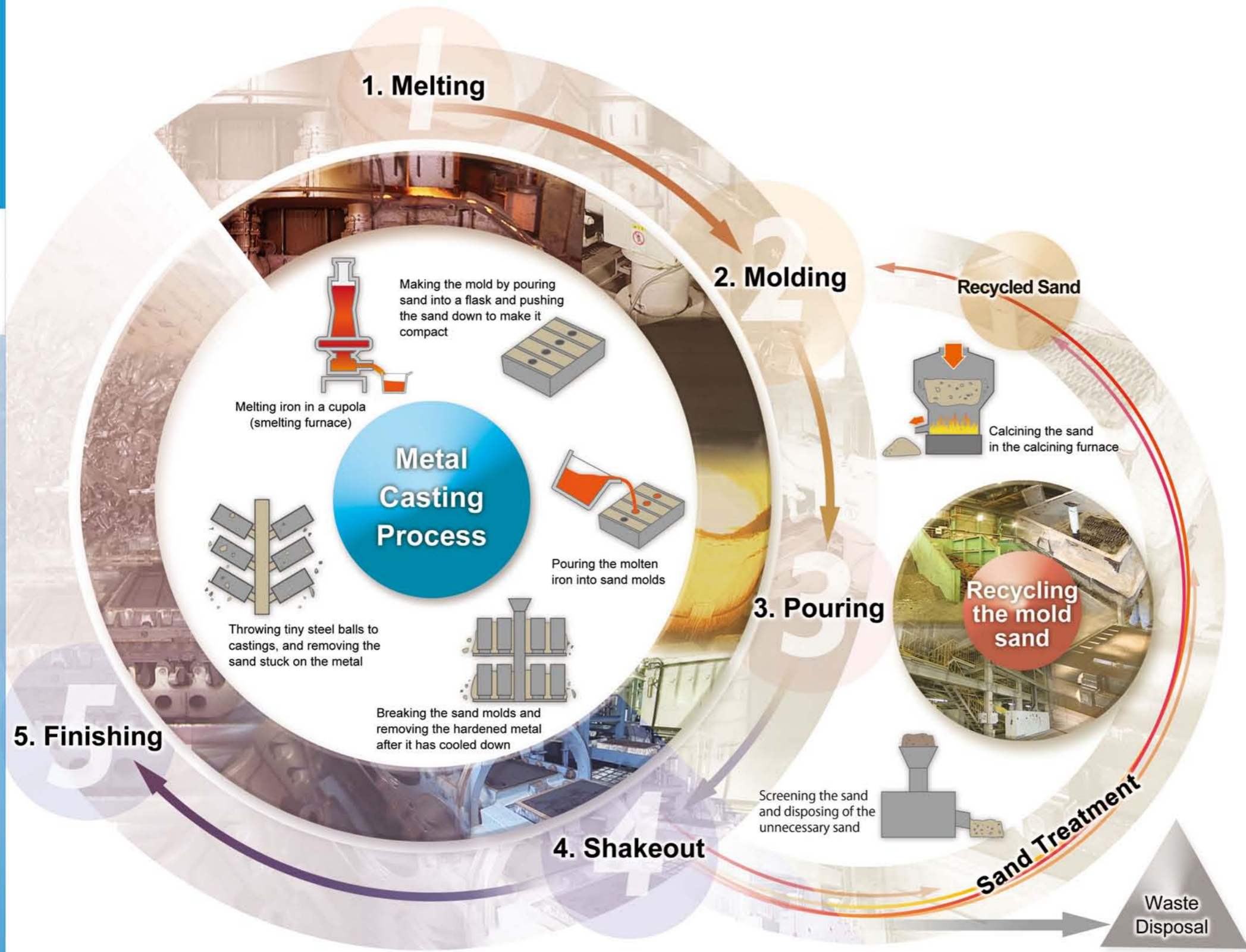
▲ History

1933	Opened the Takamatsu plant and started extracting gravel for casting.
1945	Established a corporation called Tsuchiyoshi Industry Corporation (with a capital of 50,000 yen).
1950	After the war, Tsuchiyoshi Industry Corporation restarted its business (with a capital of 1 million yen).
1957	Opened the Hiroshima office.
1966	Opened the Matsue branch office and the Gotsu plant
1977	Established three separate offices: Tsuchiyoshi Corporation, Tsuchiyoshi Corporation Hiroshima and Tsuchiyoshi Corporation Osaka. The three companies listed above merged and the company Tsuchiyoshi Corporation was established (with a capital of 90 million yen).
1988	Tsuchiyoshi Corporation and Tsuchiyoshi Industry Corporation merged, and the company Tsuchiyoshi Corporation was established.
1995	Established a joint venture producing resin-coated sand in Thailand.
2001	Separated from Tsuchiyoshi Corporation and established a new corporation, Tsuchiyoshi Industry.
2003	Obtained the ISO14001 certification.
2004	Tianjin Fangdong Casting Materials Co., Ltd. producing resin-coated sand was established in Tianjin in China as an investment made by Tsuchiyoshi Industry, Tsuchiyoshi Matec, Tochu Corporation and Xinmeida (Taiwan).
2007	Increased the capital to 80 million yen.
2009	Opened a technological development center in Onan-cho, located in Ochi-gun in the Shimane Prefecture and opened the Onan core-making factory.
2012	Opened the second core-making factory in Izumo.
2014	Opened the Onan plant. Established a sales company called "PT.TSUCHIYOSHI HOSANA INDONESIA" in Indonesia.
2015	Established a core production company called "PT.TSUCHIYOSHI PROCORE INDONESIA" in Indonesia.

▲ Obtained the ISO14001 certification

"ISO14001" is a management system for creating mechanisms and policies inside the company to continuously reduce or prevent environmental damage caused by products or services. Our company obtained the certification in 2003. All of our employees are eager to tackle environmental issues.





1. Melting

- Refractory materials
Standard: refractory brick (agalmatolite, chamotte, Silicon Carbide, etc.), heat-resistant brick, graphite brick
Non-standard: patching material, mortar, castable material, precast material, etc.
- Foundry coke
Imported coke, domestic coke, etc.

2. Molding

- Foundry sand
RCS (resin-coated sand), dry silica sand (Yunotsu silica sand, Kawamura silica sand, imported sand), special sand (zircon sand, chromite sand, Cerabeads®, alumina sand, slag sand), etc.
- Inorganic binders
Bentonite, sodium silicate, Snowtex®, etc.
- Organic binders
Furan resin, alkaline phenolic resin, phenolic urethane, etc.
- Compounding agents
Coal powder, various types of casting starch, etc.
- Coatings
For cast iron (alcohol-based, water-based), for cast steel (alcohol-based, water-based), for evaporative-pattern casting, etc.
- Mold release agents
For sand molds (oil-based, water-based), for die casting (oil-based, water-based), etc.

3. Pouring

- Molten metal additives
Recarburizer (primary, secondary), Silicon Carbide, inoculants, spheroidizing agents, ferroalloys (Fe-Si, Fe-Mn, Fe-Cr and other ferroalloys), etc.
- Slag removers

5. Finishing

- Abrasive materials
SB shots®, cut wire, various abrasive and polishing materials

Equipment

- Foundry machinery and In-plant equipment
Molding equipment: green sand mold, self-hardening type, SV processing equipment, core manufacturing machinery
Melting equipment: low-frequency electronic furnace, high-frequency electronic furnace, cupola, crucible furnace
Pouring equipment: laser pouring system
Drying equipment: hybrid drying device
Post-processing equipment: rotary media drum, shot blasting, deburring machinery and similar equipment
Anti-pollution equipment: dust collectors and similar equipment
Testing equipment: green sand mold testing devices, molten metal controlling device
High-frequency riser heating system: slim riser
- Environmental equipment
Deodorization units, water purification units, dust collectors, sound absorption systems



Network



General Affairs Division

Hiroden Mitsui Sumitomo Kaijo Bldg. 8F,
9-9 Nishi-Tokaichimachi, Naka-ku, Hiroshima City,
Hiroshima Prefecture 730-0806
TEL: (082) 295-1997 / FAX: (082) 295-2788

Sales Division, Development Division, Equipment Sales Section

3-26 Kamitenma-cho, Nishi-ku, Hiroshima City,
Hiroshima Prefecture 733-0021
TEL: (082) 291-7507 / FAX: (082) 295-3680

Hiroshima Sales Office

3-26 Kamitenma-cho, Nishi-ku, Hiroshima City,
Hiroshima Prefecture 733-0021
TEL: (082) 291-6464 / FAX: (082) 293-7628

Matsue Sales Office

1-6 Fujimicho, Matsue City,
Shimane Prefecture 690-0026
TEL: (0852) 37-1400 / FAX: (0852) 37-2284

