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SEIBU GIKEN CO.,LTD.

# products



Photographs

[www.seibu-giken.com](http://www.seibu-giken.com)



JQA-2220  
JQA-EM1347

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Desiccant Dehumidifier

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Functional Honeycomb Elements

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Triple "E"

The biggest issue confronting mankind now and in the future is the so-called Tri-lemma. The Tri-lemma involves the "three Es" standing for "Economy" (as in "growth of the economy"), "Energy" (as in "the procuring of energy") and "Environment" (as in "the protection of the environment"). However, in pursuit of an individual E, each of the others is negatively affected, a situation which is the crux of our "Triple Dilemma" or (as it is now popularly termed) Tri-lemma. Seibu Giken is proud to be at the forefront of endeavors

to realize a harmonized and well-balanced society through the simultaneous pursuit of all three components of our Tri-lemma. Seibu Giken is indeed an internationally-minded company, supplying its products to more than 30 countries worldwide in addition to the domestic market. The establishment of Seibu Giken America, Inc. in 2001 and Seibu Giken (Changshu) Co., Ltd. in 2007, in addition to the acquisition of DST (now called Seibu Giken DST AB) in Sweden in 1993, enhanced the company's

global reach. We at Seibu Giken are committed to our continuing internationalization and market development through the securing of ever-closer ties with our network of overseas offices and client bases. In addressing the Tri-lemma, it is the ultimate goal of Seibu Giken to foster economic growth in conjunction with the development of energy-conserving, environmentally friendly air-conditioning equipment.



Head Office/Plant



Seibu Giken DST AB



Seibu Giken America, Inc.



Plant #II



Plant #III



Seibu Giken (Changshu) Co., Ltd.

Products Line

**HI-PANEX-ION**  
Ion Adsorption Type  
Total Heat Exchanger

Energy conservation equipment capable of recovering the total heat energy exhausted from inside air-conditioned buildings and using this recovered energy to condition the supply air back into the building.

**DRY-SAVE**  
Desiccant Dehumidifier

The Honeycomb Active silicate rotor was the world's first to be developed without incorporating chemical absorbents. Since this revolutionary breakthrough, Seibu Giken has continued to achieve ever higher levels of performance through the development of new materials.

**PURO-SAVE**  
VOC Concentrator

By virtue of its hydrophobic zeolite rotor, this equipment is capable of concentrating and removing VOC to be exhausted from the factories. This in turn drastically alleviates the load on the incinerator following the concentration process and therefore saves a vast amount of energy.

**HONEY-SAVE**  
Functional Honeycomb Element

The corrugated honeycomb can be formed using any materials and /or substrates. Various filtering functions may therefore be achieved such as deodorization, dust collection, air straightening, ozone decomposing and removing VOC.

**E-SAVE**  
Desiccant Air-Conditioning Unit

Comfortable air conditioning can be realized by removing moisture from the air via our groundbreaking desiccant technology. Since various forms of industrial exhaust heat can be utilized as regenerated power for the desiccant AC unit, realizing our goal of high thermal energy efficiency with environmental friendliness is readily available.

# DRY-SAVE Desiccant Dehumidifier

## History of Desiccant Dehumidifier Rotors

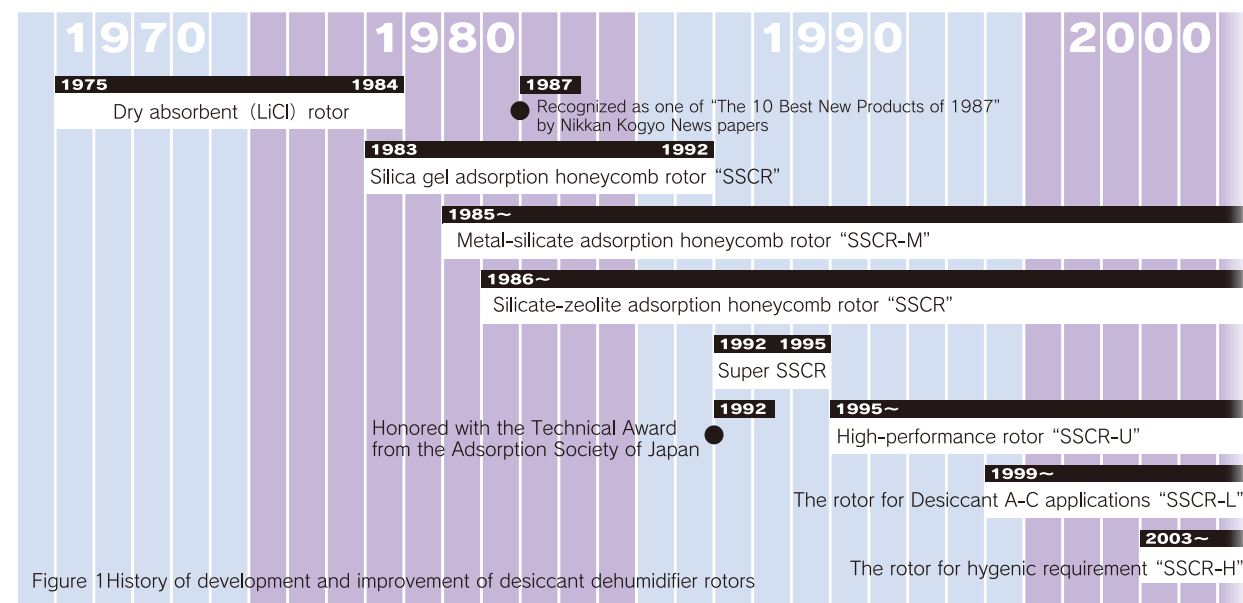


Figure 1 History of development and improvement of desiccant dehumidifier rotors

Desiccant Dehumidifier DRY-SAVE is ideally suited to the dehumidification of lower temperature air by virtue of its honeycomb type desiccant adsorption. Its superior performance is due to its utilization of metal-silicate (referred to as high performance silica gel including metal ion). Seibu Giken's Desiccant Dehumidifier Rotor is a patented product approved and acclaimed internationally for its world-class high quality and performance. It exhibits high dehumidification performance with superior stability in the range between low and high humidity levels.

### (1) SSCR is not a dry absorbent but adsorbent (desiccant) type dehumidifier rotor

The basic patent for the dry absorbent type dehumidifier was obtained by the late Mr. Carl Munters in Sweden 40 years ago. The product at that time was made of Asbestos papers as an absorbent impregnated with Lithium Chloride (LiCl). As the honeycomb rotor impregnated with the absorbent is operated in dry conditions, it is called the Dry Absorbent type dehumidifier in Japan, as distinguished from the Kasabar Lithium Chloride Liquid (Wet) type dehumidifier.

Although we at Seibu Giken developed a similar dry absorbent type dehumidifier 25 years ago, we experienced a lot of trouble and customer claims due to the use of Lithium Chloride for the following reasons:

1. Impregnated LiCl absorbed excessive quantities of moisture under high humidity conditions. The LiCl then formed a liquid which corroded the auxiliary metal equipment.
2. Deterioration of performance occurred due to the loss of LiCl by deliquescence. Excessive absorption or inequality of impregnated LiCl in the rotor due to its movement toward the regeneration side was subsequently caused by the capillary phenomenon.
3. Impregnated LiCl concentrated by its movement toward the regeneration side became crystallized causing damage and eventual breakdown to the honeycomb structure.

