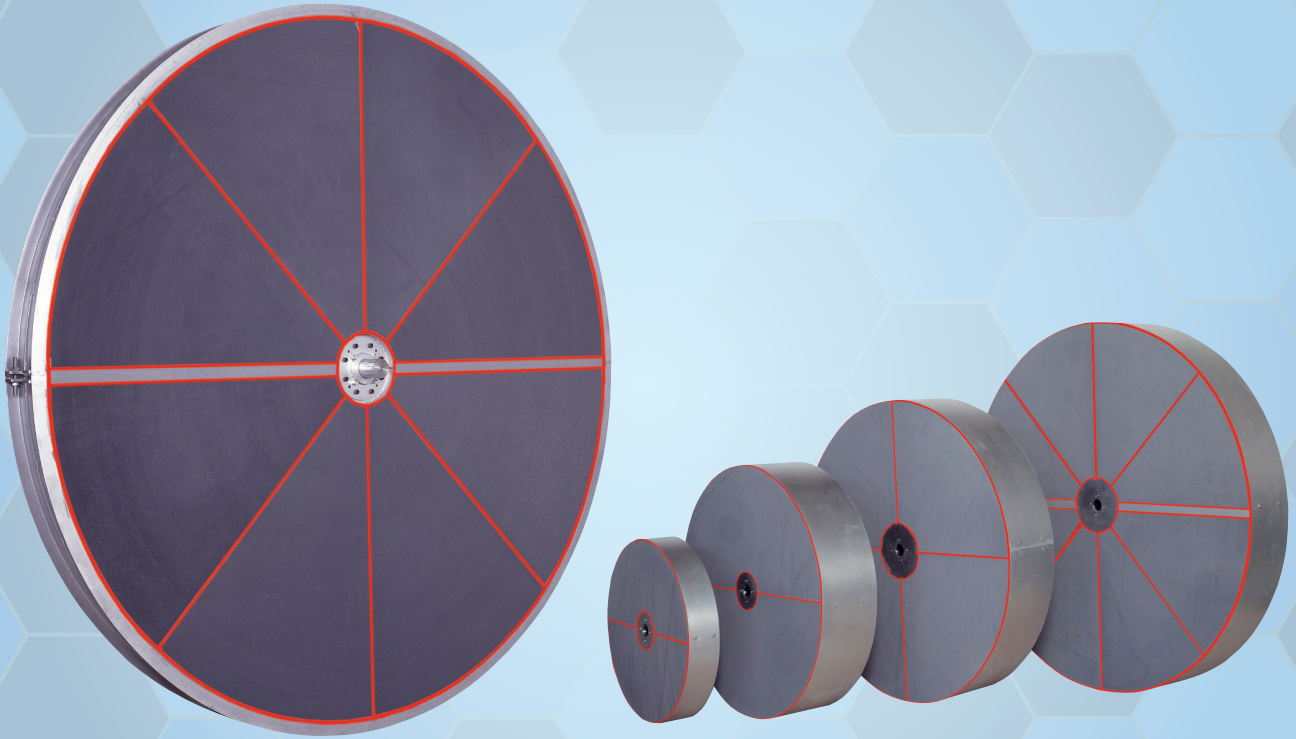


TOMBO™ BRAND

Mar. 2025

Industrial desiccant rotor

HONEYCLE™ desiccant

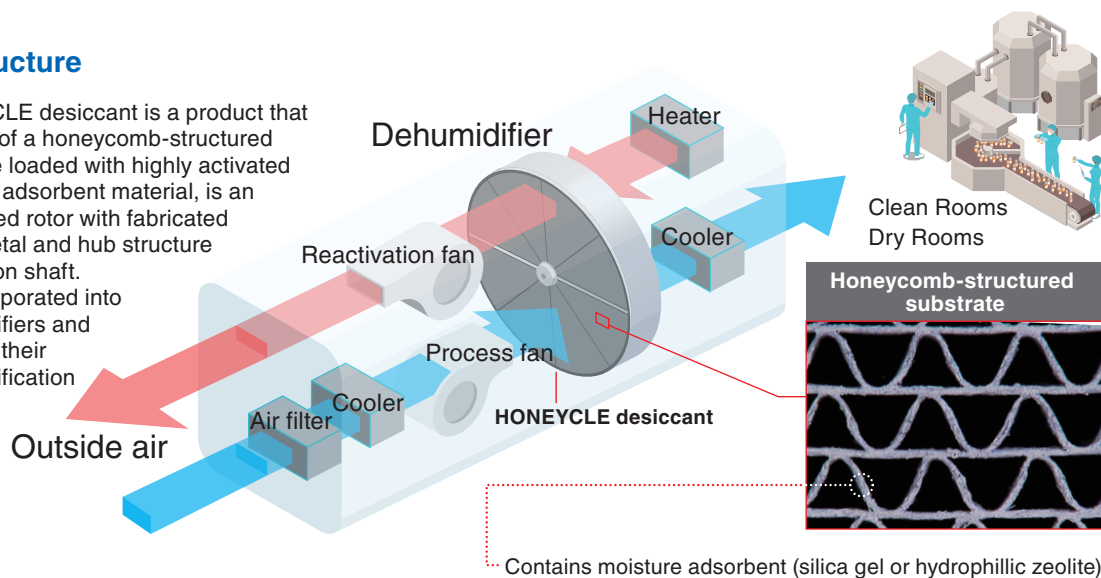


Outline

In recent years, humidity control has become indispensable in a variety of industrial fields, such as, pharmaceutical production, food process, chemical industry, semiconductor production process, and lithium-ion battery production, because of the quality problems that moisture in the air can cause. Dehumidification methods for controlling and managing moisture include desiccant dehumidification, which uses moisture adsorbents, and dehumidification by condensation, which reduces moisture under overcooled condition. We have been supplying the market with honeycomb rotors for dehumidification (hereinafter referred to as HONEYCLE desiccant) for many years.