Izumo Branch Office

2400 Jinzaiki-cho, Izumo City,
Shimane Prefecture 699-0822
Located inside Daihatsu Metal Co., Ltd.
TEL: (0853) 43-2041 / FAX: (0853) 43-3305

Okayama Branch Office

Imoto Mansion 101, 1-2-34 Higashi Fukatsu-cho,
Fukuyama City, Hiroshima Prefecture 721-0974
TEL: (084) 931-7321 / FAX: (084) 931-7232

Kyushu Branch Office

Office Parea Nakahata V B-1, 1-5-23 Nakahata,
Onojo City, Fukuoka Prefecture 816-0943
TEL: (092) 558-7375 / FAX: (092) 558-7399

Manufacturing Division, Product Sales Section, Production Technology Section

1053-2 Wada, Onan-cho, Ochi-gun,
Shimane Prefecture 696-0403
TEL: (0855) 83-2023 / FAX: (0855) 83-2024

Onan Factory

1053-2 Wada, Onan-cho, Ochi-gun,
Shimane Prefecture 696-0403
TEL: (0855) 83-2023 / FAX: (0855) 83-2024

Gotsu Factory, Purchasing Group

1988-2 Asari-cho Gotsu City, Shimane Prefecture 695-0002
TEL: (0855) 55-1120 / FAX: (0855) 55-1121

Onan Core-making Factory

696-0403
1053-10 Wada, Onan-cho, Ochi-gun,
Shimane Prefecture 696-0403
TEL: (0855) 83-2434 / FAX: (0855) 83-1615

Yoshika Core-making Factory

647 Nanukaichi, Yoshika-cho, Kanoashi-gun,
Shimane Prefecture 699-5522
TEL: (0856) 78-1400 / FAX: (0856) 78-1300

Izumo Core-making Factory

516-40 Nagahama-cho, Izumo City,
Shimane Prefecture 693-0043
TEL: (0853) 28-0798 / FAX: (0853) 28-1407

Izumo Core-making Factory 2

516-25 Nagahama-cho, Izumo City,
Shimane Prefecture 693-0043

Technology Division (Research Center)

696-0403
1051-7 Wada, Onan-cho, Ochi-gun,
Shimane Prefecture 696-0403
TEL: (0855) 83-1614 / FAX: (0855) 83-1684

Affiliated Companies

TSUCHIYOSHI SOMBOON COATED SAND
CO.,LTD.

19MOO 4 TAMBON PLUAKDAENG,
AMPHUR PLUAK DAENG, RAYONG,
21140 THAILAND
TEL: +66-(0)38-954-020 / FAX: +66-(0)38-954-019

PT.TSUCHIYOSHI HOSANA INDONESIA

Jl.Celebration Boulevard Blok BA 1 No.01 Grand Wisata
Desa Lambangsari Kec. Tambun Selatan Kab.Bekasi INDONESIA
TEL: +62-(0)21-2956-6828 / FAX: +62-(0)21-2956-6829

PT.TSUCHIYOSHI PROCORE INDONESIA

Jl. Sungkai II, Blok F26 No 19E, Delta Silicon III Industrial Park Lippo
Cikarang Cicau, Cikarang Pusat, Bekasi, Jawa Barat, INDONESIA
TEL: +62-(0)21-8991-1388 / FAX: +62-(0)21-8991-1389

Taiyo Maintenance Co., Ltd.

Aioi-dori Takajo Bldg. 3F, 1-1-9 Tokaichimachi, Naka-ku, Hiroshima City,
Hiroshima Prefecture 730-0805
TEL: (082) 208-2430 / FAX: (082) 208-3922

Business Partner



Aisin Takaoka Engineering Co., Ltd.

Asagoe Industry Co., Ltd.

Asahi Aluminium Co., Ltd.

AT Kyushu Co., Ltd.

Daihatsu Metal Co., Ltd.

Daiwa Heavy Industry Co., Ltd.

Eagle Highcast Co., Ltd.

Hikawa Manufacturing Co., Ltd.

Hirata Kogyo Corporation

Hirata Seiki Co., Ltd.

Hiroshima Aluminum Industry Co., Ltd.

Hitachi Metals Precision, Ltd.

Hitachi Metals, Ltd. Yasugi Works

Imai Corporation

Imanishi Manufacturing Co., Ltd.

Kiriu Corporation

Kitagawa Iron Works Co., Ltd.

Kodama Co., Ltd.

Maekawa Casting Machinery Co., Ltd.

Mayekawa Mfg. Co., Ltd.

Mazda Motor Corporation

Meiji Drop Forge Ltd.

Mitsubishi Heavy Industries Co., Ltd.

Paper and Printing Machinery Division

Mitsubishi Heavy Industries Co., Ltd.

Hiroshima Machinery Works

Mitutoyo Corporation

Miyoshi Casting Co., Ltd.

Moriya Cutlery Laboratory, Ltd.

Nakamura Brace Co., Ltd.

NTN Casting Corporation

OMK., Ltd.

Ota Chuzousyo Co., Ltd.

Sakamoto Jukoh Co., Ltd.

Shinko Ind. Ltd.

Shinkoh Kinzoku Co., Ltd.

Taisei Shell Co., Ltd.

Takeda Casting Co., Ltd.

Tomotetsu Co., Ltd.

Toyo Seitetsu Co., Ltd.

Watanabe Seikosyo Ltd.

Yanmar Casting Technology Co., Ltd.

Yanmar Co., Ltd.

Yokota Manufacturing Co., Ltd.

Yonago Tekkousyo Co., Ltd.

Yoshiwa Kogyo Co., Ltd.

(Without honorifics)



Environmental Apparatus / Handled Items

Odor

Deodorization unit proposals

Deodorizing liquid vaporizer "Sawayaka" /
Atmospheric chamber system

Water
pollution

Water purification unit proposals

Aqua Blaster (aeration diffuser)
Anti Ruster (electrolytic and reduced
water purifier)

Particulates

Dustproof unit proposals

BECS / Special mist spraying unit

Noise

Soundproofing and sound absorption system proposals

Bull Sound System



Earth Friendly Environmental Equipment



TSUCHIYOSHI INDUSTRY CO.,LTD.

Head Office

Hiroden Mitsui Sumitomo Kaijo Building 8F, 9-9 Nishitokaichimachi,
Naka-ku, Hiroshima City, Hiroshima Prefecture, Japan 730-0806
TEL 082-295-1997 FAX 082-295-2788

Marketing Division

3-26 Kamitenmancho, Nishi-ku, Hiroshima City, Hiroshima Prefecture,
Japan 733-0021
TEL 082-291-6464 FAX 082-293-7628

Equipment Division

3-26 Kamitenmancho, Nishi-ku, Hiroshima City, Hiroshima Prefecture,
Japan 733-0021
TEL 082-291-7507 FAX 082-295-3680



TSUCHIYOSHI INDUSTRY CO.,LTD.

Deodorization Unit (Deodorizing Liquid Vaporizer)

Main Odorous Substances by Industrial Sector

Out of the "substances that cause unpleasant odor and entail risk of harming the living environment" as designated in the Offensive Odor Control Act (1971) Article 2, 22 substances are specified in the enforcement regulations of the said Act.

In areas designated by prefectural governors, concentrations of these substances are controlled on site perimeters.

Industrial Sector		Odorous Substances and Sources	
Sector		Specific Odorous Substance	Main Source Plants
Livestock agriculture	Pig farming	Ammonia	Livestock plants / Dead animal processing plants / Night soil treatment plants
	Cattle farming	Trimethylamine	Livestock plants / Dead animal processing plants / Fisheries canning plants
	Poultry farming	Methyl mercaptan	Pulp manufacturing plants / Dead animal processing plants / Night soil treatment plants
Feed and fertilizer manufacturing industry	Fish innards treatment plant	Dimethyl disulfide	Pulp manufacturing plants / Dead animal processing plants / Night soil treatment plants
	Animal innards treatment plant	Dimethyl sulfide	Livestock plants / Pulp manufacturing plants / Night soil treatment plants
	Compound fertilizer manufacturing plant	Hydrogen sulfide	Livestock plants / Pulp manufacturing plants / Night soil treatment plants
Food manufacturing plants	Fisheries foods manufacturing plant	Acetaldehyde	Chemical plants / Fish innards treatment plants / Tobacco manufacturing plants
	Fatty foods manufacturing plant	Propionaldehyde	Baking finishing plants
	Starch manufacturing plant	Normal butyl aldehyde	
	Cooking foods manufacturing plant	Isobutyl aldehyde	
	Coffee manufacturing plant	Normal valeraldehyde	
	Others	Isobutyl aldehyde	
	Chemical plants	Chemical fertilizer manufacturing plant	Isobutanol
Inorganic chemical industrial products manufacturing plant		Ethyl acetate	Coating / Printing plants
Plastics plant		Methyl isobutyl ketone	
Petrochemicals plant		Toluene	
Fat processed products manufacturing plant		Xylene	Chemical plants / FRP product manufacturing plants
Asphalt manufacturing plant		Styrene	
Craft pulp manufacturing plant		Propionic acid	Fatty acid manufacturing plants / Dyeing plants
Other pulp and paper plants		Normal butyric acid	Livestock plants / Dead animal processing plants / Starch plants
Others		Normal valeric acid	
Other manufacturing plants		Textile plant	Isovaleric acid
	Printing factory		
	Paint factory		
	Ceramics and stone and clay products manufacturing plant		
	Casting plant		
	Transport machinery and apparatus manufacturing plant		
Service industry, etc.	Waste final disposal site		
	Waste incinerator		
	Sewage treatment plant		
	Night soil treatment plant		
	Cleaning / laundry plant		
	Restaurant		
	Others		