Due to the drawbacks outlined above, Seibu Giken succeeded in developing and commercializing the Silica gel adsorption honeycomb type as an alternative to the dry absorbent type dehumidifier rotor SSCR (referred to as the Desiccant Dehumidifier Rotor). Developed in 1984, the rotor was the first in the world not to use LiCl.

### (2) A history of the improvement in the performance of SSCR

Developed and commercialized in 1984, SSCR has been improved to enhance its dehumidification performance by optimizing the materials and synthesizing method etc. as per fig. 1.

### (3) Kinds of rotor

Seibu Giken's comprehensive range of desiccant rotors ensures that an ideally suited model may be selected to meet specific required conditions and applications. For general use, SSCR-U is primary employed. (Table 1) SSCR-L is suitable for desiccant air conditioning applications by utilizing low temperature waste heat such as hot water or low-pressure steam to heat the regeneration air to around 80 Deg.C. Besides the above, the hygienic desiccant rotor SSCR-H has been recently developed and commercialized to meet the great demand from food and pharmaceutical industries. Furthermore, SZCR impregnated with synthesized hydrophilic zeolite and suitable for low dew point applications or high temperature process air dehumidification is also available.

Table 1 List of SSCR/SZCR

SSCR-U	General Industrial use
SSCR-L	Low reactivation temperature (For Desiccant A-C applications, etc.)
SSCR-H	Food and pharmaceutical industrial use
SZCR	Low dew point applications

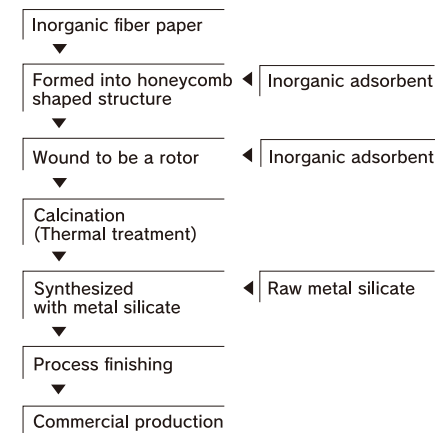


Figure2 Manufacturing process chart

### (4) Manufacturing method of the desiccant rotor

The manufacturing method of the desiccant rotor is as follows: Inorganic fiber paper formed into a honeycomb shaped structure is wound into the basic shape of the rotor containing the honeycomb matrix, in which silica gel as metal silicate is chemically synthesized via polymerization with several chemicals. SG therefore obtained the first manufacturing patent in the world utilizing the silica gel as an adsorbent binding agent for the honeycomb matrix.

The honeycomb matrix (element) is then appropriately cut and finished, and then assembled to be a finished desiccant rotor.

Since metal silicate itself is chemically synthesized and bound into a matrix without using the binder checking adsorption performance, 100% of the adsorption capacity of metal silicate can be utilized.

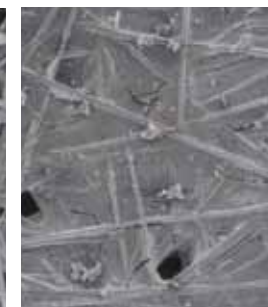
As the honeycomb matrix has high physical strength due to its reinforcement with inorganic fiber, metal silicate will not deteriorate even in long-term operation. Picture 2 shows metal silicate before synthesization. Picture 3 is SEM after synthesization.



Picture 1 Shape of honeycomb



Picture 2 SEM picture of metal silicate before synthesization



Picture 3 SEM picture of metal silicate after synthesization

Recognized as one of "The 10 best new products" of 1987 sponsored by Nikkan Kogyo News Paper (Major Japanese Industrial News Paper)

### "The desiccant dehumidifier rotor in the super low dew point dehumidifier"

Since the adsorbents used for conventional dehumidifiers are of the granular or powder type, there were some problems such as the shedding of those adsorbents as they were bound with the fiber matrix. It was therefore revolutionary for the adsorbing silica gel to be bound into the ceramic fiber. Nevertheless to increase durability and strength was another goal which, if achieved, would really create an epoch-defining product and world leader. (Quoted from the article of Nikkan Kogyo News Paper)

The technical award from The Adsorption Society of Japan 1992

### "Gas separation unit with inorganic adsorbent in honeycomb structure"

The ability to synthesize or compound silica gel, metal silicate or adsorbents functioning inside the matrix of the inorganic fiber paper as an adsorption substratum was developed. Seibu Giken succeeded in designing a specific facility for adsorption in terms of dehumidification or concentration and removal of Volatile Organic Compounds by taking advantage of the high speed of adsorption and efficient transference of the honeycomb structure. Both the integrated and continuous operating equipment for adsorption and desorption, and the honeycomb rotor itself are now commonly used throughout the world. Since this groundbreaking technological achievement has been lauded as such by several academic seminars and symposiums, it is expected that it will also be applied to other technological fields. It is, therefore, fully deserving of the recognition bestowed upon it by the Adsorption Society of Japan. (Quoted from an extract from the letter of recommendation issued by The Adsorption Society of Japan)

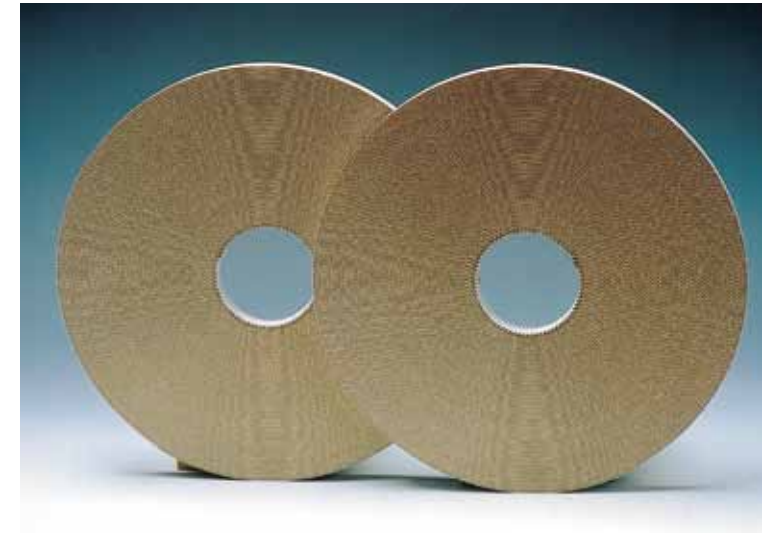
# DRY-SAVE Desiccant Dehumidifier Rotor/SSCR,SZCR



## SSCR-U

Desiccant dehumidifier rotor

φ 300mm×100mm  
(φ 12" × 14")



## SZCR-R

Desiccant dehumidifier rotor  
for domestic appliances

φ 270×20mm  
(φ 11" × 0.8")



## SZCR

Desiccant dehumidifier rotor  
for low dew point applications

φ 2450×400mm  
(φ 96" × 16")



## SSCR

Desiccant dehumidifier rotor  
(Special use)

φ 200×200、250mm  
(φ 8" × 8", 10")