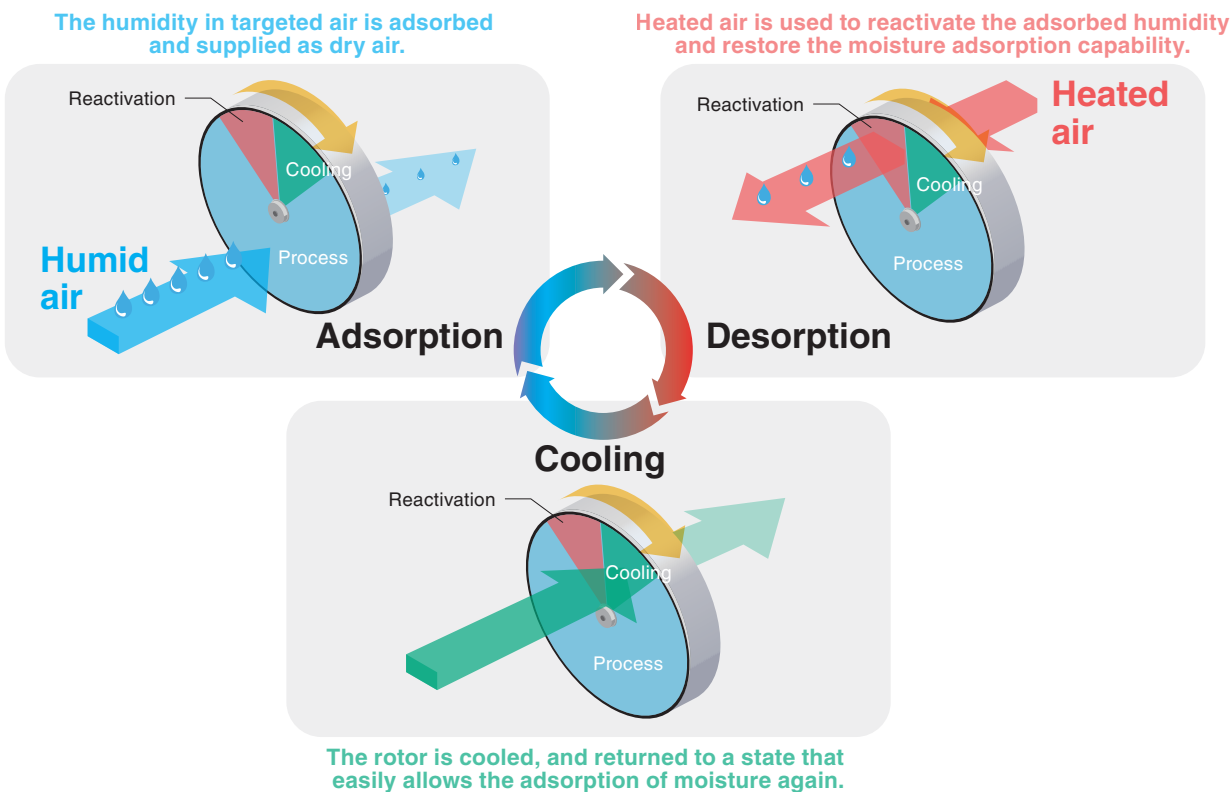
Structure

HONEYCLE desiccant is a product that consists of a honeycomb-structured substrate loaded with highly activated moisture adsorbent material, is an assembled rotor with fabricated sheet metal and hub structure for rotation shaft. It is incorporated into dehumidifiers and provides their dehumidification function.



Basic mechanism

HONEYCLE desiccant rotor is used in the devices with heat-resistant seals that are divided into either (A) a process zone and a reactivation zone, or (B) a process zone, a cooling zone, and a reactivation zone. Dehumidification (adsorption) and reactivation (desorption) are performed by rotation at the optimal speed as determined by the condition of the air, making it possible to supply a dry air continuously.



Features

01

Possible to process a larger airflow volume

Thanks to honeycomb structure, adsorbent has a low pressure loss (= air flow resistance) and can dehumidify a large airflow volumes with less power for airflow.

02

Possible to dehumidify a low temperature process air

In comparison with compressor dehumidification, HONEYCLE desiccant can consistently dehumidify the moisture under low temperature environments without loss of dehumidification performance.

03

Easy maintenance

The desiccant rotor unit is a simple structure and is easy to maintain it.

04

Long life

Every product in this lineup utilizes material with excellent water and heat resistance to ensure a long lifespan.

Product lineup

	AC-SG/EX-SG	MS-D	DH
Application	<ul style="list-style-type: none"> Relatively high-humidity air conditions in lithium-ion battery plants, office buildings, chemicals, food, and pharmaceutical plants. Suitable for semiconductor factory, Li-ion battery factory, and others for low dew point. 	<ul style="list-style-type: none"> Suitable for plastic-molding process (hopper dryers). Drying for high temperature air. 	<ul style="list-style-type: none"> Suitable for semiconductor factory, Li-ion battery factory, and others for low dew point.
Moisture adsorbent	Silica gel	Hydrophilic zeolite	Silica gel + hydrophilic zeolite
Features	<ul style="list-style-type: none"> <u>High adsorption capacity</u>, ideal for high humidity. <u>Low-temperature reactivation</u> is possible. Dehumidifying performance tends to decrease at higher temperatures. 	<ul style="list-style-type: none"> Available consistent adsorption in <u>high temperature, low humidity air</u>. Low adsorption capacity, unsuitable for more humid air. Performance hardly degrades even under circulated air conditions. 	<ul style="list-style-type: none"> Dehumidification at <u>ultra-low dew points</u> is achieved using rotors in series (silica gel for the first stage and zeolite for the second stage).
Maximum reactivation temperature	140°C	180°C	180°C

