

Energy-Saving Air Conditioning System

# Earthclean<sup>®</sup> Air Conditioning Desiccant



Earth Clean Tohoku CO., LTD

# Desiccant Air Conditioning System

Humidity control is the focal point behind saving energy in air conditioners.

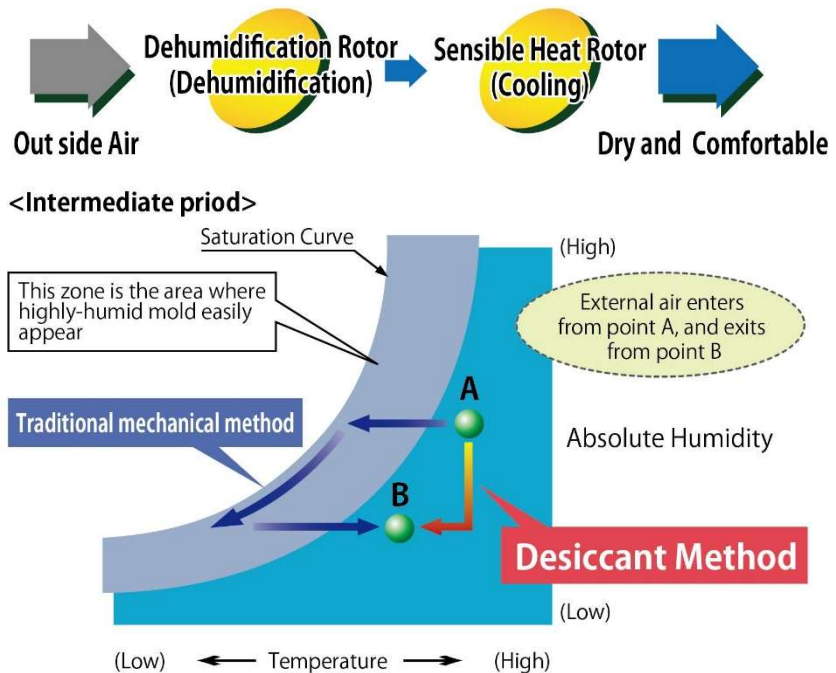
In a traditional air conditioning systems utilizing refrigerators or cold water, in order to lower humidity after chilling the air, a method to re-heat to the specified temperature was employed.

However, in addition to this method wasting energy, it was not flexible in supporting outside conditions.

In contrast, a desiccant air conditioning system, which can separately control temperature and humidity, exhibits incredibly high energy-efficiency by employing a method to chill to a specified temperature by directly removing the moisture in the air using a dehumidifying rotor coated with desiccant, and afterwards exchanging heat by using a sensible heat rotor.

In addition, due to being flexible in accommodating to any changes in outside conditions and appropriately control the internal air, it is optimal for any environments that require large-volume incorporation of outside air or strict dehumidification controls.

## Basic Principles of the Desiccant Air Conditioning Unit



## Features and Merits

### 1 Does not require excessive cooling and reheating

Unlike traditional air conditioning methods, there is no need to reheat to the specified temperature after reaching the target humidity by excessive cooling, thus resulting in saving excess energy.

### 2 Utilizes dry air for optimum comfort, even if cooling temperature settings are high

For cooling type air conditioners, the simultaneous control of both heat (temperature) and humidity is important. Low humidity (dry) air will improve the comfort level even at the same temperatures, as well as requiring less energy.

### 3 Controls indoor air contaminants through 100% ventilation

Possible to ventilate up to 100% while keeping comfortable humidity. In addition to suppressing floating bacteria and mold, our system controls VOC (volatile organic compound) or sick - building syndrome.

### 4 Reduce auxiliary air conditioning system facilities and operation costs

The moisture removal rate of desiccant air conditioning units are 3 times of that of traditional ones. Reduce both energy costs and required refrigerating capabilities, as well as contributing to improved efficiency by using alongside other air conditioning systems.