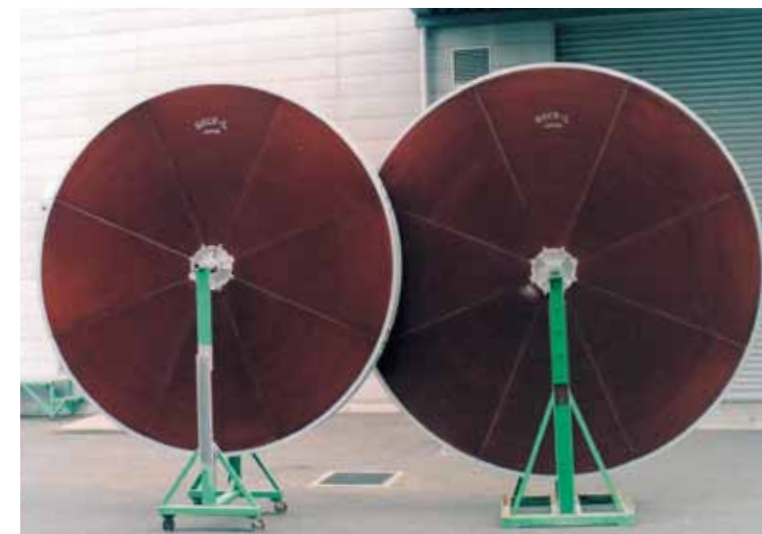
Negative pressure, positive pressure  
in the atmosphere



## SSCR

Desiccant dehumidifier rotor element

φ 2400×400mm  
(φ 95" × 16")



## SSCR-L

Desiccant dehumidifier rotor  
for low reactivation temperatures

φ 1940×200mm(φ 77" × 8")  
φ 1730×200mm(φ 68" × 8")



### Desiccant dehumidifier cassette for low dew point applications

SSC-250H20  
Air volume : 100m<sup>3</sup>/h~300m<sup>3</sup>/h  
(60cfm~180cfm)



### Desiccant dehumidifier cassette

SSC-965H20  
Air volume : 3,500m<sup>3</sup>/h~7,000m<sup>3</sup>/h  
(2,100cfm~4,200cfm)  
SSC-1940H20  
Air volume : 14,800m<sup>3</sup>/h~29,500m<sup>3</sup>/h  
(8,800cfm~17,500cfm)



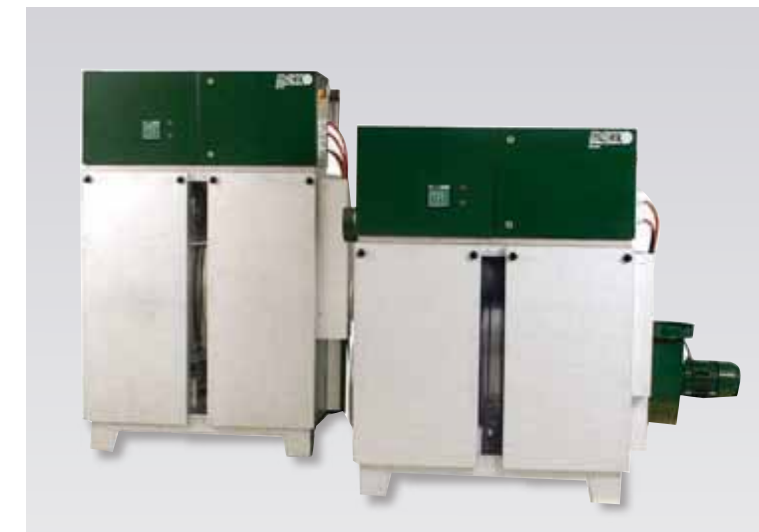
### Horizontal type desiccant dehumidifier cassette

SSC-1940H40  
Air volume : 30,200m<sup>3</sup>/h  
(18,000cfm)



### Compact units(Small size) "DST series"

Air volume : 190m<sup>3</sup>/h~1,450m<sup>3</sup>/h  
(110cfm~850cfm)



### Compact units (Medium/Large size) "DST series"

Air volume : 2,600m<sup>3</sup>/h~13,500m<sup>3</sup>/h  
(1,500cfm~8,000cfm)



### Standard packaged unit "New-SGP series"

Air volume : 330m<sup>3</sup>/h, 660m<sup>3</sup>/h, 1,100m<sup>3</sup>/h  
(200cfm, 400cfm, 650cfm)



### Desiccant dehumidifier unit (Custom-design)

Air volume : 300m<sup>3</sup>/h~2,000m<sup>3</sup>/h  
(180cfm~1,200cfm)

Dew point : 0°C~-20°C  
(32°F~68°F)



### Desiccant dehumidifier unit (Custom-design)

Air volume : 600m<sup>3</sup>/h  
(350cfm)

Dew point : -40°C~-60°C  
(-104°F~-140°F)



### Desiccant dehumidifier unit (Custom-design)

For liquefied natural gas(LNG)vaporizer

LNG vaporizing volume:  
1t/h Exhaust air= 100°CDB(-212°FDB)



### Desiccant dehumidifier unit(Custom-design)

for supermarkets

Air volume : 6,500m<sup>3</sup>/h (3,900cfm)



### Desiccant dehumidifier unit (Custom-design)

for power stations

Air volume: 15,000m<sup>3</sup>/h (8,900cfm)

## Primary applications

1. Production and preservation for pharmaceuticals, foods, chemical industries.
2. Anti-bacteria, dehumidification and prevention of condensation for power stations, chemical plants, ships and precision industries. Maintenance for thermal power stations, water power stations and large turbines in chemical plants. Anti-corrosion for the storage holds on ships. Quick dehumidification for warehouses and vessels.
3. Dehumidification and preservation for noodles, tea, seaweed, grains, wood, etc.
4. Anti-corrosion, prevention of condensation and preservation in low humidity areas for Space defense hardware, tanks, aircraft, missiles and control equipment for rockets.
5. Air conditioning, humidity control for clean rooms, environmental test rooms, museums and galleries.
6. Quality control, production improvement for pharmaceutical, chemical fertilizer and Food processing industries using hygroscopic materials.
7. Low humidity maintenance for plastics and molding industries, and air conditioning with low dew-point control for lithium battery manufacturing.
8. Prevention of condensation and fogging, and a reduction in the operating costs of ice skating rinks.
9. Manufacturing and wrapping process for candy, chocolate and chewing gum manufacturers.
10. Dehumidification after the flooding of under-ground shopping malls, residences, offices.
11. Prevention of condensation & mold by comfortable air conditioning (RH 50% or less), reduction of maintenance costs and improvement of IAQ (in-door air quality) for indoor pools and lobbies in hotels.
12. Prevention of condensation for refrigerated warehouses.

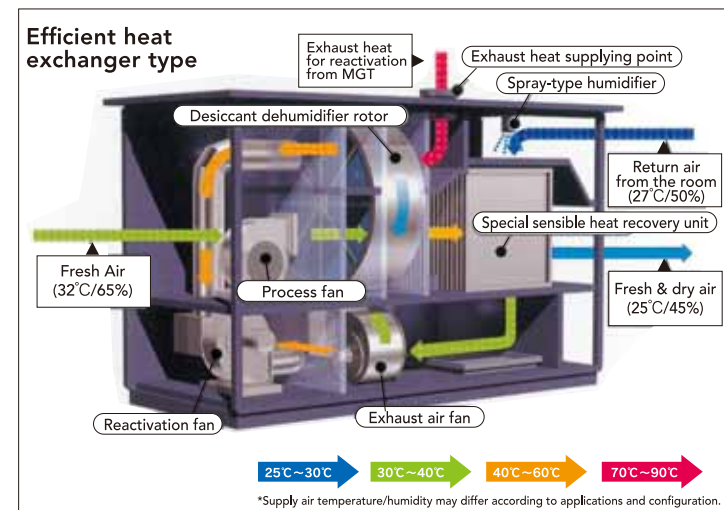
# E-SAVE Desiccant A-C Unit

E-SAVE is a packaged system that provides air conditioning by removing moisture from the air by adsorption by the desiccant. E-SAVE is able to dramatically enhance Indoor Air Quality as it can efficiently replace dirty indoor air with fresh outdoor air. This is achieved without compromising the environment or concerns regarding energy conservation. Since E-SAVE can run on exhaust heat (gas/hot water/steam) according to cogeneration system, it can drastically reduce emissions of CO<sub>2</sub>. E-SAVE can therefore be said to be an environmentally-friendly air conditioning unit for the 21st century.