Application



LiB production



Pharmaceutical production



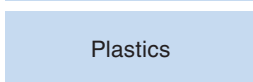
Data centers



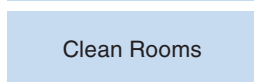
Paint booth (automotive)



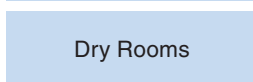
Food process



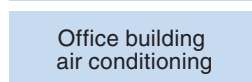
Plastics



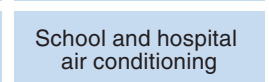
Clean Rooms



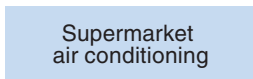
Dry Rooms



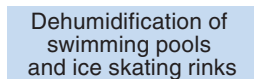
Office building air conditioning



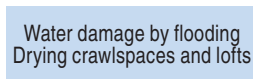
School and hospital air conditioning



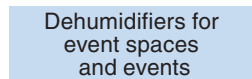
Supermarket air conditioning



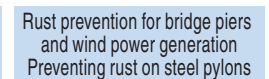
Dehumidification of swimming pools and ice skating rinks



Water damage by flooding Drying crawlspaces and lofts



Dehumidifiers for event spaces and events



Rust prevention for bridge piers and wind power generation Preventing rust on steel pylons

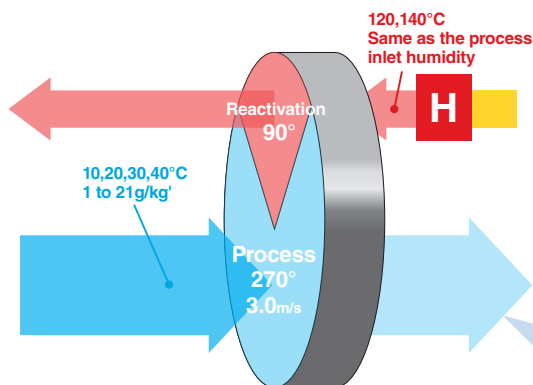
Examples of dehumidification performance using HONEYCLE™ desiccant industrial dehumidification rotor

*These are not a guaranteed value but is a typical values for reference.

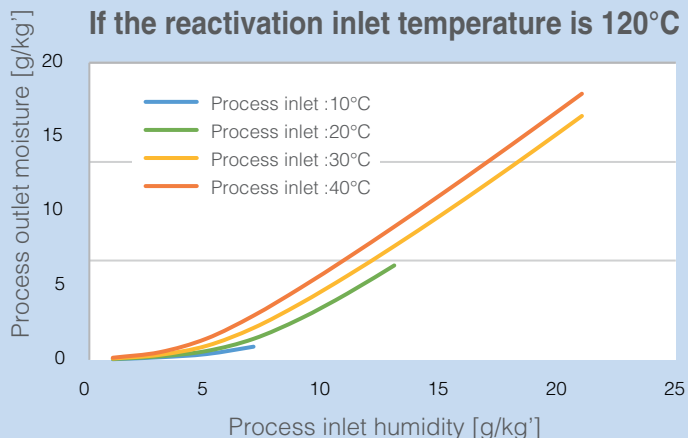
Commercial and general industrial applications (office buildings, supermarkets, schools, manufacturing facilities, etc.)

EX-SG

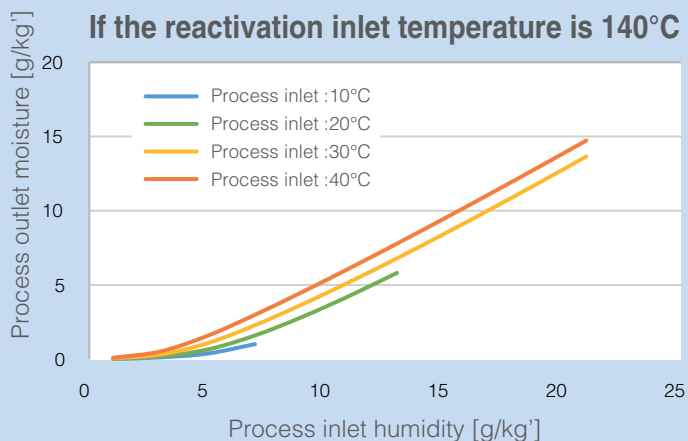
Thickness: 200 mm
Airflow ratio
(process : reactivation) = 3:1



If the reactivation inlet temperature is 120°C



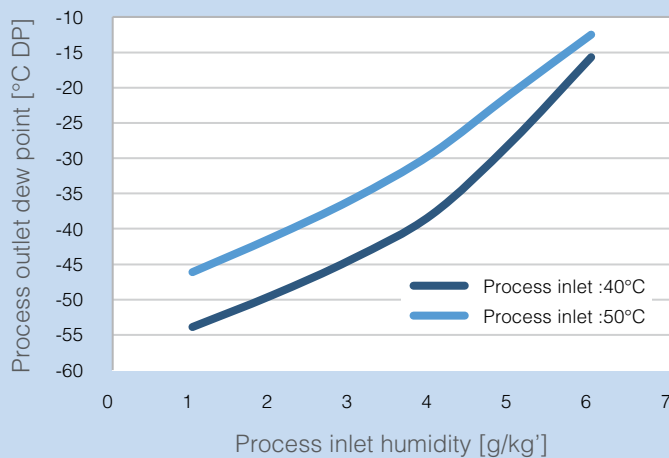
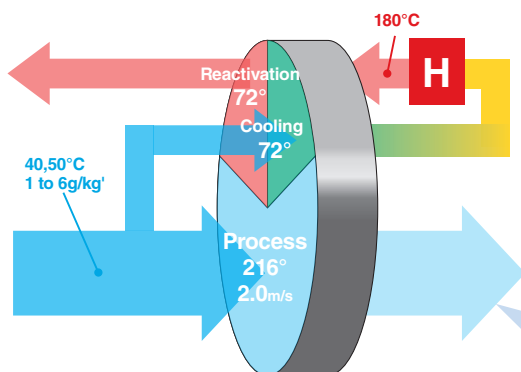
If the reactivation inlet temperature is 140°C



Application when process inlet temperature is higher.