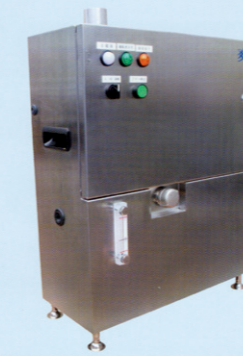
Hazardous air pollutants (substances to be addressed with priority)	
Acrylonitrile / Acetaldehyde / Vinyl chloride monomer chloroform / Ethylene oxide / 1, 2-dichloroethane / Dichloromethane / Dioxins / Tetrachloroethylene / Trichloroethylene / 1, 3-butadiene / Benzene / Benzo[a]pyrene / Formaldehyde / Mercury and its compounds / Nickel compounds / Arsenic and its compounds / Beryllium and its compounds / Manganese and its compounds / Hexavalent chrome compounds / Chloromethyl methyl ether / Talc (including asbestos fibers)	

Deodorizing Liquid VEON-G (VEON Green)

Sawayaka

In this eco-friendly neutralization and decomposition deodorizing system, the liquid VEON-G is vaporized in the liquid vaporizer "Sawayaka", thereby improving the contact effect with odorous molecules. (This is not a masking system.)

Sawayaka-I Model: SW102



Main unit dimensions	W500 × H600 × D220
Weight	30kg (40kg when tank is full)
Power source capacity	Single phase 100V 30W
Target exhaust gas flow	Up to 100m³/min
Connecting pipe diameter	40A

Sawayaka-II Model: SW201



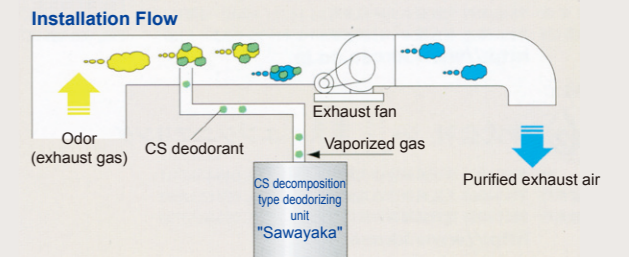
Main unit dimensions	W1400 × H700 × D900
Weight	600kg
Power source capacity	3 phase 200V 6KW
Target exhaust gas flow	Up to 1000m³/min
Connecting pipe diameter	Ø200

Features

- Because the system vaporizes the deodorizing liquid, the contact efficiency with odorous molecules is improved and the deodorizing effect is enhanced.
- The deodorizing liquid VEON-G (VEON Green) is made from natural plant oils and is thus kind to the environment.
- Introductory cost is low. (The works entail simply installing the main unit and connecting the pipe to the duct).
- This is a versatile system applicable for deodorization in a wide range of situations.

Targets

- Kitchen exhaust odors (supermarkets, restaurants, eateries)
- Factory exhaust odors (paint, casting, printing, etc.)
- Hospitals / Fertilizer plants / Fish processing plants / Asphalt plants, etc.



Deodorizing Liquid VEON-G (VEON GREEN)

Natural Plant Oil Odor Neutralizer

VEON-G is a neutralization decomposition type natural odor neutralizer made from natural plant oils. It is completely harmless with respect to people, animals, ocean, rivers, atmosphere, soil and so on. It can be applied to and conducts chemical neutralization and decomposition of almost all odors, both organic and inorganic.



Mechanism of Neutralization and Decomposition

- ▶ **Basic gases ... Ammonia, amines, etc.**
The organic acid content of VEON-G reacts with the base of odorous molecules to form organic salts and render them odorless.
- ▶ **Acid gases ... H2SO4, Phenols, etc., methyl mercaptan, etc.**
In the case of acidic compounds that can be ionized, the VEON-G works on the double-bonded parts to make them into non-bonded electron pairs.
Ionized compounds generate a reaction whereby natural cushioning substances and organic salts are made.

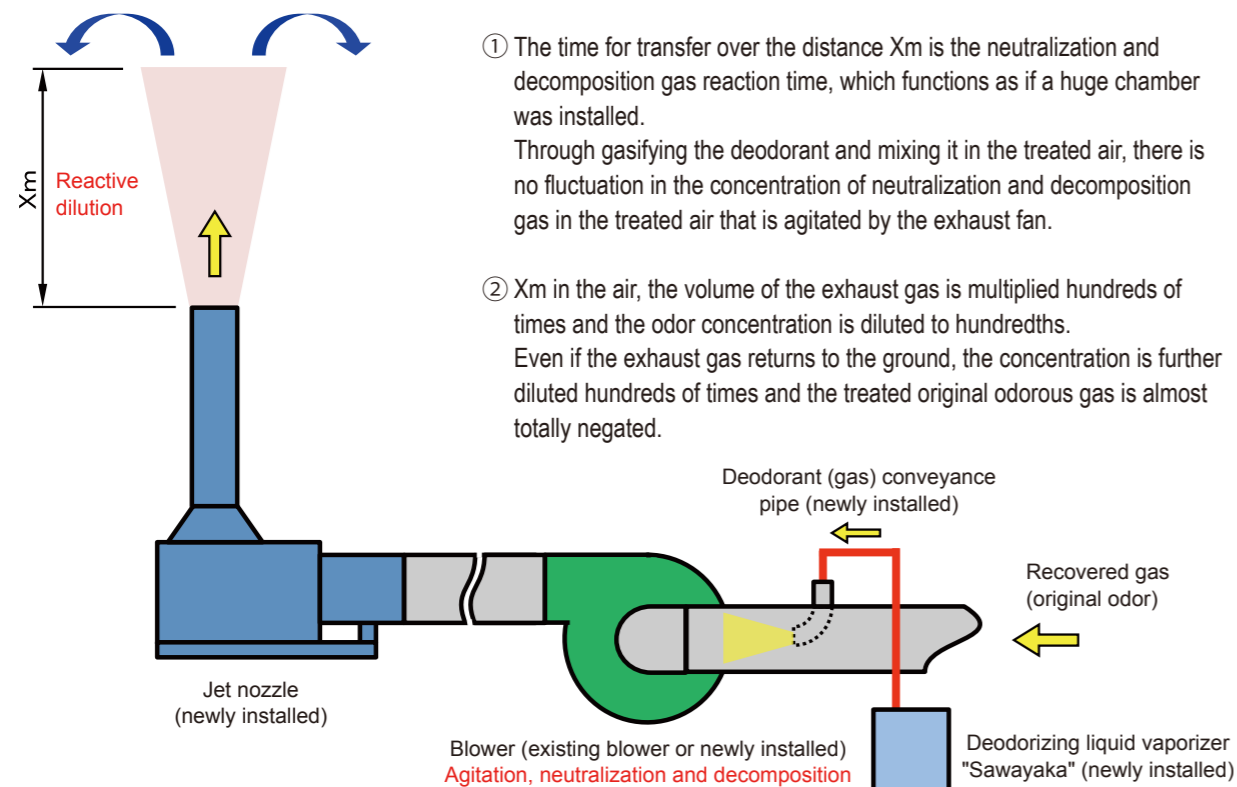
•VG-I (for commercial uses) •VG-II (for industrial uses) •VG-S (for sedimentation tanks)

* We are confident that our CS deodorization system can be useful in various industrial sectors from small-scale to large-scale exhaust volumes. Please call us if you need any assistance with related problems.

Deodorization Unit (Air Chamber System)

Features of the Air Chamber System

1. The deodorant is a natural plant oil neutralizing agent.
2. The vaporizer can spray the deodorant in vaporized form, thereby increasing the contact efficiency with odorous molecules.
3. It is applicable to a wide range of fields (professional kitchens, hospitals, care facilities, industrial coating, casting, etc.)