### 5 Can utilize exhaust heat as a source of recycled heat for dehumidification rotor

Cogeneration system as a source of recycled heat for dehumidification rotor  
- Can utilize exhaust heat such as cogeneration system, GHP (gas heating pump) and excessive steam.  
Can get further energy saving effects.

### 6 Environmentally Friendly Air Conditioning System

Does not utilize refrigerants, and therefore it is non-Freon. Can be utilized in combination with traditional air conditioning units for less-Freon air conditioner. The utilized heat source for recycling is gas, and the exhaust heat can be also used, thereby contributing to reduced CO<sub>2</sub> emissions.

# Highly efficient and high performance air conditioning unit born from a new desiccant called "Sponge Like Titanium Oxide Desiccant"

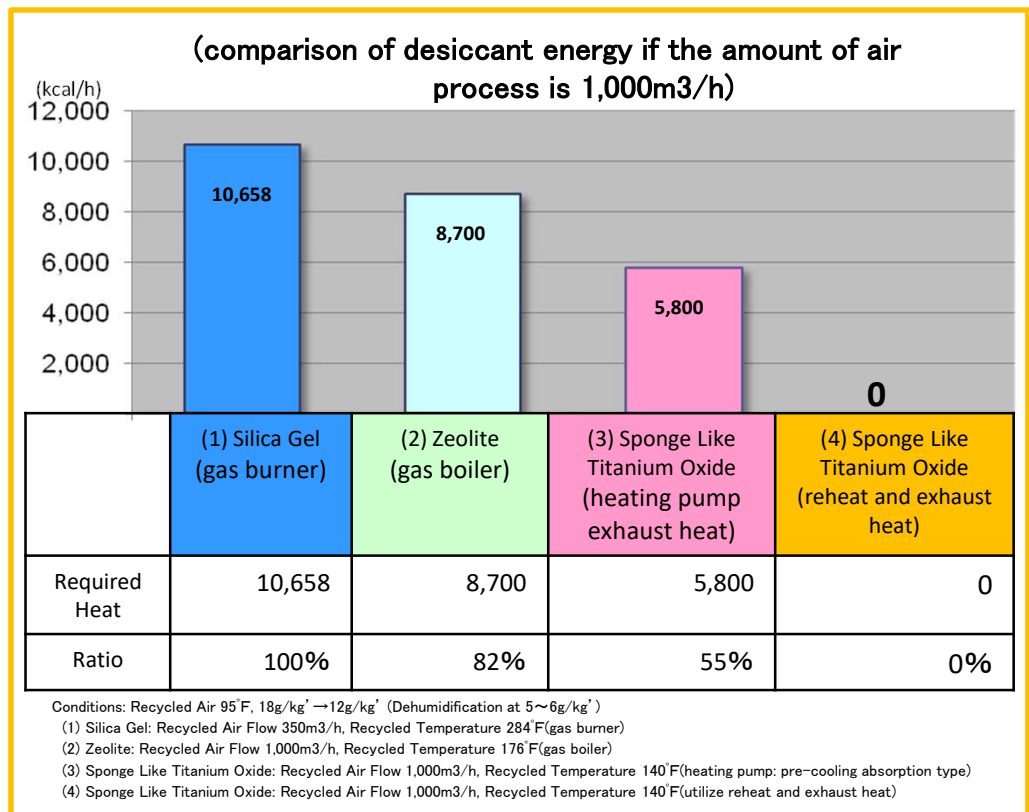
Successful in developing a highly efficient desiccant