MS-D

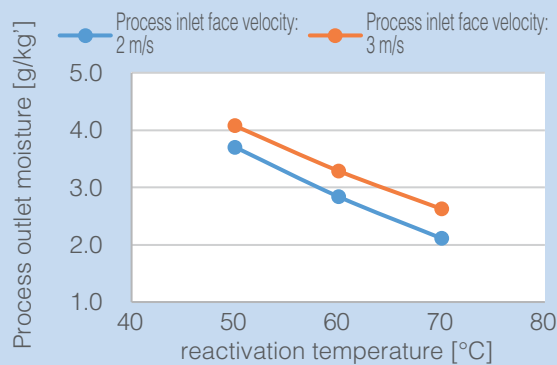
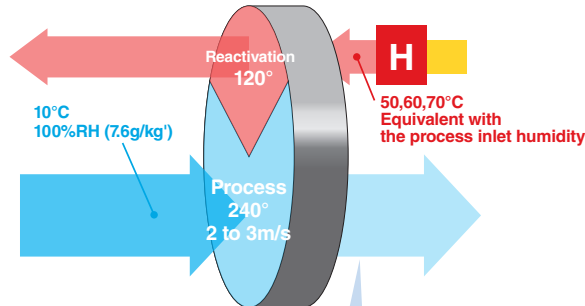
Depth: 400 mm
Airflow ratio
(process : reactivation) = 3:1



Applications involving low-temperature reactivation, such as those utilizing waste heat

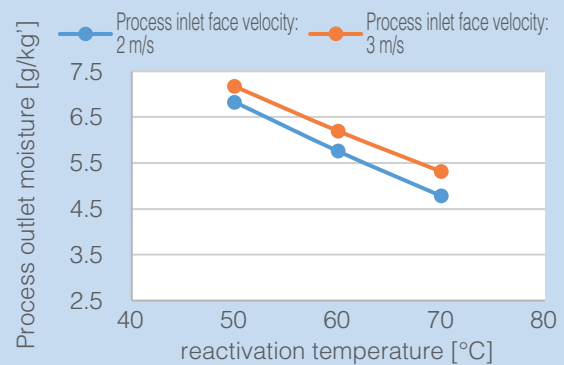
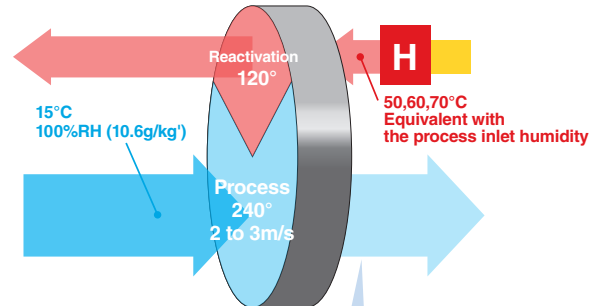
EX-SG

Depth: 200 mm
Airflow ratio
(process : reactivation) = 2:1



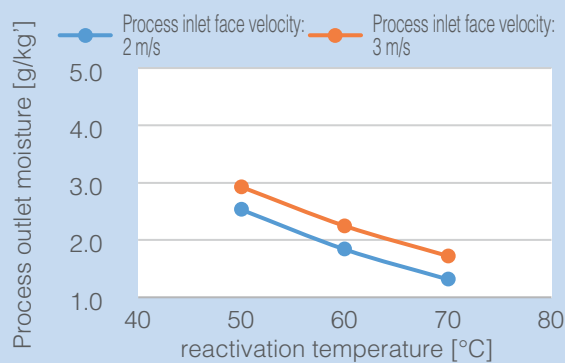
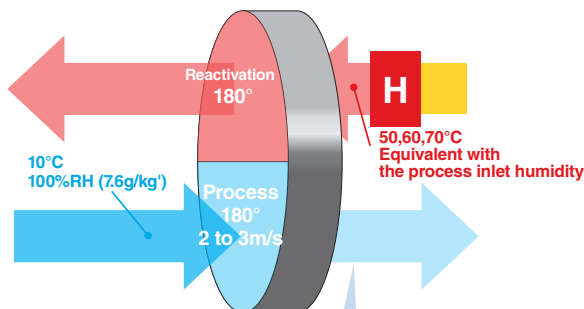
EX-SG

Depth: 200 mm
Airflow ratio
(process : reactivation) = 2:1



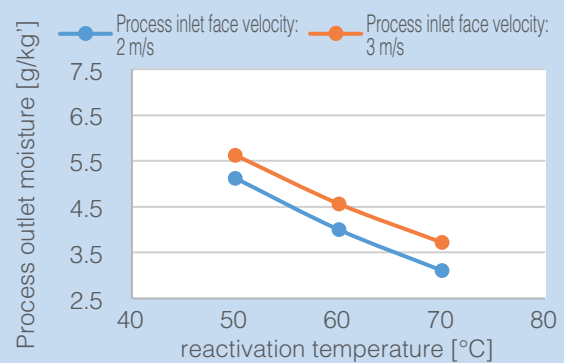
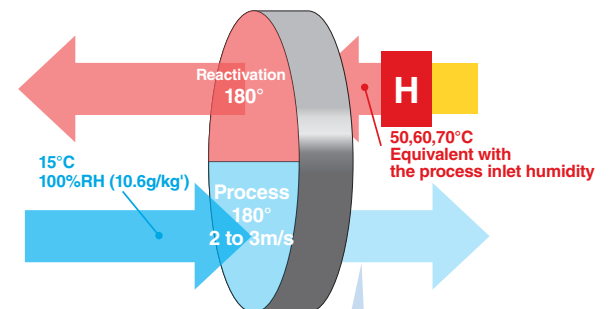
EX-SG