Deodorizing Liquid VEON-G Mechanism

Below is indicated part of the deodorization mechanism of VEON-GREEN

Basic gas Ammonia Amines, etc.	Neutralization reaction of acid=base	The organic acid content of VEON-G reacts with the base of odorous gases to form organic salts and render the gases odorless.
Acidic gases Hydrogen sulfide, phenols, etc. Methyl mercaptan	Neutralization and decomposition	In the case of acidic compounds that can be ionized, the VEON-G works on the double-bonded parts to make them into non-bonded electron pairs. The ionized compounds generate a reaction whereby natural cushioning substances and organic salts are made, and this causes neutralized deodorization.

Deodorizing Liquid Vaporizer "Sawayaka"

- This unit vaporizes the deodorizing liquid VEON-G.
- The amount sprayed can be optionally controlled using the timer.
- Thanks to vaporized contact, this unit has outstanding odor decomposition performance.



Jet Nozzle and Blower

- The blower (duct) recovers the original odor.
- The jet nozzle is installed on the exhaust outlet and raised high in the air, thus forming a chamber in the air and producing a decomposition and dispersion effect.



Performance evaluation / Casting plant (shell mold core odor)

Treatment flow / Static pressure	Odorous substance	Original odor	After treatment
286m ³ /min/600Pa	VOC	95ppm	8ppm
	Ammonia	260ppm	22ppm

Performance evaluation / Coating plant (coating odor inside a coating booth)

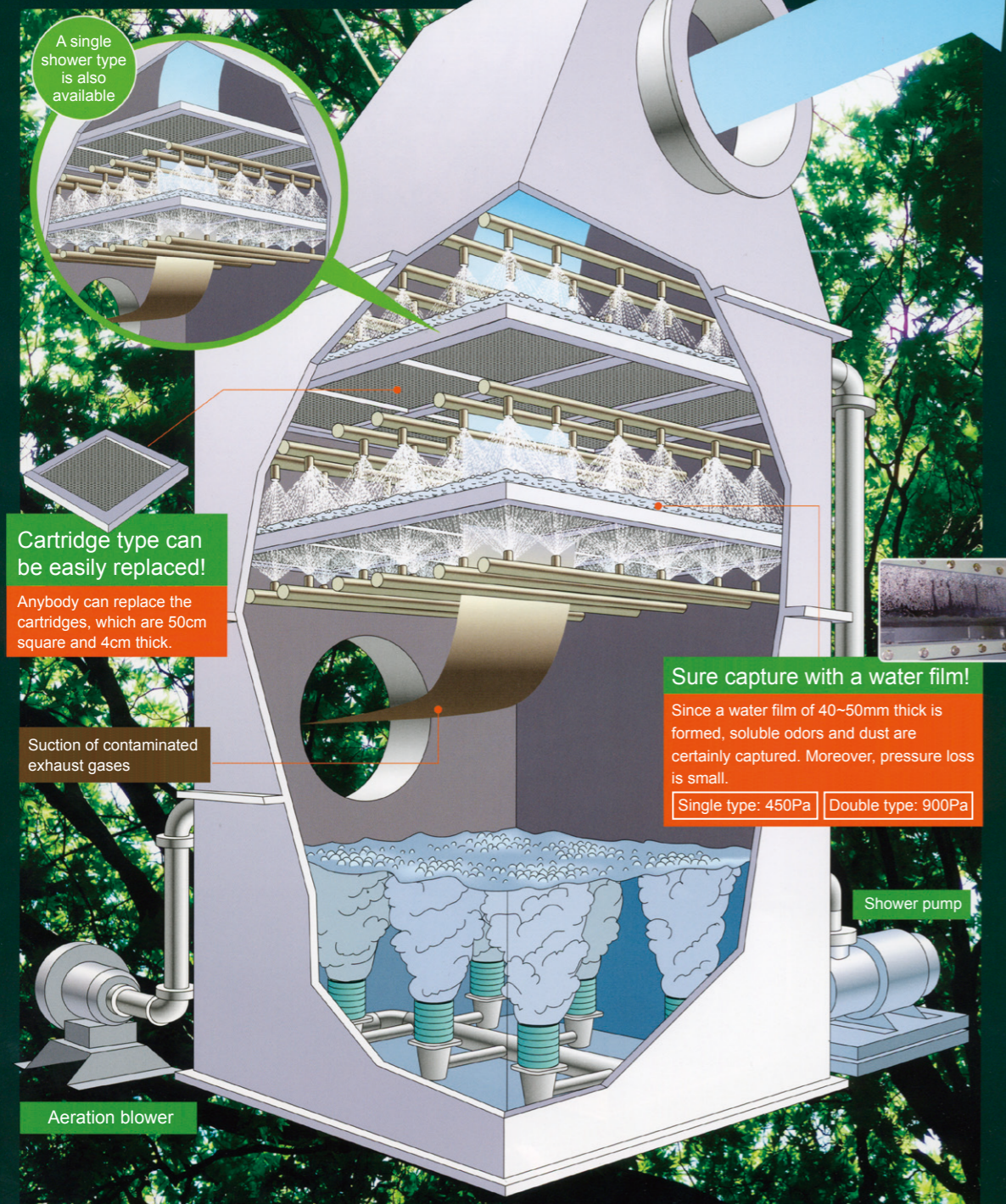
Treatment flow / Static pressure	Odorous substance	Original odor	After treatment
3,150m ³ /min/220Pa	Ethyl benzene	10ppm	2ppm
	Xylene	11ppm	3ppm
	Naphthalene	27ppm	5ppm



Deodorization Unit (Bio Deoriser)

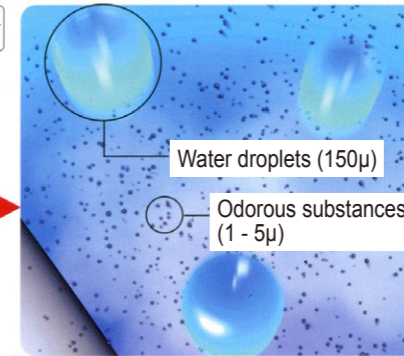
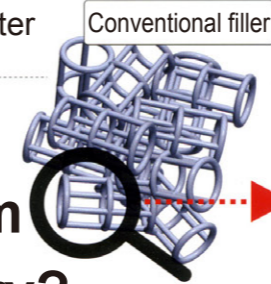
DEORISER

The Bio Deoriser is a revolutionary scrubber that captures odors and dust by means of water film and purifies contaminated air by means of circulating water.



Need for a Water Film

Why is a water film necessary?



Looking into the world of microns...

Net-type filling materials have width of approximately 2mm and gaps of approximately 5mm. In terms of microns, odorous substances have diameter of 1-5 microns, while the water droplets that capture them are approximately 150 microns. Multiplying the scale by a thousand times, the odorous substances becomes 1-5mm and the water droplets become 150mm or the size of softballs. Moreover, the width of filler materials becomes a path of 2 meters wide and the gaps between them are 5 meters. From these figures, it can be gathered that the gas-liquid contact ratio is poor.

Gas-liquid Contact Mechanism

• Design comparison table in the case where ammonia (NH₃) gas of 300m³/min is treated from 50ppm to 5ppm (90% reduction)

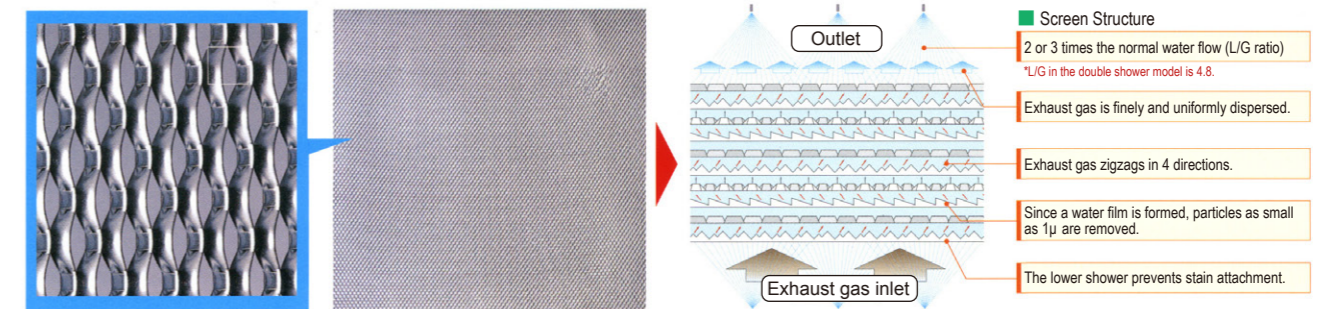
	Remarks	Conventional scrubber
Liquid (L) / Gas (G)	The gas-liquid contact ratio becomes higher as the amount of liquid increases compared to the amount of gas.	530L/min / 300m ³ /min L/G=1.7 *Water is circulated or passed through once
Filler thickness	It is important for the filler to be resistant to clogging and easy to maintain.	1,700mm *Clogging is caused
Pressure loss	The lower the pressure loss becomes, the smaller is the fan electric capacity and the better is the energy efficiency.	62mmAq *Pressure loss increases due to clogging

Bi-Deoriser (Single Shower Specifications)

960L/min / 300m ³ /min L/G=3.2 *Water is circulated
40mm *There is hardly any clogging
40mmAq *Pressure loss remains unchanged

*L/G in the double shower model is 4.8.