## Primary applications

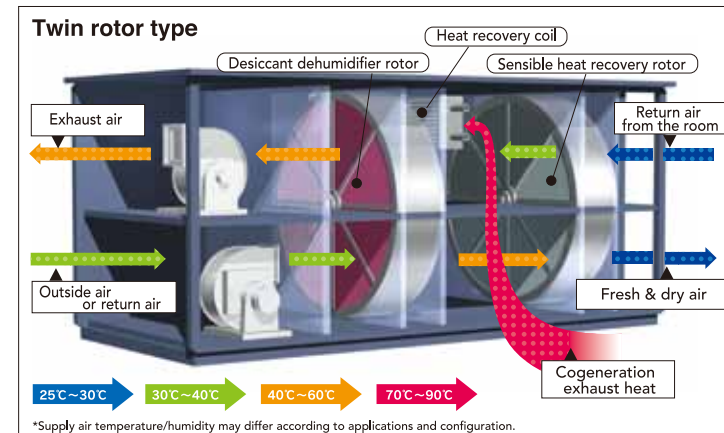
- Food factories, Low Temperature/Humidity Factories:**
  - Product quality management via temperature and humidity control.
  - Energy saving through the elimination of over-cooling and re-heating.
  - The contribution to HACCP introduction.
  - Prevention of condensation and frost.
  - Low temperature dehumidification.
- Supermarkets:**
  - Fresh appearance of frozen foods and frost free operation of refrigeration units.
  - Solving the problem of the "cold" aisle; by lowering the humidity, the temperature can be raised.
  - The prevention of mildew and foul odor due to condensation is eliminated.
  - Improved IAQ by ventilation and humidity control.
- Hospital and Nursing Homes:**
  - Elimination of foul odors via increased ventilation and humidity control.
  - Reduction of bacteria counts by dehydration and sterilization effect.
  - Elimination of over-cooling due to the over-sizing of air conditioning units or the lack of re-heating.
  - Improved IAQ by ventilation and humidity control.
- Movie Theaters, Single Theaters, Multiplex Theaters:**
  - Elimination of foul odors via increased ventilation and humidity control.
  - Elimination of over-cooling due to the over-sizing of air conditioning units or the lack of re-heating.
  - Improved IAQ by ventilation and humidity control.
- Recreational Facilities:**
  - Corrosion protection of electronic games and controls.
  - Elimination of over-cooling due to the over-sizing of air conditioning units or the lack of re-heating.
  - Improved IAQ by ventilation and humidity control.
- Sports gymnasiums, Indoor Pools:**
  - The achievement of "comfort" via humidity control.
  - Elimination of foul odors via increased ventilation and humidity control.
  - Elimination of over-cooling due to the over-sizing of air conditioning units or the lack of re-heating.
  - Improved IAQ by ventilation and humidity control.
- Restaurants:**
  - Elimination of over-cooling due to the over-sizing of air conditioning units or the lack of re-heating.
  - Improved IAQ by ventilation and humidity control.
- Refrigerated warehouses, Skating Rinks:**
  - Prevention of condensation and frost.
  - Low temperature dehumidification.
  - Low humidity air-conditioning.

## E-SAVE unit configuration and principles of operation (Conceptual figure/Summer time)



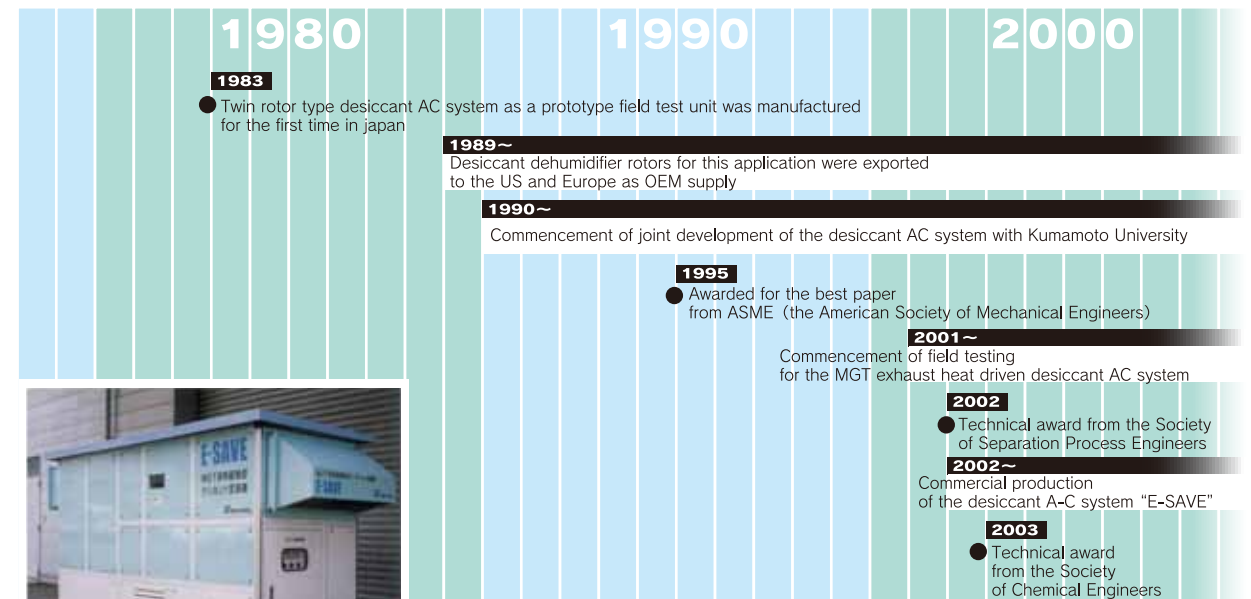
**Micro gas turbine (MGT) exhaust heat driven multi-functional desiccant A-C unit**

(Efficient heat exchanger type)  
SDP-552-20C  
Air volume: 5,500m<sup>3</sup>/h (3,300cfm)



**Desiccant A-C unit (Twin rotor type)**  
SDP-552-20R  
Air volume : 5,500m<sup>3</sup>/h (3,300cfm)

## History of the development of the Desiccant A-C system



**Desiccant A-C unit**  
(Efficient heat exchanger type)  
Air volume: 3,500m<sup>3</sup>/h (2,100cfm)

A world first, Seibu Giken commercially produced the SSCR as the Silica gel Adsorption type rotor (referred to as the Desiccant Dehumidifier Rotor) in 1984. This groundbreaking new rotor was largely adopted by desiccant AC systems in Europe, USA, Korea, etc. Furthermore, Seibu Giken commenced a joint development program for the desiccant AC system with Kumamoto University. We then received an award for the best paper from the American Society of Mechanical Engineers in 1995. As a result of the theoretical know-how outlined in those academic works, the twin rotor type desiccant AC system was successfully produced in 2001. Subsequent to this, we commenced field testing of the MGT exhaust heat driven desiccant AC system in February 2001 with an eye to the revitalization of the dispersed power (co-generation) system market. After a thorough program of field tests, the MGT exhaust heat driven desiccant AC system, known as E-SAVE-ED, was finally put on the market for official sale.