Depth: 200 mm
Airflow ratio
(process : reactivation) = 1:1



EX-SG

Depth: 200 mm
Airflow ratio
(process : reactivation) = 1:1



Low dew point application in LiB production process

Point 1

Minimize the fan capacity to save energy

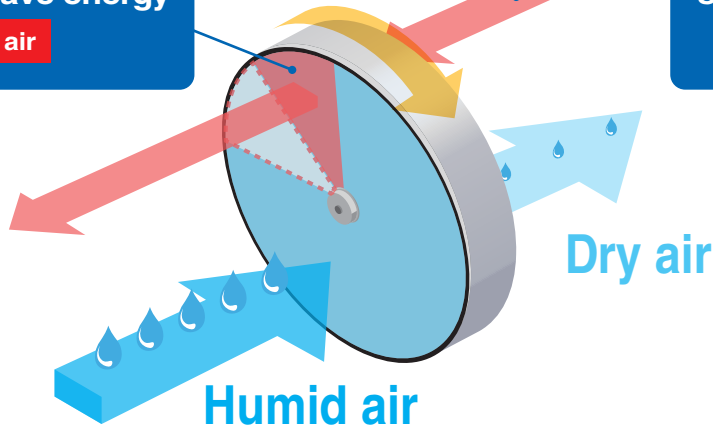
Less hot air

Heated air

Point 2

Boiler free design to save energy

140°C → 90°C



Stage 1 rotor

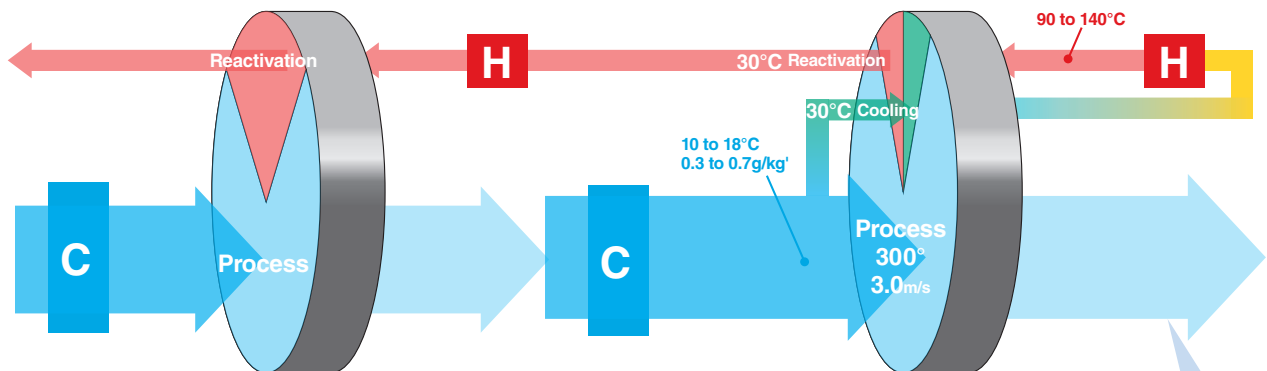
Stage 2 rotor

EX-SG

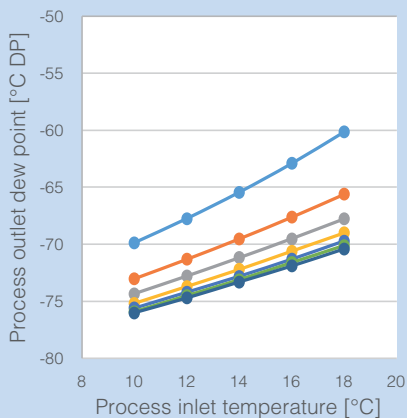
Depth: 400 mm

Airflow ratio

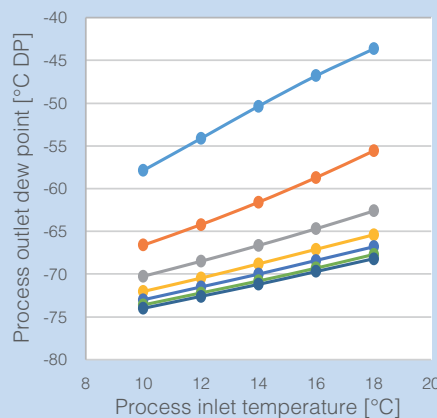
(process : reactivation) = 10:1



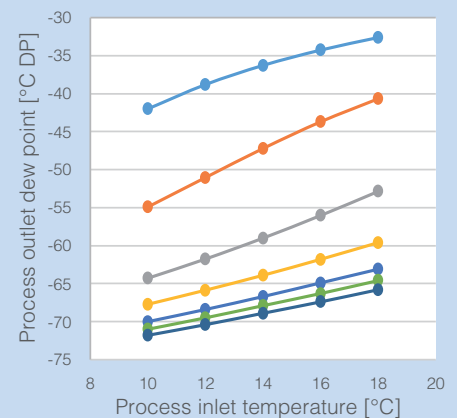
Process inlet moisture 0.3g/kg'



Process inlet moisture 0.5g/kg'



Process inlet moisture 0.7g/kg'



Typical Example — 80°C reactivation — 90°C reactivation — 100°C reactivation — 110°C reactivation — 120°C reactivation — 130°C reactivation — 140°C reactivation

Product type

Product type notation

NR (1) - (2) - (3) - (4)

(1)