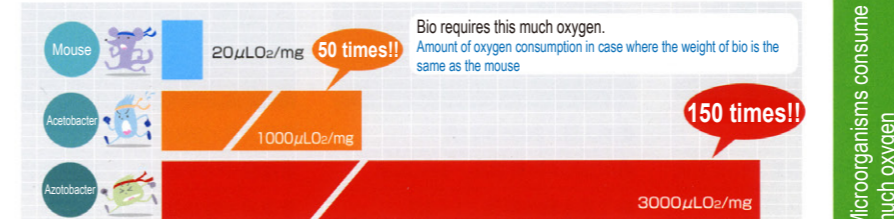
The revolutionary special multi-layered stainless steel screen that is fitted as a standard item to the Bio Deoriser



Circulating Water Purification Mechanism

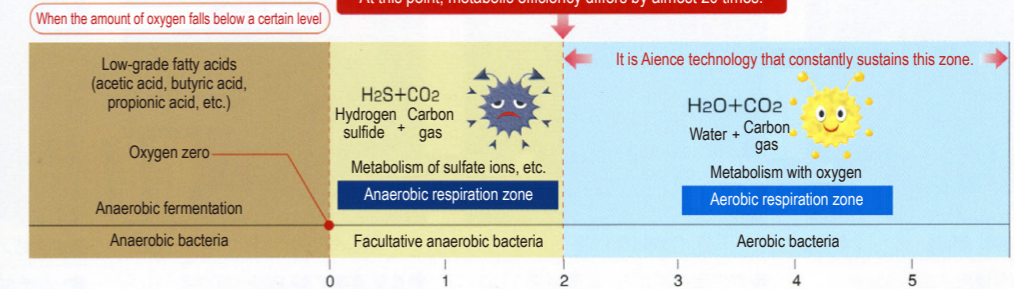
The Aqua Blaster biodegrades and purifies organic substances in the captured odorous substances.

Comparison of oxygen consumption per equal weight



Because the microorganisms can always perform aerobic metabolism, highly efficient and high-speed bio degradation is possible.

Types of microorganisms and differences in metabolism

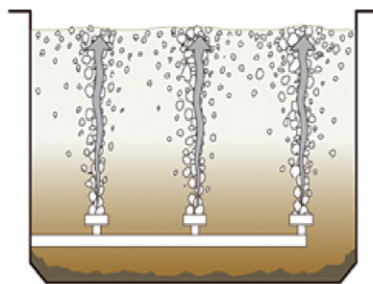


Water Purification Unit (Wastewater & Sludge Treatment / Aqua Blaster)

With minute tornado bubbles and powerful mixing force, this unit displays outstanding effectiveness even with dense wastewater. The Aqua Blaster is an aeration diffuser that exhibits high oxygen dissolution efficiency and powerful convective mixing force. It resolves problems of dissolved oxygen deficiency and circulation deficiency in wastewater treatment and sludge treatment at various plants and factories.

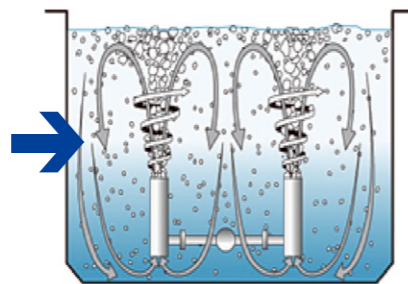
Achieving high oxygen dissolution efficiency and powerful convective mixing force with powerful water current!

Conventional aeration system



Sludge accumulates and becomes anaerobic at the bottom.

Circulating aeration system



Oxygen reaches all over the tank and prevents sludge from accumulating on the bottom.



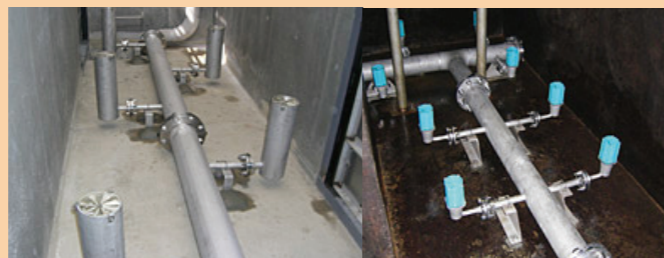
Excellent Features and Performance of the Aqua Blaster

- | | | |
|---|---|--|
| High oxygen dissolution efficiency of 20% or higher *1 | → | Reduction of electricity consumption and CO ₂ |
| Low pressure loss | → | Up to 50% less power consumption compared to the diffuser |
| Reduction of accumulated sediment due to the airlift effect | → | Reduction of cleaning costs and industrial waste treatment costs and CO ₂ |
| Reduction of hydrogen sulfide and putrefying odor | → | Local area countermeasures, pest prevention, prevention of poisoning accidents |
| Long-term durability (approximately 5 times longer than the diffuser) | → | Reduction of LCC (long cycle cost) |
| Clogging-resistant structure | → | Reduction of maintenance cost and personnel expenses |
| Ideal for combination with the membrane separation (MBR) method *2 | → | In pretreatment tank and membrane separation tank |

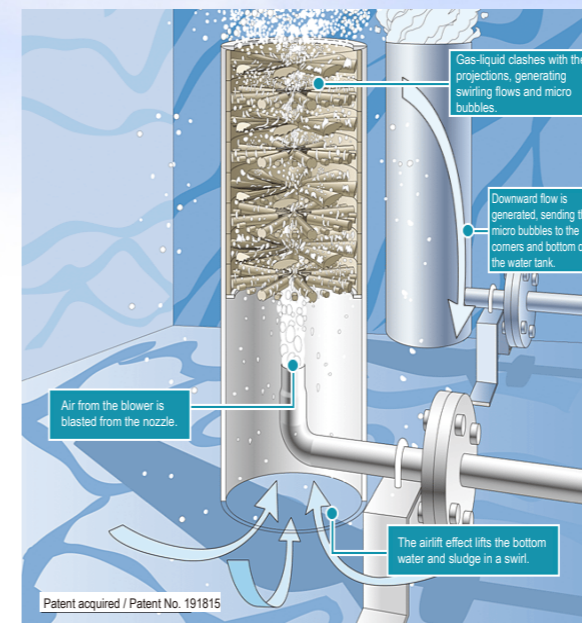
*1 At water depth of 4m (see the next page) *2 Structure is resistant to clogging even at MLSS 20000mg/L/hour.

Industrial Sectors and Applications

- Purification of industrial wastewater (up to river and sewerage discharge)
- Purification of wastewater from food plants
- Purification of wastewater from livestock farms
- Odor countermeasures and purification in coating plants
- Purification of reduced waste oil, etc.
- Reduction of sludge in rivers, ponds and dam facilities
- Oxygen deficiency countermeasures in aqua farms
- Night soil treatment facilities

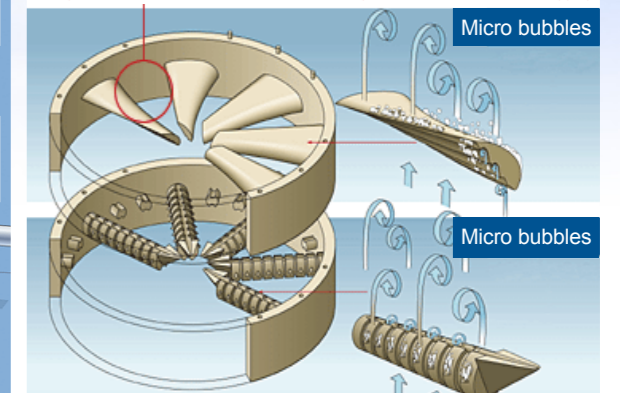


Powerful water current dissolves oxygen while conserving energy!! Achievement of high oxygen dissolution efficiency and powerful mixing convection



Mechanism of micro bubble generation

Foreign materials of up to 20mm can pass, making the structure resistant to clogging.