**The technical award**  
from the Society of Separation Process Engineers in 2002

### "Desiccant air conditioning system by means of the honeycomb type desiccant rotor"

As a pioneer in its field, Seibu Giken developed the world's first desiccant rotor. This new desiccant rotor is made of ceramic paper or glass fiber paper formed into a honeycomb shaped matrix in which silica gel is chemically synthesized. The desiccant rotor enables the mass volume treatment of gas with less pressure loss. This is due to the fact that it can be operated with a small amount of desiccant thanks to its excellent heat and material mass transfer capabilities. The development of adsorption and separation of more than 80% of the water vapor in the air passing through the desiccant rotor (in 0.1 seconds) hastened the commercialization of the desiccant air conditioning process that was still under development at that time. The commercialization of the desiccant air conditioning process is held in high esteem by those involved in the deployment of separation technology on the basis of saving energy. It is expected that this technology will make a remarkable contribution to society and the environment as its wide scale application would lead to the demand for electricity for air-conditioning in the summer to be cut by half, thereby reducing CO<sub>2</sub> emission levels by about 1% nationwide. (Quoted from an extract from the letter of recommendation from the Society of Separation Process Engineers)

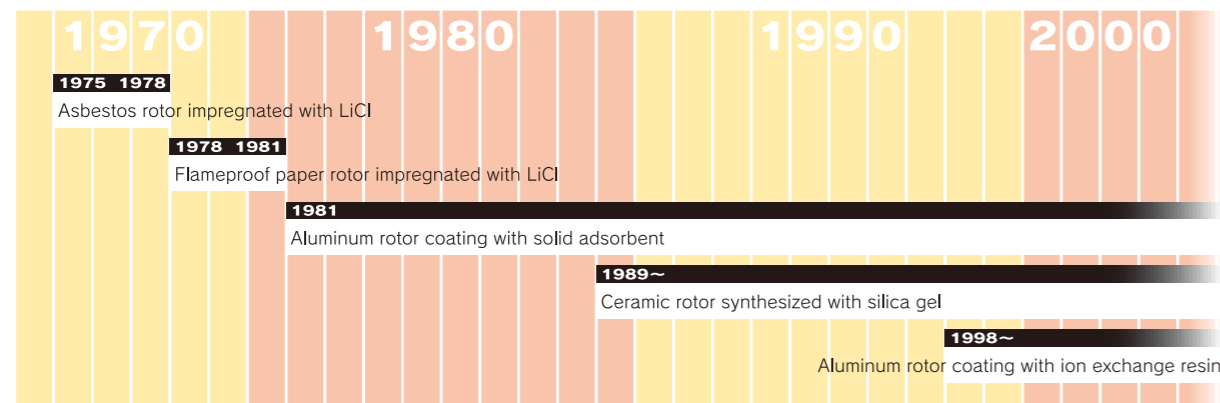
**The technical award**  
from the Society of Chemical Engineers, 2002

### "Development of adsorption type desiccant air conditioning system"

The researchers, who had been working on the development of a high efficiency desiccant air-conditioning system equipped with a honeycomb adsorption type desiccant rotor, have, by taking advantage of solar energy or low temperature waste heat, developed a system which enables drastic cuts in the demand for air conditioning equipment in summer time. In particular, the system in particular has succeeded in largely increasing cooling capacity by rationally incorporating system components to utilize direct exhaust heat from Micro Gas Turbine (MGT) as part of its co-generation system. The remarkable feature of this system is that the desiccant rotor can be regenerated by direct exhaust gas that is relatively clean from MGT by passing the air flow stream through the line of regeneration. The system employs a cross flow type sensible heat exchanger incorporated with an indirect evaporative cooler as a newly developed component. It is furthermore capable of being simply and compactly designed. From the prevention of global warming and conservation of energy points of view, the collaborative research of industrial and academic societies led to the development and incorporation of the most suitable components and materials. The system was therefore able to achieve a very high degree of cooling efficiency. 4 prototype units and 6 trial sales units are already in operation and official sales commenced in February 2002. (Quoted from an extract from the letter of recommendation from The Society of Chemical Engineers)

# HI-PANEX-ION Ion adsorption type total heat exchanger

## History of development of total heat exchange rotors



**Ion adsorption type total heat exchanger "Hi-Panex-Ion" is the energy saving equipment that minimizes the enthalpy heat loss in ventilation and introduces fresh air into the building with high-energy recovery efficiency.**

**As the heart of the equipment, Seibu Giken's total heat exchange rotor employs ion exchange resin as an adsorbent for latent heat recovery with minimum odor transfer. This is a world first. Compared to the old model employing silica gel, the accumulation of odors or the odor transfer ratio is extremely reduced by the ion adsorption mechanism.**

**Hi-Panex-Ion realize the dream of clean and comfortable living combined with simultaneous energy-conservation.**

The total heat exchanger was invented in Sweden in 1953. As its excellent performance with regards to energy saving was recognized and approved, it spread throughout the world. In 1975, we at Seibu Giken successfully developed the total heat exchangers and local production was initiated for a model made of asbestos as a substratum impregnated with Lithium Chloride. Seibu Giken was able to do this by virtue of a subsidy for the purpose of technical improvement sponsored by the Ministry of industry and commerce. The subsequent revelation that asbestos caused cancer led to its replacement with flameproof paper, but Lithium Chloride was still used. As a consequence, performance deteriorated or there were corrosion problems due to deliquescence of the Lithium Chloride under high temperature and high humidity conditions.

In 1981, to solve this problem, we at Seibu Giken succeeded in developing and commercially producing an aluminum type total heat exchange rotor with excellent total heat exchange performance by means of aluminum sheeting with a solid adsorbent.

At first, granules of silica gel were used as a solid adsorbent, though problems in terms of odor adsorption by silica gel under high temperatures and high humidity condition soon became apparent. In order to overcome this problem, granules of ion exchange resin have been used since 1998.

Thanks to ion exchange resin, a thorough enhancement of indoor air quality has been realized by drastically reducing the problem of odor accumulation or transfer combined with the effects of anti-bacteria and mold effects agents.

The technological accomplishment of the ion exchange resin Hi-Panex-Ion was officially unveiled at ASHRAE and The Society of Heating, Air-Conditioning and Sanitary Engineering of Japan, and was since become widespread not only in domestic but also in current overseas markets.

As mentioned above, we at Seibu Giken conduct relentless research and development programs with the aim of producing systems of the highest quality and performance.

### Adsorption Society of Japan:

The Technical Award in 2004

### Association of Invention:

Award from the chairman of the Patent Attorneys Association in 1999

The award obtained from the above was in recognition of the fact that the production method of Seibu Giken's total heat exchanger was officially patented, and that its development would make a great contribution to energy saving worldwide.