■ Difference in rotor hub structure

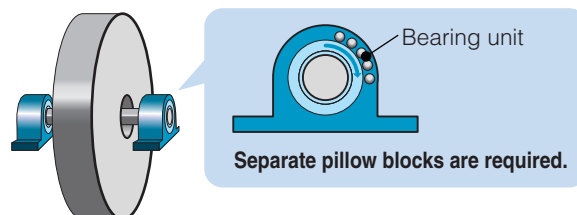
Type A: No bearing

Type B: Internal bearing

Type

A

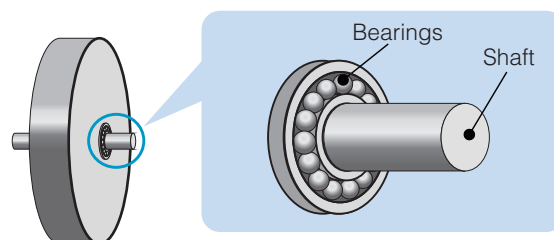
Rotor specifications without internal bearings



Type

B

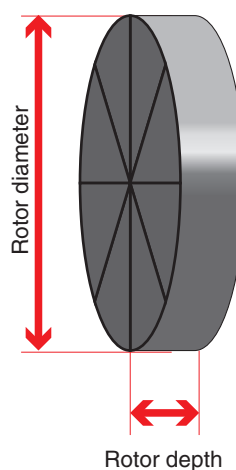
Rotor specifications with internal bearings



(2)

■ Rotor diameter [mm]

250	1525
370	1650
440	1740
550	1940
770	2190
965	2450
1050	2650
1220	2950
1370	



(3)

■ Rotor depth [mm]

200
300
400

(4)

■ Rotor type

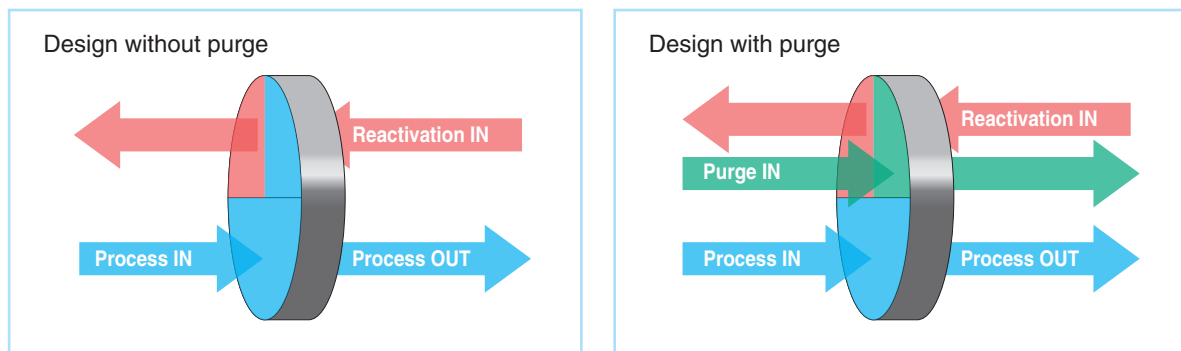
AC-SG
EX-SG
MS-D
DH

HONEYCLE desiccant rotor inquiry sheet

This inquiry sheet provides the necessary information to determine HONEYCLE desiccant specifications. Please show us the possible design condition. Design flow sheets are also available by design program. If you need it, please give us the following air conditions.

Company name			
Department name		Name of contact	
Telephone	() -	FAX	() -
Name of company for delivery			
Territory for delivery	/ (Examples: Kanagawa Prefecture, Japan; Shanghai, China)		
Application	(Examples: air conditioning for lithium-ion battery manufacturing process; office building air conditioning)		

Required air conditions to design a dehumidification rotor



Zone Angle	Process	°
	Reactivation	°
	Purge	°

Process IN	Airflow volume	<input type="checkbox"/> CMH <input type="checkbox"/> CFM
	Temperature	<input type="checkbox"/> °C <input type="checkbox"/> °F
	Humidity	<input type="checkbox"/> g/kg' <input type="checkbox"/> %RH <input type="checkbox"/> dp°C

Reactivation IN	Airflow volume	<input type="checkbox"/> CMH <input type="checkbox"/> CFM
	Temperature	<input type="checkbox"/> °C <input type="checkbox"/> °F
	Humidity	<input type="checkbox"/> g/kg' <input type="checkbox"/> %RH <input type="checkbox"/> dp°C

Purge IN	Airflow volume	<input type="checkbox"/> CMH <input type="checkbox"/> CFM
	Temperature	<input type="checkbox"/> °C <input type="checkbox"/> °F
	Humidity	<input type="checkbox"/> g/kg' <input type="checkbox"/> %RH <input type="checkbox"/> dp°C

Process OUT	Humidity	<input type="checkbox"/> g/kg' <input type="checkbox"/> %RH <input type="checkbox"/> dp°C
-------------	----------	---

Contribute to the earth's bright future through our **TATSU-TAMOTSU™** (Insulation and Protection) technologies.

The NICHIAS Group started in 1896 as a pioneer in the field of temperature control and thermal insulation. Over our 120-year history, we've expanded our activities from basic industries such as electric power, gas, oil refining and petrochemicals, chemicals, shipbuilding, steel, automobiles, and construction to electronics, environment-related industries, and other industrial fields.