(Sponge Like Titanium Oxide) (patented) through nano-technology

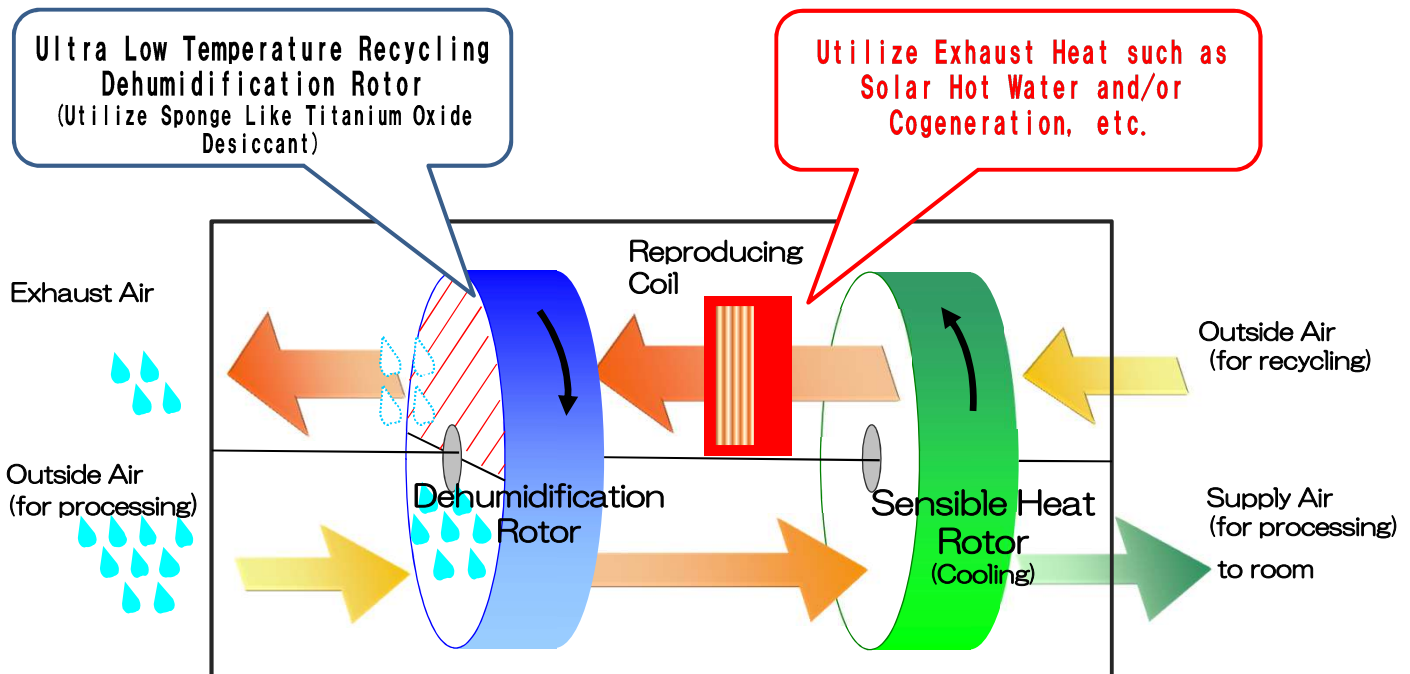
Cooperative Research between Miyagi Prefecture and Specially Appointed Professor Uchida from the College of Liberal Arts and Sciences, University of Tokyo

- (1) Exhibit Highly Efficient Moisture Absorption/Desorption Properties in Room Temperature
- (2) Realize a highly energy saving and high-quality dehumidification air conditioning ventilation system

Use renewable energy such as exhaust heat (around 122° F) and solar water heater by realizing ultra-low temperature recycling through highly efficient desiccants.  
(contribute to energy saving, promote the use of natural energy, and prevent global warming)



## Image of System



# IAQ (indoor air quality) Conditions met by Desiccant Air Conditioning

## -Exhibits Results in a Wide Variety of Uses-

IAQ is made of the following factors: (1) cooling, (2) heating, (3) ventilation, (4) dehumidification, (5) humidification, (6) dust removal, (7) odor removal, (8) bacteria removal, etc. Ventilation methods by humidity control of the desiccant air conditioner will solve the issues generated due to these factors not being at optimal levels. Provide an optimal IAQ for various facilities or building used in a variety of purposes.