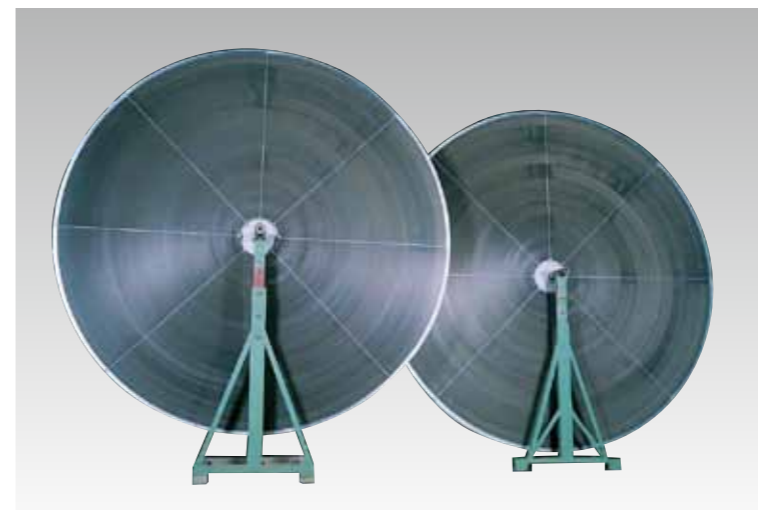
# HI-PANEX-ION Total heat exchange rotor



## Total heat exchange rotor

Material: Aluminum

φ 300~730×60mm  
(φ 12"~29"×2.5")



## Total heat exchange rotor

Material: Aluminum

φ 3,900×200mm (φ 155"×8")



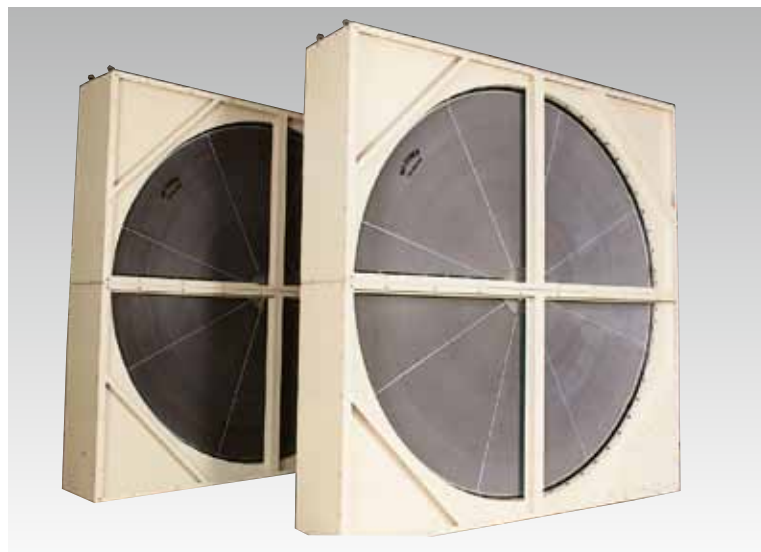
# HI-PANEX-ION

**Total heat exchange cassette**  
Air volume: 500m<sup>3</sup>/h~80,000m<sup>3</sup>/h (300cfm~50,000cfm)



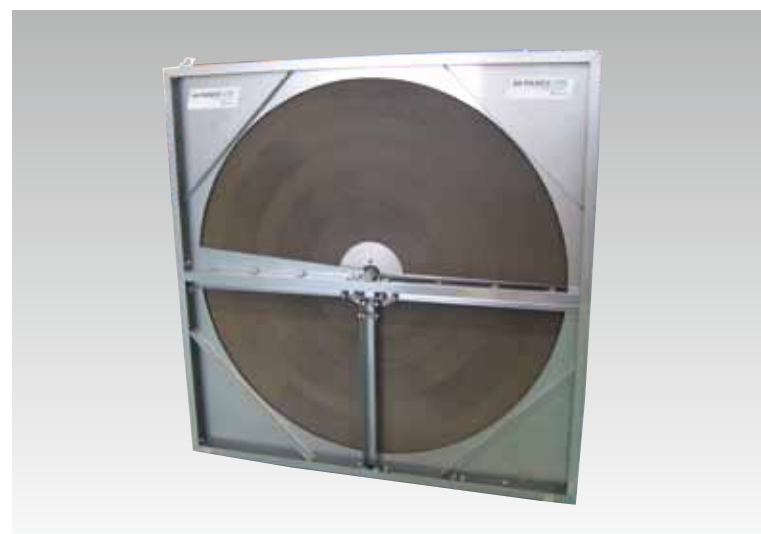
## Total heat exchange cassette

PAC-800T  
PAC-1100T



## Total heat exchange cassette

PAC-2150T



## Total heat exchange cassette Standard type for AHU

PAC-1500T

# HI-PANEX

**Cross flow element for total and sensible heat exchanger**

Material: Flame-proofed paper  
Plastic sheet  
Aluminum sheet  
Stainless steel sheet  
Ceramic paper

Size: Standard size Width 190mm(7.5")  
\*Optional size (60mm/2.5"~500mm/20") is available.  
Please contact our sales department for details.



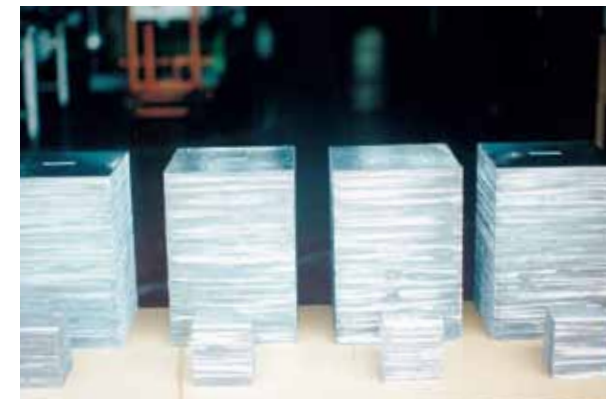
## Cross flow element for sensible heat exchanger

Material: Plastic sheet (Polypropylene)



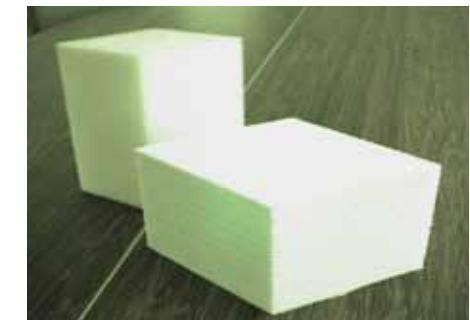
## Cross flow element for total heat exchanger

Material: Flame-proofed paper,  
Flame-proofed paper + Plastic sheet



## Cross flow element for sensible heat exchanger

Material: Aluminium sheet, Stainless steel sheet

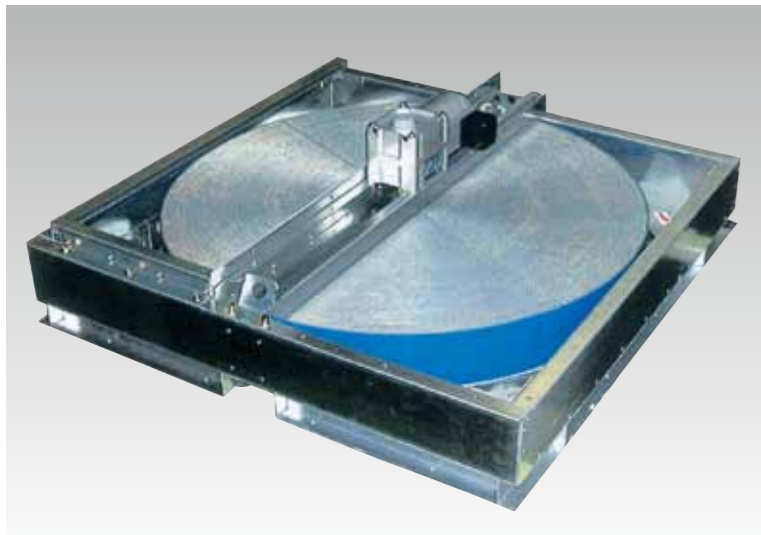


## Cross flow element for total heat exchanger (Diamond-shaped)

Material: Plastic sheet,  
Flame-proofed paper  
+ Plastic sheet

# HI-PANEX-ION

## Small-sized horizontal cassette : HI-PANEX-MINI



### ■Center-drive system

Since the adoption of the center-drive system, the belt is not necessary and maintenance requirements are simplified.