*The inner structure does not rotate. Patent acquired / Patent No. 191815

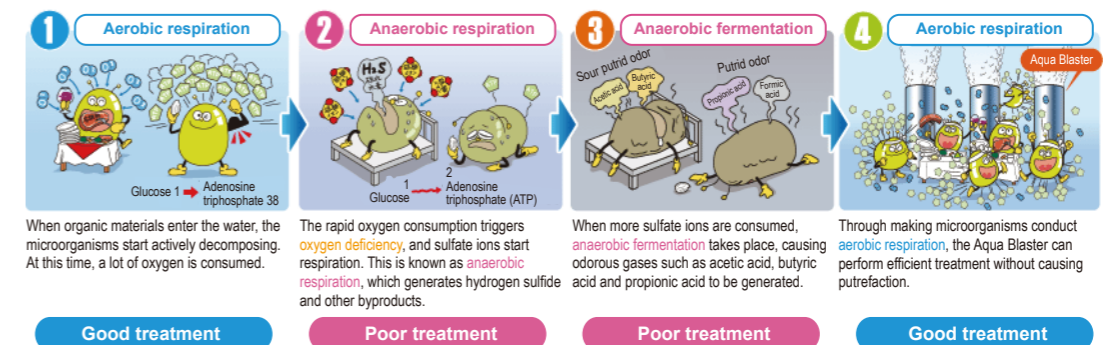
Micro bubbles are generated through clashing the gas-liquid mixture flow into the projections that are designed based on fluid dynamics.

Why are oil and sludge decomposed?



Why does putrefaction occur? The mechanism of water putrefaction

[Mechanism of Odor and Treatment]

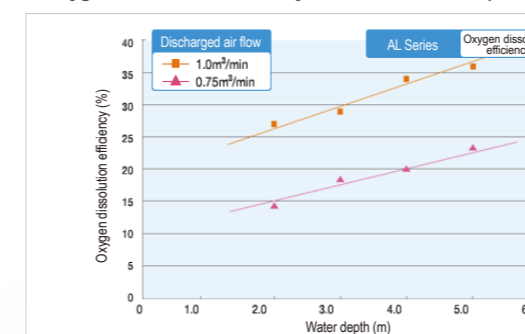


Outstanding Oxygen Dissolution Efficiency

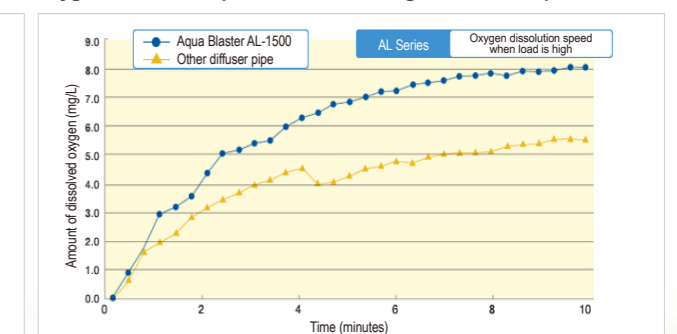
Micro bubbles are generated through causing air to violently clash into the inner projections, thereby heightening the dissolved oxygen of high-load wastewater and circulating water.

Through spreading the oxygen all over the tank, the aerobic respiration of microorganisms is supported, thereby maximizing the metabolic and biodegrading capacity.

Oxygen dissolution efficiency in clear water at temperature of 20°C



Oxygen dissolution speed in MLSS 7000mg/L at water temperature 23°C



High oxygen dissolution efficiency = Generation of many micro bubbles

Water Purification Unit (Scale & Red Rust Removal / Anti Ruster)

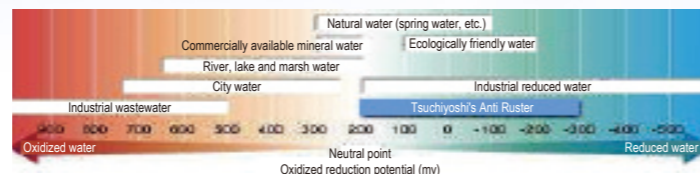
Red rust reduction system for cooling towers and chillers that uses water to remove scale, bacteria and fur through transforming red rust to a black skin

The reduced water that is made by this unit is pure water in which active hydrogen is used to remove active oxygen that causes red rust and deterioration. Not only does this produce pure water, but it is also effective for refreshing water by removing red rust, etc. that has already formed.

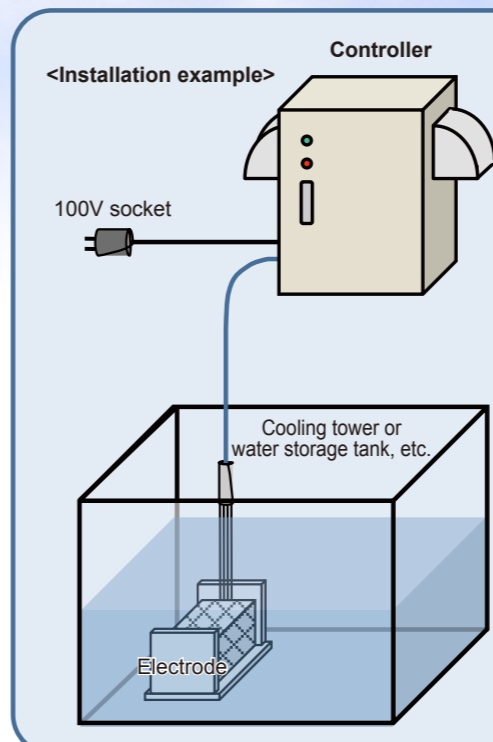
Reduced water refers to water that causes ambient oxides to become reduced rather than oxidized.

Through applying a low-voltage, high-frequency electrical current to water, the electronic energy causes reductive energy to dissolve in the water. Since no chemicals are used in this reduced water purification process, the pH value is neutral.

Rather than the two-water separation of conventional electrical decomposition, because the target water is totally converted to reduced water through one-water mixing, antioxidant water is produced with high efficiency. This method is thus attracting a lot of attention from industry.



	City water	Pure water	Reduced water
General characteristics	pH: 5.5~6.5	pH: 6.9~7.9	pH: 6.0~7.5
	Electric conductivity: 18~25mS/m	Electric conductivity: <0.1mS/m	Electric conductivity: 0.1~16mS/m
	Dissolved oxygen concentration: 7~9mg/l	Dissolved oxygen concentration: 7~8mg/l	Dissolved oxygen concentration: 0.1~6mg/l
	Oxygen reduction potential: +300~+750mV	Oxygen reduction potential: +250~+400mV	Oxygen reduction potential: 0~-700mV
O17INMR full width at half maximum	HW=150HZ 1M-150.6Hz	HW=69HZ 1M-59.3Hz	HW=54HZ 1M-53.0Hz



<Features of the Anti Ruster>

- It addresses scale and legionella bacteria in cooling towers.
- Through certainly conduct hot-cold adjustment and stabilizing quality in various chiller machines, it prevents unwanted machine stoppages caused by rust, scale, etc.
- It extends the service life of pipes and plumbing.
- Freedom from maintenance (cost + time) is realized.
- Since it uses no chemical agents, it helps resolve environmental issues arising from wastewater, etc.
- Odor caused by toxicity of organic solvents and putrefaction of water can be reduced

Anti Ruster Medium Scale HS-360-50

This certainly resolves problems of scale, rust and bacteria in circulating water used in cooling towers and chillers of general machines, injection molding machines, blow molding machines, molds, freezers, printing machines, and air conditioning.