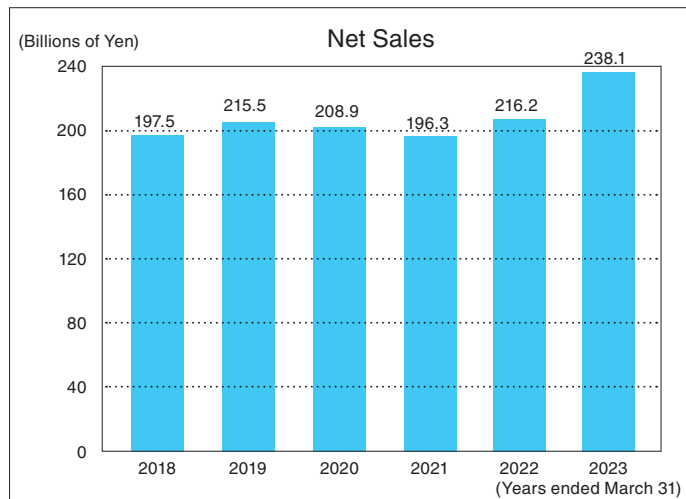
We shall continue to contribute to the earth's bright future through our TATSU-TAMOTSU (Insulation and Protection) technologies.



■ Outline (As of March 31, 2023)

Corporate name	NICHIAS Corporation
Founded	April 9, 1896
Head Office	6-1, Hatchobori 1-Chome, Chuo-ku, Tokyo 104-8555, Japan
Capital	12,128 million yen
Employees	6,445

Consolidated Sales Performance



Group companies in Japan

■ Sales & Construction companies

NICHIAS CERATECH CO., LTD.

Manufacture and sale of insulation materials and building materials

TOKYO MATERIALS CORPORATION

Sale of fluoropolymer products

NICHIAS KANTO SALES CORPORATION

Sale of sealing materials, insulation materials and fluoropolymer products

NISHI-NIPPON NICHIAS CO., LTD.

Sale of sealing materials and fluoropolymer products

HAMAASU CORPORATION

Sale of sealing materials, insulation materials, fluoropolymer products and building materials, installation work of building materials

NIPPON THERMAL ENGINEERING CORPORATION

Engineering and construction of insulation materials

NICHIAS ENGINEERING SERVICE CORPORATION

Engineering and construction of insulation materials

INOCRETE CO., LTD.

Engineering and construction of insulation materials

NICHIAS KYUSHU SALES CO.,LTD

Sale of sealing materials, insulation materials and fluoropolymer products

NIPPON ROCKWOOL CORPORATION

Sale of building materials and agricultural products

NICHIAS CEMENTRE CORPORATION

Sale and construction of building materials

■ Factories

NICHIAS CERATECH CO., LTD.

Manufacture and sale of insulation materials and building materials

SAKAI NICHIAS CORPORATION

Manufacture of insulation materials

KOKUBU INDUSTRY CORPORATION

Manufacture of insulation materials and auto parts

TATSUTA INDUSTRY CORPORATION

Manufacture of insulation materials, Filters, auto parts, and building materials

OHTA KASEI CORPORATION

Manufacture of insulation materials

NICHIAS MECHATECHNO CO., LTD.

Manufacture of sealing materials and fluoropolymer products

NISHI-NIPPON NICHIAS CO.,LTD.

Sale of sealing materials and fluoropolymer products

FUKUSHIMA NICHIAS CORPORATION

Manufacture of fluoropolymer products and insulation materials

KUMAMOTO NICHIAS CORPORATION

Manufacture of fluoropolymer products

METAKOTE INDUSTRY CORPORATION

Manufacture of auto parts

APJ Corporation

Manufacture of auto parts

N&A TECH CO.,LTD.

Manufacture of auto parts

Global Network

■ Sales & Construction companies

● Indonesia

PT. NICHIAS SUNIJAYA

Sales of sealing materials, insulation materials, fluoropolymer products, auto parts, building materials, and Engineering and insulation work

● Malaysia

NICHIAS SOUTHEAST ASIA SDN. BHD.

Sales of insulation materials, and Engineering and insulation work

● Singapore

NICHIAS SINGAPORE PTE. LTD.

Sales of sealing materials, insulation materials, Filters, fluoropolymer products, auto parts, and building materials

● Vietnam

NICHIAS VIETNAM CO., LTD.

Sales of sealing materials, insulation materials, fluoropolymer products, and auto parts

● Thailand

NICHIAS (THAILAND) CO., LTD.

Manufacture and Sales of auto parts

THAI NICHIAS INTERNATIONAL CO., LTD.

Sales of sealing materials, insulation materials, and fluoropolymer products

● China

NICHIAS (SHANGHAI) TRADING CO., LTD.

(露佳斯(上海)貿易有限公司)

Sales of sealing materials, insulation materials, filters, fluoropolymer products, and building materials

NICHIAS (SHANGHAI) TRADING CO., LTD.

GUANGZHOU BRANCH

(露佳斯(上海)貿易有限公司 廣州分公司)

Sales of sealing materials, insulation materials, filters, fluoropolymer products, and building materials

NICHIAS (SHANGHAI) AUTOPARTS

TRADING CO.,LTD.

(露佳斯(上海)汽車零件貿易有限公司)

Sales of auto parts

SHANGHAI XINGSHENG GASKET CO., LTD.

(上海興盛密封墊有限公司)

Manufacture and Sales of auto parts

SUZHOU SHUANGYOU AUTOPARTS CO., LTD.

(蘇州雙友汽車零部件有限公司)

Manufacture and Sales of auto parts

● India

NICHIAS INDUSTRIAL PRODUCTS PRIVATE LTD.

Manufacture and Sales of auto parts

● Czech

NICHIAS AUTOPARTS EUROPE a.s.

Manufacture and Sales of auto parts

● Mexico

NAX MFG, S. A. DE C. V.

Manufacture and Sales of auto parts

■ Factories

● Indonesia

PT. NICHIAS ROCKWOOL INDONESIA

Manufacture of sealing materials, insulation materials, and auto parts

PT. NICHIAS METALWORKS INDONESIA

Manufacture of sealing materials and building materials

● Malaysia

NICHIAS FGS SDN. BHD.