### ■Using the galvanized steel sheet

We use the galvanized steel sheet for the casing.

### ■Compact design

Installation is easy and space can be saved.

### Small-sized horizontal cassette (For total heat exchange)

PAC-450T10~990T10

# HI-PANEX-ION

## Total heat exchange unit

Air volume: 500m<sup>3</sup>/h~80,000m<sup>3</sup>/h (300cfm~50,000cfm)



### Total heat exchange unit

PAU-FP2150T



### Total heat exchange unit

PAU-FP3500T

# HI-PANEX

## Sensible heat exchange cassette (For high temperature reactivation)



### Sensible heat exchange cassette

PSC-2150S

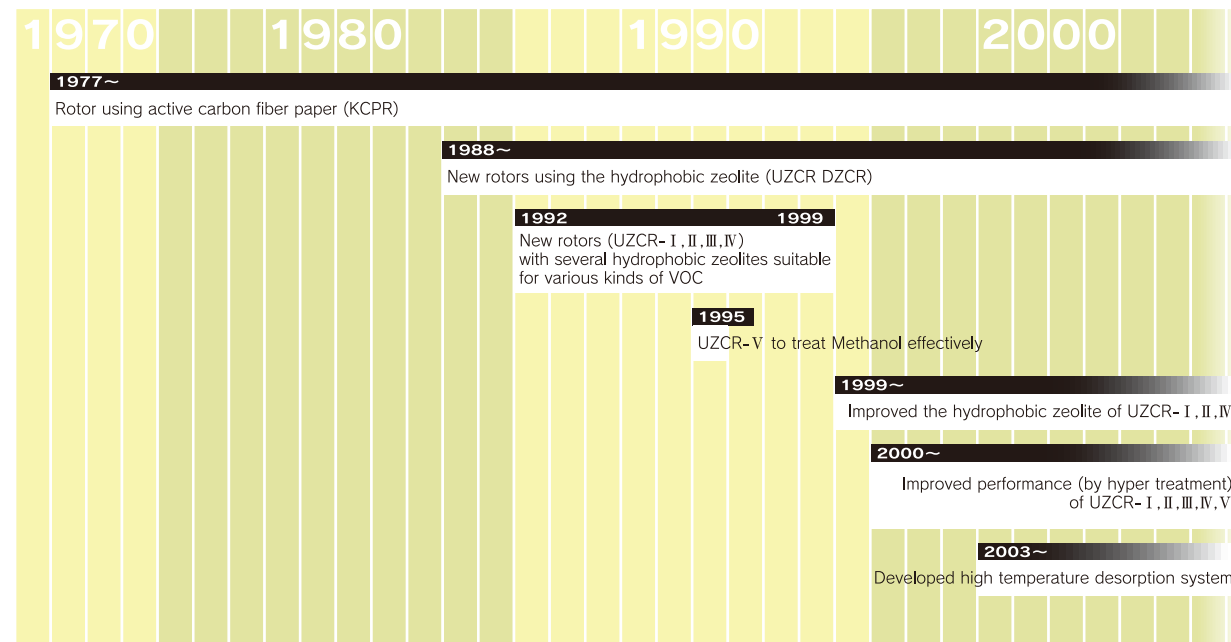
Material: Stainless sheet

### Primary applications

1. Office buildings, Laboratories
2. Schools, Hospitals, Hotels
3. Vessels, Swimming pools
4. Factories, Animal laboratories
5. Green houses, Residences
6. Movie theaters, Single theaters, Multiplex theaters
7. Recreational facilities
8. Sports gymnasiums
9. Restaurants

# PURO-SAVE VOC Concentrator

History of development of VOC concentration rotors



**VOC\* Concentrator "PURO-SAVE" can efficiently remove and concentrate various kinds of mixed VOC(s) & odorous substances exhausted from factories by means of the rotor's honeycomb matrix, in which adsorbents such as hydrophobic zeolites or activated carbons are tightly fixed either singularly or in a mixture with impregnation and burning processes.**

\*VOC=Volatile Organic Compound

**The Technical Award**  
from the Society,  
of Chemical Engineers in 1994

**"Gas continuation refining equipment with honeycomb layered adsorbent"**

With this technology, a honeycomb laminate being hygienically safe and being less of a fire risk, is developed by using an inorganic fiber (e.g. ceramics, etc.).Silica gel, having high adsorbability for moisture, or hydrophobic zeolite having high adsorbability for solvents is then chemically synthesized or impregnated into the fiber with an inorganic binder.By using these honeycomb laminates, the continuous operation type air dryer and VOC concentrator were developed and garnered impressive sales records and references from experts in the field.(Quoted from an extract from the letter of recommendation from the Society of Chemical Engineers)

Discussion about global environmental issues began around 1988 in Japan, but air pollution caused by VOC(s) was of global concern much earlier. Crops around Los Angeles in the US were blighted in 1944 with NOx and VOC(s) being specified as the cause six years later. After that, VOC(s) were regarded as a problem in Europe as well, and legislation to regulate VOC emission was requested by an EEC order in 1976. Since VOC regulation was officially legislated in 1984, the movement to regulate VOC emission has been spreading throughout the world, with regulation becoming stricter year by year. We at Seibu Giken developed the technology to manufacture the VOC concentration rotor and block by forming active carbon fiber paper into a honeycomb shape in 1977. With this technology, the present VOC purifying system removing and concentrating VOC(s) from exhausted gas with large gas volume but low VOC concentration, and delivering the concentrated gas to an incinerator could be realized. However, cases in which the carbon fiber paper rotor could not readily be adopted increased due to the diversification of the demand for VOC purification and the necessity of extinguishing equipment as a precaution against the carbon catching fire. In order to solve this problem, we succeeded in developing the VOC concentration rotor "UZCR" in 1988. Special synthesized zeolite (hydrophobic zeolite) possessing a molecular-sieving effect was impregnated into the honeycomb shaped ceramic substrate. Since UZCR is only made from inorganic materials, its temperature resistance is very high and, therefore, the possibility of using the VOC concentration rotor in various circumstances was drastically enhanced. Moreover, we had been seeking to diversify the rotors since 1992 in order to treat a greater variety VOCs by combining different types of zeolite with respective adsorbabilities. In 1995, we developed UZCR-V, capable of removing Methanol which had been considered very difficult to be removed with a zeolite type adsorbent. In 2000, we succeeded in improving the performance of UZCR by optimizing the production processes as well as the base materials, and in the following year we also succeeded in having all the rotors upgraded the better performance. While regulations for VOC emissions in Japan like PRTR (Pollutant Release Transfer Register) law and/or bylaws of local government have become increasingly stricter in recent years, we at Seibu Giken are constant in our endeavor to realize higher performance and longer life for products by developing a catalyst rotor and high temperature reactivation system. With these innovations we expect to be able to meet the demands of global market in the future.