Controller HS-360-50 and electrode A-25

Specifications	
Controller / HS-360-50	
Dimensions	300mm × 200mm × 415mm (W×D×H) *Excluding projections
Weight / Cable length	20kg/Standard 10m
Power supply voltage	AC 100V ±10% Input: 150W
Frequency	50/60Hz
Maximum electrode output	Approx. 50W or less
Electrode / A-25 / B-25 (for high temperature use)	
Dimensions	265mm × 200mm × 150mm (W×D×H) *Excluding projections
Weight / Cable length	2.8kg / *Not including cable, standard 2m

Full-scale Filtration Reduction Spare Tank HS-Y200

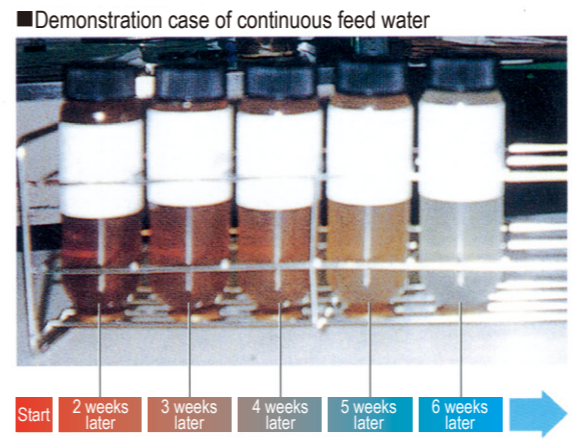
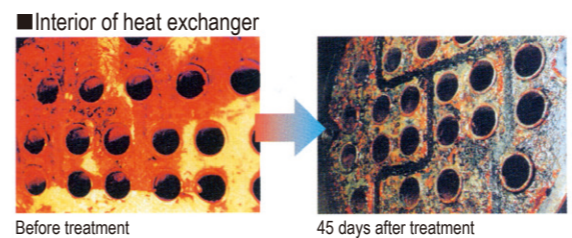
Filtration reduction spare tank for addressing rust and scale in heat exchangers and pipe cooling lines



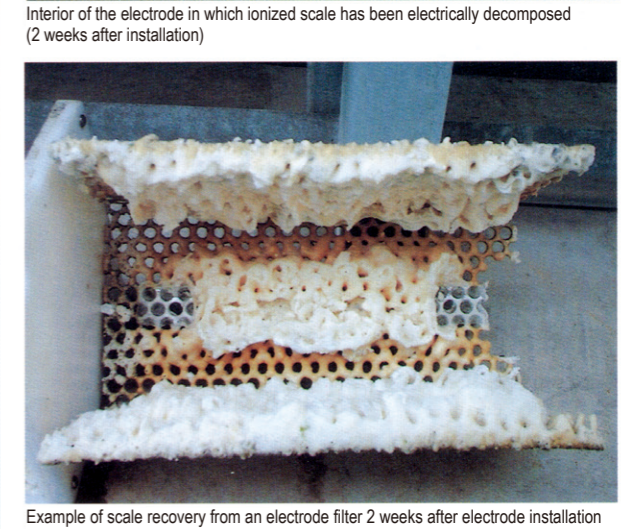
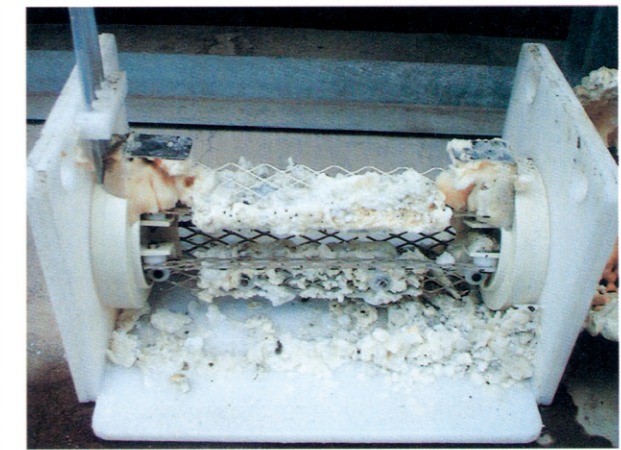
Anti Ruster medium scale and spare tank HS-Y200

Specifications	
Dimensions	751mm × 942mm × 1,182mm(H)
Weight	132kg
Effective tank capacity	125L
Power supply and capacity	AC 100V 50/60Hz 10A
Pipe nominal diameter	IN:20A OUT:20A Drain outlet: 40A socket (PVC pipe)
Reducer	Anti Ruster HS-360-50
Electrode	A-25
Maximum electrode output	Approx. 50W or less
Pressurizing pump output	150W
Return pump output	265/365W
Pressurizing pump flow rate	19.3L/min-5m ~ 18.7L/min-15m (50Hz) 25.5L/min-5m ~ 22.0L/min-15m (60Hz)
Return pump flow rate	30L/min-10.4m ~ 20L/min-13.2m (50Hz) 30L/min-15.2m ~ 20L/min-18.4m (60Hz)
Filter	PW filter Ø300 × 300L
Alarm	Filter exchange.....Flashing pilot lamp
External remote operation circuit	Attached
Pressurizing pump self-feed circuit	Attached

Examples of Red Rust Removal in a Heat Exchanger and Chiller



Example of Scale Removal in a Cooling Tower



Dustproof Unit (BECS)

Special mist spraying method Through spraying suspended particulates with a special mist, dust dispersion is prevented and particulates are captured and removed.



Advantages of BECS

[Conventional suspended particulate countermeasures]

Conventional measures for dealing with suspended particulates also entailed either **1) water sprinkling**, or **2) dust collectors**.

- 1) Water sprinkling** Due to the surface tension of water, the water wasn't compatible with dust and couldn't capture it. Due to the large size of water droplets, products and work sites became drenched in water and other problems were caused.
- 2) Dust collectors** Because it is difficult to suck in suspended particulates over wide areas, large-scale systems are needed, leading to high equipment costs and a lot of time and effort in installation work.

In the Mist Spraying Method

1. High particulate capture effect

The dust prevention agent makes particulates become more compatible with water; moreover, because the water is sprayed in micro mist form, the dust and mist contact frequency is increased and the particulates are definitely captured.

2. No impact on products and work sites

Because water is sprayed in micro mist form (10~100 microns), particulates can be captured without getting products and work sites wet.

3. Simple maintenance

Through adopting a two-fluid system, clogging of nozzles is prevented and stable operation is made possible.

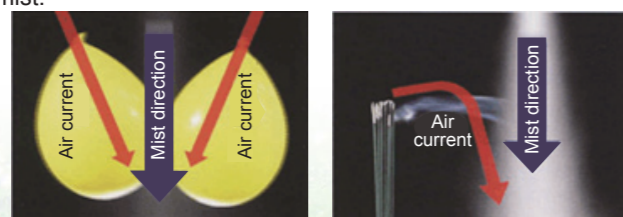
4. Secondary effects

The mist spraying dilutes odors and hence provides a deodorizing effect. Moreover, since heat vaporization causes the temperature to drop by 2~3 degrees, the work environment is improved.

Mechanism of Particulate Capture

Since the BECS' mist spraying is vigorously emitted using compressed air, air pressure around the mist drops, causing air flows to develop in the direction of the mist and particulates to be sucked towards the mist like a balloon or smoke.

Through including dust prevention agent in the special mist, the sucked particulates are definitely captured and removed with the special mist.



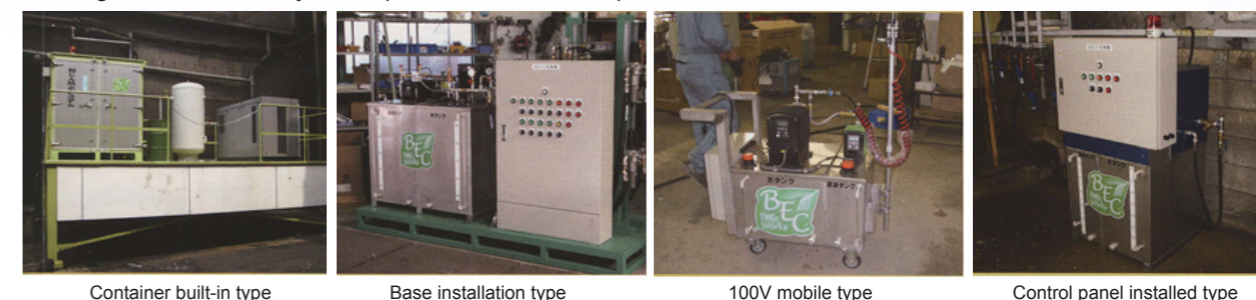
System Composition and Diverse Lineup

A standard system composition is introduced here.