Use	Merit	IAQ conditions met by the use of desiccant air conditioning							
		Cooling	Heating	Ventilation	Dehumidification	Humidification	Bacteria removal	Dust Removal	Odor Removal
Supermarket	<ul style="list-style-type: none"> <li>●Condensation Suppression of Products and Display Cases</li> <li>●Energy saving of Freezer and Refrigerator Display Cases</li> <li>●Resolve Cold Aisle</li> </ul>	-	●	●	●	-	-	●	●
Food Processing Factory	<ul style="list-style-type: none"> <li>●Energy saving by System Discontinuation of Ultra Cooling and Reheating</li> <li>●Maintain Low Humidity to Improve Productivity</li> <li>●Contribute to HACCP by realizing Dry Kitchen</li> <li>●Condensation and Mold Suppression by Humidity Management</li> </ul>	-	●	●	●	-	●	●	●
Production Factory	<ul style="list-style-type: none"> <li>●Energy saving by System Discontinuation of Ultra Cooling and Reheating</li> </ul>	●	●	●	●	-	-	-	-
Nursing Home	<ul style="list-style-type: none"> <li>●Comfortable Environment without Ultra Cooling</li> <li>●Suppress Odors and Sterilization Effects</li> </ul>		●	●	●	●	●	-	●
Movie Theater or Theater	<ul style="list-style-type: none"> <li>●Comfortable Environment without Ultra Cooling</li> <li>●Process Latent Heat generating Indoors</li> </ul>	●	●	●	●	-	-	-	●
Indoor Playground	<ul style="list-style-type: none"> <li>●Appropriate Humidity Processing in regards to Large Volume Ventilation</li> <li>●Process Latent Heat generating Indoors</li> </ul>	●	●	●	●	-	-	-	●
Restaurant	<ul style="list-style-type: none"> <li>●Comfortable Environment by Humidity Management</li> <li>●Utilize Fresh Clean outside Air</li> </ul>	●	●	●	●	-	-	-	●
Pool and Public Bath House	<ul style="list-style-type: none"> <li>●Process Latent Heat generating Indoors</li> <li>●Condensation and Mold Suppression</li> </ul>	-	●	●	●	-	-	●	

## Unit Specifications

### ●Cogeneration, Desiccant Specifications

Model Type	Flow Rate (m3/h)	Motor (kW)		External Dimensions (L×W×H) mm	Weight (kg)
		Process-Side	Recycle-Side		
DC2-35H	3,500	2.2	1.5	3,630×1,550×1,650	1,950
DC2-60H	6,000	3.7	3.7	3,630×1,660×1,940	2,350
DC2-75H	7,500	5.5	3.7	3,810×1,990×2,130	2,850
DC2-90H	9,000	5.5	3.7	3,810×1,990×2,130	2,900
DC2-105H	10,500	7.5	5.5	4,000×2,160×2,240	3,400
DC2-120H	12,000	11	5.5	4,000×2,160×2,240	3,500
DC2-140H	14,000	11	5.5	4,250×2,330×2,500	4,150
DC2-170H	17,000	15	11	4,250×2,330×2,500	4,700

### ●Gas Powered Hot Water Boiler, Desiccant Specifications

Model Type	Flow Rate (m3/h)	Motor (kW)		External Dimensions (L×W×H) mm	Weight (kg)
		Process-Side	Recycle-Side		
DC2-60G	6,000	3.7	3.7	4,100×1,780×1,950	3,600
DC2-75G	7,500	5.5	3.7	4,340×2,140×2,140	4,500
DC2-90G	9,000	5.5	3.7	4,390×2,140×2,140	4,500
DC2-105G	10,500	7.5	5.5	4,480×2,330×2,250	4,800
DC2-120G	12,000	11	5.5	4,480×2,330×2,250	4,800
DC2-140G	14,000	11	5.5	4,630×2,330×2,650	5,400
DC2-170G	17,000	15	11	4,780×2,330×2,650	5,500

Note: 1. External static pressure is 600Pa at the process-side, and 200Pa at the recycling side (however, 500Pa at the process-side for DC2-60H and DC2-75H)  
 2. This catalog is based on the information present as of November 20th, 2012.  
 3. Specifications are subject to change for improvement without notice.



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