# PURO-SAVE VOC concentration rotor/block



## VOC concentration rotor

UZR-3550V40  
φ 3,550×400mm(φ 140"× 16")



## VOC concentration block

UZCB (800×234×254mm)  
(30"×9"×10")

KCPB (700×234×254mm)  
(28"×9"×10")

UZCB: Zeolite honeycomb laminate block

KCPB: Honeycomb adsorption block consisting of active carbon fiber paper

※ The rotor as a single component may not be sold except in cases of replacement.



**VOC concentration cassette**

UZC-3550V45



**VOC concentration cassette**

UZC-3550V45



**VOC concentration cassette**

UZC-3950V45×3



**VOC concentration unit**

UZU-2950V40

Air flow volume:33,000m<sup>3</sup>/h (19,500cfm)  
VOCs:IPA, Acetone  
Installation: Semiconductor factory



**VOC concentration unit**

UZU-3550V40

Air flow volume:59,000m<sup>3</sup>/h (35,000cfm)  
VOCs:Toluene, Ethyl acetate, MEK,IPA etc.  
Installation: Printing factory



**VOC abatement system including thermal oxidizer & concentration cassette**

UZC-3550V45

Air flow volume:58,000m<sup>3</sup>/h (34,000cfm)  
VOCs:IPA, acetone etc.  
Installation: Semiconductor factory(Taiwan R.O.C)

**Primary applications**

1. Painting booth(Automobile/Airplane/Furniture)
2. Chemical, Printing factories (Photo gravure)
3. Semiconductor factories (DRAM/LCD etc)
4. Sticky tape/Magnetic tape manufacturers
5. Synthetic resin adhesive manufacturers

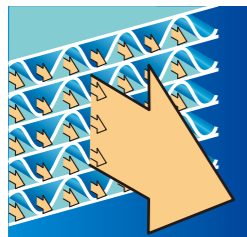
# HONEY-SAVE Functional Honeycomb Element

	AS-20	AS-22	AS-24	AS-26	AS-31	AS-42	AS-50	AS-63	AS-70	AS-85	
P	2.0	2.2	2.6	2.6	3.4	4.2	5.2	6.4	7.2	9.0	mm
H	0.85	0.95	1.10	1.40	1.90	2.50	3.00	3.50	4.50	5.20	mm
SurfaceArea	5,400	4,800	4,200	3,500	2,400	2,000	1,700	1,400	1,100	900	m <sup>2</sup> /m <sup>3</sup>
No. of cell	750	600	450	350	200	120	80	60	40	30	Cell/Inch

Note) Each number is for reference. Since there are cases in which the number changes according to materials used, please contact our sales department for details.

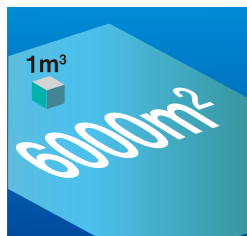
We at Seibu Giken possess the technology to form various kinds of functional materials into a honeycomb shape. According to the demands of the actual circumstances of application, the most suitable material is selected from ceramic paper, glass fiber paper, active carbon paper, optical catalyst paper, metal sheets, polypropylene film and others, and is then assembled into the honeycomb. We have also established the technology to continuously and effectively impregnate such powders as catalysts, adsorbents deodorants and so on into the honeycomb. Any size can be produced from mini to gigantic. Any shape, such as rotor, block, cross-flow type block, diagonal, non-rectangular, cylindrical and so on can also be formed into the honeycomb structure. By virtue our technology and unparalleled Know-how, we can therefore fully realize your needs.

## Merits of the honeycomb structure



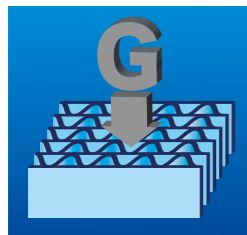
### Extremely low pressure loss

There are many small openings in the honeycomb. Therefore, air can pass through very smoothly without undue pressure loss, thereby keeping energy consumption to a minimum.



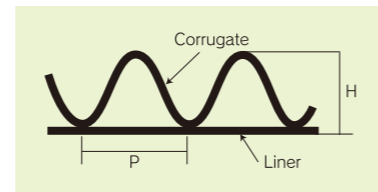
### Extremely large surface area

With the special structure of laminated layers consisting of flat and corrugated materials, the surface area to be placed in direct contact with the air is greatly enlarged. Therefore, the unit's performance capacity can be maximized according to the space available.



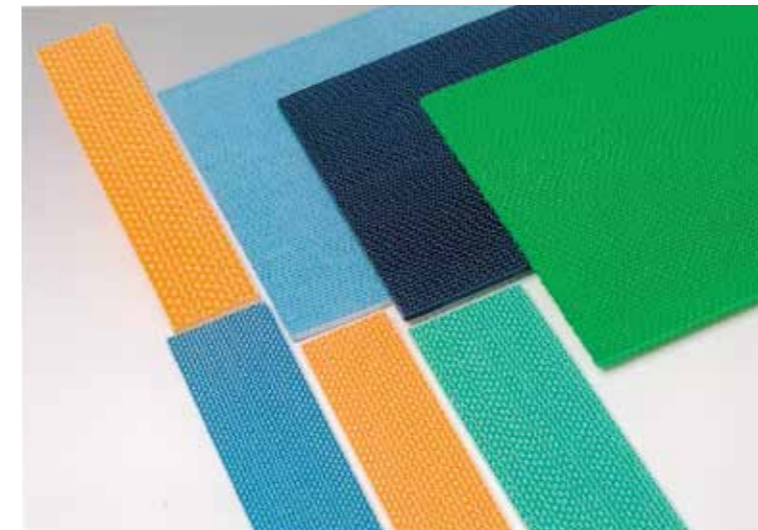
### Light, yet strong

The combined structure with the corrugated material inserted between the flat materials is very light but physically very strong and highly durable.



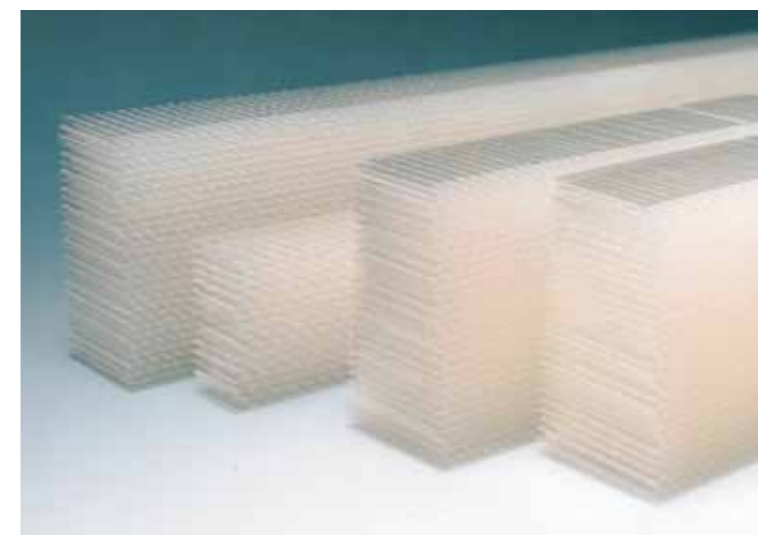
## Ozone decomposing element

For photocopy machines, printers  
Material: Carbon paper



## Deodorizing filter

For air purifiers, air conditioners  
Material: Various papers



## Air straightener

For open type show cases  
Material: Polypropylene

Note) The above products are just OEM samples. We will be able to process honeycomb shape with materials provided by the suppliers.