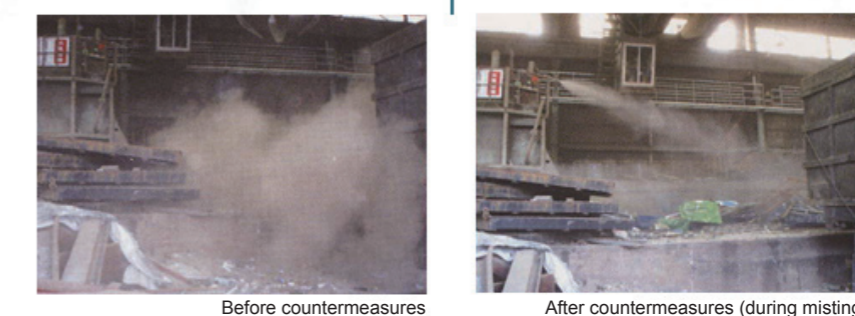
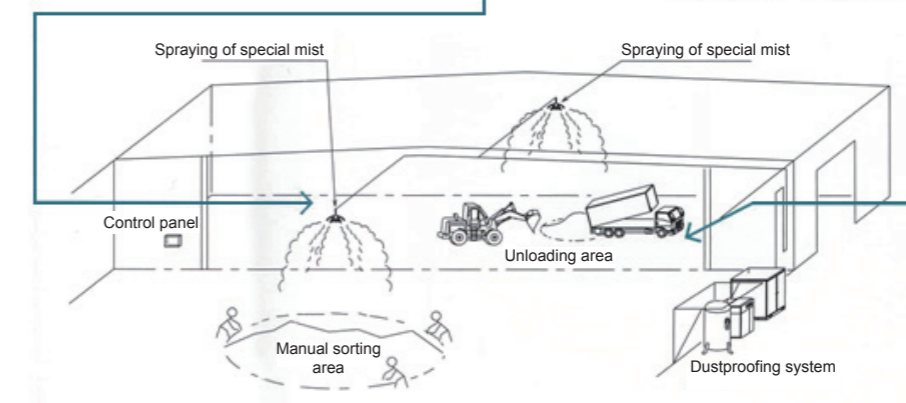
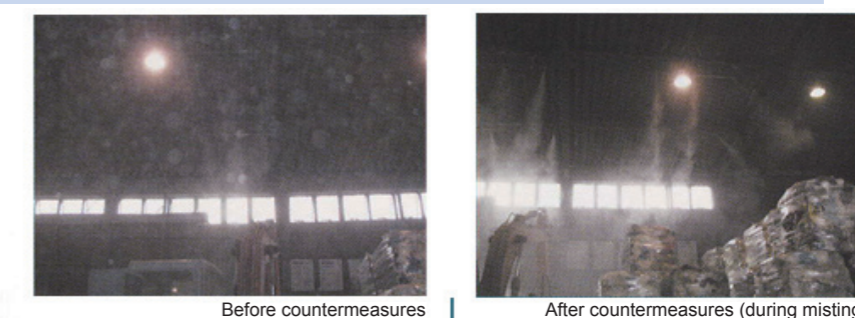
Our diverse lineup can respond to conditions and the needs of customers in all kinds of work environment.

System

Our dustproofing and deodorizing systems, based on the container built-in type and base installation type, can be designed in various ways in response to needs for sophistication and diversification.



Example of Effects



Various Chemical Agents

The system can handle various chemical agents according to the purpose of use.

Product	Purpose of Use	Style of packing
Dust prevention agent (DC-10)	Used in BECS as a dust prevention agent	18L can 200L drum
Road surface dust prevention agent (UR-20)	Used for preventing particulates arising from unpaved road surfaces	
Deodorant (SE Series)	Various deodorants according to various odors	
Coal dust prevention agent (CP Series)	Used for preventing weathering in coal and stone storage areas	

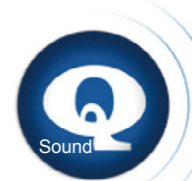


Soundproofing and Sound Absorption System (Bull Sound System)

Bull Sound System

The Bull Sound System is the unique soundproofing system of Bull & Bear Co., Ltd. This uses special sound absorbing material and 250 types of aluminum material to address sound of all frequencies and conditions. With attractive aluminum frame, outstanding durability and speedy installation, this system revolutionizes thinking on soundproof panels.

Features of the Bull Sound System "Q-sound Panel"



Bull Sound System™

- Aluminum soundproof panel**
Through using aluminum, ultra-light and ideal soundproof panels are realized. Moreover, 95% and more of panels can be recycled.
- Outstanding sound absorption effect**
Based on the results of various experiments by the company, we can propose the ideal system for each situation.
- Clean environment**
These soundproof panels do not suffer from rust or corrosion. They constantly maintain a beautiful exterior and require no maintenance.
- Nonflammable and waterproof**
The used sound absorption material is nonflammable and can be used both indoors and outdoors.

Patents acquired

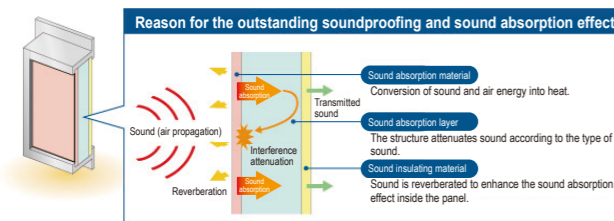
Patent No. 3065262
Patent No. 3522583

Patent No. 3155719
Patent No. 4112958

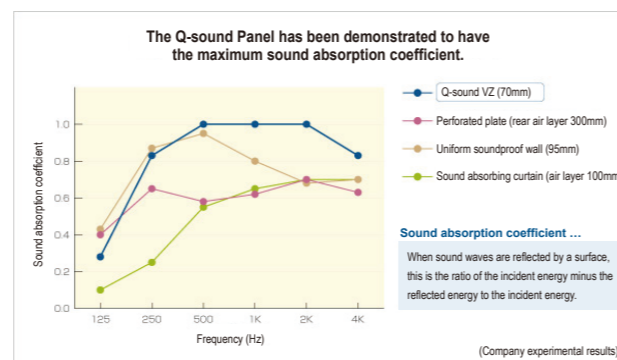
Patent No. 3437082

Triple Layer Structure of the Bull Sound System Q-sound Panel

The triple layer structure of the Bull Sound System Q-sound Panel not only suppresses sound reverberation but also attenuates sound transmission to the panel exterior.



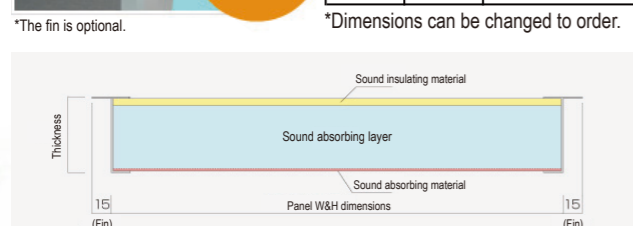
Sound Absorption Rate Comparison



Basic Specifications of the Soundproof panel Q-sound VZ / VA-HI

Thickness	Weight (/m ²)	Standard Dimensions (excluding fin)
30mm	10kg	1005 × 1005mm 1005 × 2005mm
50mm	12kg	
70mm	15kg	
100mm	18kg	

*The fin is optional. *Dimensions can be changed to order.

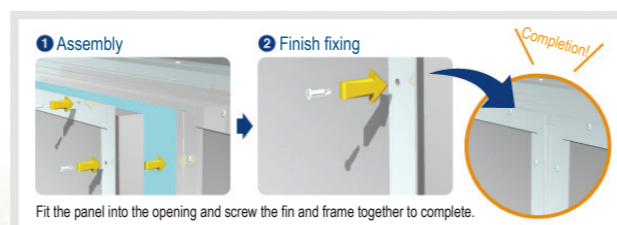


Features of the Soundproof panel Q-sound VZ / VA-HI

This can be used for both indoor and outdoor noise control. (VZ only)
It can also be fitted as interior lining of pre-existing walls and covers.

Basic Attachment Example of Soundproof panel Q-sound VZ / VA-HI

Light enough for 1 person to attach.



We can propose soundproofing and sound absorption systems according to purpose of use with respect to all noises in factories and elsewhere.

◇ For simple noise control

Q-sound VZF

Connecting type soundproof panels

[Uses]
Small generators / compressors, etc.

[Features]
This can be used for both indoor and outdoor noise control. Moving and assembling the soundproof panels is easy.



The connecting part is a sliding rubber joint.

◇ For noise control in small equipment

Q-sound PZ

Circular sound absorbing model

[Uses]
Ventilation and air exhaust pipes, etc.

[Features]
This can be used for both indoor and outdoor noise control. This is required for noise control in places that require lighting and ventilation. Can also be used for noise control in constricted places.



The 360° sound absorbing surface displays a three dimensional sound absorbing effect.

◇ For noise control in general factories

Q-sound VZ / VZ-Hi

Frame opening fit type

[Uses]
Press machines / Crushing machines / Chillers / Dust collectors / Blowers / Pumps / Motors / Outdoor units / Air supply and exhaust fans / Hydraulic units / Compressors / Cooling towers, etc.

[Features]
This can be used for both indoor and outdoor noise control. (VZ only)
It can also be fitted as interior lining of pre-existing walls and covers.



With fin for easier attachment

*The fin is optional.

◇ For noise control in large equipment

Q-sound VZDX / VZDX-Hi

H steel insertion type

[Uses]
Outdoor units / Large soundproof walls, etc.

[Features]
This can be used for both indoor and outdoor noise control. (VZDX only)
For outdoor unit soundproofing, use a small box completed product.



Attached bolts for easy fixing