Manufacture and Sales of sealing materials, fluoropolymer products, auto parts, building materials, and Sales of insulation materials

NT RUBBER-SEALS SDN. BHD.

Manufacture of sealing materials

● Vietnam

NICHIAS HAIPHONG CO., LTD.

Manufacture and Sales of sealing materials, filters, and fluoropolymer products

● Thailand

NICHIAS (THAILAND) CO., LTD.

Manufacture and Sales of auto parts

THAI-NICHIAS ENGINEERING CO., LTD.

Sales of insulation materials, and Engineering and insulation work

● China

SUZHOU NICHIAS INDUSTRIAL

PRODUCTS CO., LTD.

(蘇州露佳斯工業製品有限公司)

Manufacture of fluoropolymer products and auto parts

SUZHOU NICHIAS SEAL MATERIAL CO., LTD.

(蘇州露佳斯密封材料有限公司)

Manufacture of sealing materials, insulation materials, and filters

SHANGHAI XINGSHENG GASKET CO., LTD.

(上海興盛密封墊有限公司)

Manufacture and Sales of auto parts

SUZHOU SHUANGYOU AUTOPARTS CO., LTD.

(蘇州雙友汽車零部件有限公司)

Manufacture and Sales of auto parts

● India

NICHIAS INDUSTRIAL PRODUCTS PRIVATE LTD.

Manufacture and Sales of auto parts

● Czech

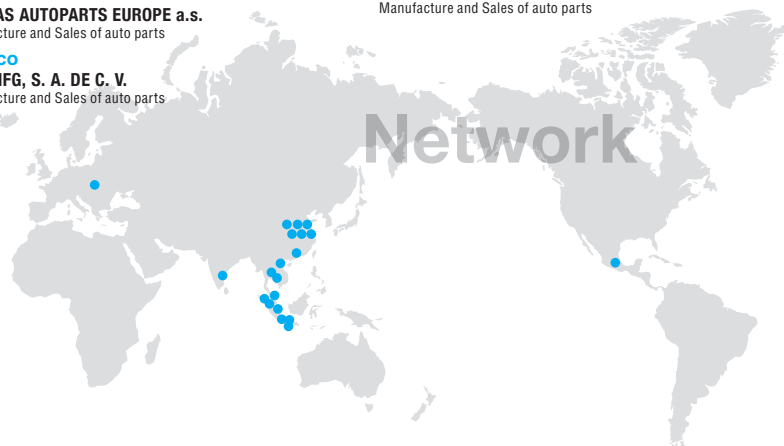
NICHIAS AUTOPARTS EUROPE a.s.

Manufacture and Sales of auto parts

● Mexico

NAX MFG, S. A. DE C. V.

Manufacture and Sales of auto parts





■ Head Office

6-1, Hatchobori 1-chome, Chuo-ku, Tokyo 104-8555, Japan
International Marketing and Sales Group
 Phone: 81-3-4413-1132 Fax: 81-3-3552-6108
 Web Site: <https://www.nichias.co.jp/>

■ Overseas Sales Companies

Indonesia

PT. NICHIAS SUNIJAYA

Sequis Tower Level 19 Suite 1&2,
 Jl. Jend Sudirman Kav. 71, Jakarta 12190, Indonesia
 Phone: +62-21- 2277-6101 Fax: +62-21- 2793-8033

Malaysia

NICHIAS SOUTHEAST ASIA SDN. BHD.

Suite A1102, 11th Floor, West Wing, Wisma Consplant 2,
 No. 7, Jalan SS 16/1, 47500 Subang Jaya, Selangor Darul Ehsan, Malaysia.
 Phone: +60-3-5636-4067 Fax: +60-3-5636-4078

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NICHIAS SINGAPORE PTE. LTD.

25 International Business Park, #01-15/17 German Centre,
 Singapore 609916
 Phone: +65-6571-0830/0838 Fax: +65-6265-7681

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NICHIAS VIETNAM CO., LTD

Room 709, Elite Business Center, 7th Floor Diamond Flower Building,
 48 Le Van Luong Street, Nhan Chinh Ward, Thanh Xuan District,
 Hanoi, Vietnam
 Phone: + 84-24-6664-3136 Fax: + 84-24-6666-8168

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NICHIAS (THAILAND) CO., LTD.

85 Moo 1, Wellgrow Industrial Estate T. Homsin, A. Bangpakong
 Chachoengsao 24180, Thailand
 Phone: +66-38-570-600 Fax: +66-38-570-601

THAI NICHIAS INTERNATIONAL CO., LTD.

Unit 1107, 11th Floor, AIA Capital Center
 89 Ratchadaphisek Road, Dindaeng, Dindaeng, Bangkok 10400 Thailand
 Phone: +66-2-001-2060 Fax: +66-2-001-2062

China

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霓佳斯（上海）贸易有限公司
 Room 1701, THE PLACE, Tower A, No. 100 Zun Yi Road,
 Changning District, Shanghai, P.R.China Postcode 200051
 中国上海市长宁区遵义路100号虹桥南丰城A栋1701室 邮编200051
 Phone: +86-21-6236-1783 Fax: +86-21-6236-1781

NICHIAS (SHANGHAI) TRADING CO., LTD. Guangzhou Branch

霓佳斯（上海）贸易有限公司 广州分公司
 17F-G, Gold Sun Building, No.109 Tiyu West Road, Guangzhou,
 Guang Dong Province, 510620, P.R.China
 中国广东省广州市天河区体育西路109号高盛大厦17楼G室 邮编 510620
 Phone: +86-20-3879-1640 Fax: +86-20-3879-1647

NICHIAS (SHANGHAI) AUTOPARTS TRADING CO., LTD.

霓佳斯（上海）汽车零部件贸易有限公司
 Room 1702, THE PLACE, Tower A, No. 100 Zun Yi Road,
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