

MAKIBEE™

Fire resistant covering material



The MAKIBEE Method™ is a world-first reliable and safe installation method developed by Nichias for fireproofing covers.



is a series of wrap-on fireproofing covering materials developed by Nichias that consist of a heat-resistant rock wool substrate.

The MAKIBEE Method™ is a simple installation method in which the MAKIBEE product is wrapped around a steel structure or the like and secured with pins.

No special technical skills are required to install the material, unlike spray-on insulation work.

Nichias is proud to present the MAKIBEE Method™ : the benchmark for next-generation insulation installation.

Shifting from Spray-on to **Wrap-on, Nichias Welcomes a New Generation of Fireproofing Covers.**

What Is Heat-Resistant Rock Wool?

Born out of Nichias' many years of research and its proprietary manufacturing technologies, Heat-Resistant Rock Wool is a material with greater resistance to **high temperatures than regular rock wool**.



A shrinkage comparison of MAKIBEE and regular rock wool when left at 800°C.



List of certifications obtained

- Certificate of conformity of fire rated enclosure system in Singapore (FSP2023-1365)

This certificate of conformity is issued based on the assessment report (WF report No. 525159) of the fire resistance tests results and the result (SETSCO test report No. CT-8500250418/THC) of the Non-Combustibility test.

The fire resistance tests carried out in accordance with BS476 Part 21 (1987).

The Non-Combustibility test carried out in accordance with BS476 Part 4 (1970).

- Singapore Green Building Product Certificate (SGBP4021)




VERY GOOD
SGBP 4021

SUSTAINABLE

It has been awarded the rating of "VERY GOOD" as GREEN BUILDING PRODUCT in Singapore.

CLEAN

The reduced dust emissions during construction shorten construction time by allowing other construction work to proceed in parallel.

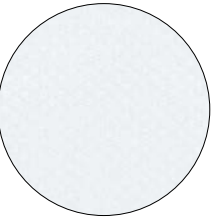
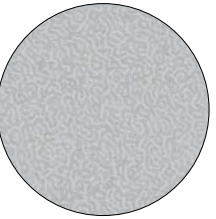
ECOLOGY

This thin, lightweight material reduces manufacturing energy per square meter, and more than half of the material is comprised of slag, a waste material produced during steel manufacturing. By cutting a dedicated fixing pin, it can be separated from the steel frame easily, which makes possible to recycle the steel frame.

SAFETY

It can be securely fixed to steel frames by using electric welding (stud welding) to install dedicated fixing pins and also reduces risk of falling off or damage due to displacement and vibration in situations such as earthquakes.

◆ Color lineup

Regular model	Optional models			
				
MAKIBEE	MAKIBEE WGR Note 1	MAKIBEE BL Note 1	MAKIBEE WTA Note 1	MAKIBEE CLA Note 1
Standard color	White grey	Black	White silver	Silver
Flame-retardant nonwoven fabric			Flame-retardant nonwoven fabric + Aluminum foil + PET Film	

Note 1 : WGR, BL, WTA and CLA are made-to-order, so their delivery and price differ from the regular model.

*The actual color of the product will differ slightly from the printed image in this catalog.

◆ Product specifications

Product	Thickness	Density	Standard dimensions (working width)	Properties
MAKIBEE (Regular model, WGR,BL, WTA,CLA)	20mm	80 to 120 kg/m ³	925(915)×10,000mm	Noncombustible material Formaldehyde emission characteristics F☆☆☆☆
	40mm	80 to 120 kg/m ³	925(895)×6,000mm	
	50mm Note 2	80 to 120 kg/m ³	925(895)×4,000mm	
	65mm	90 to 130 kg/m ³	925(895)×3,300mm	

Note 2: MAKIBEE BL and MAKIBEE CLA are not available in 50mm.



MAKIBEE Method™ Installation



Installation Procedure

1

Materials are delivered



2

Materials are cut



The materials are cut to the required dimensions with a cutter blade or scissors

4

Processing of joints, etc.



5

Self-inspection



Stable thickness and density due to being produced in a plant
→ Fewer inspection items after installation



QUALITY
Stable quality

The conventional spray-on method is largely inconsistent. The MAKIBEE Method™ does away with the thickness gauge and density sample inspections that were required at spray-on installation areas.



CLEAN
Little dust generation

The MAKIBEE Method™ produces significantly less dust than compared to the conventional spray-on method, meaning protective covering work is not required.



SAFETY
Long-term safety

Fits securely in place due to the welding installation.



COST
Reduces the total cost

Can be installed significantly faster than the conventional spray-on installation method.

Procedure

MAKIBEE Method™

A world-first, simple pin backstep welding installation method developed by Nichias

Welding equipment



Fixing pins

See P9 'Auxiliary Materials'



Photo provided by: Tilement Corporation

- 1 Place MAKIBEE onto the installation position.
- 2 Install the pins with a welding gun, and then stick the pins in from the top of MAKIBEE.
- 3 Press the pins so that the tips of the pins piercing to the steel structure surface.
- 4 Press the weld switch of the welding gun and affix the fixing pins.
- 5 The welding process is finished.

3 Wrapping



6 Clean up



Easy to remove as there is no need for protective coverings
→ Allows you to quickly move on to the next process

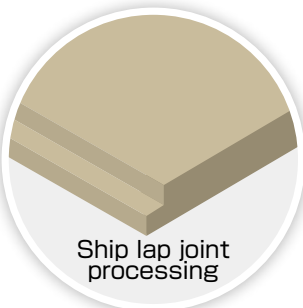
Complete

Reduces the total cost thanks to its efficient installation!



Nichias' exclusive wrap-on fireproofing covering materials born out of Nichias' many years of research and manufacturing technologies

Surface decorative material

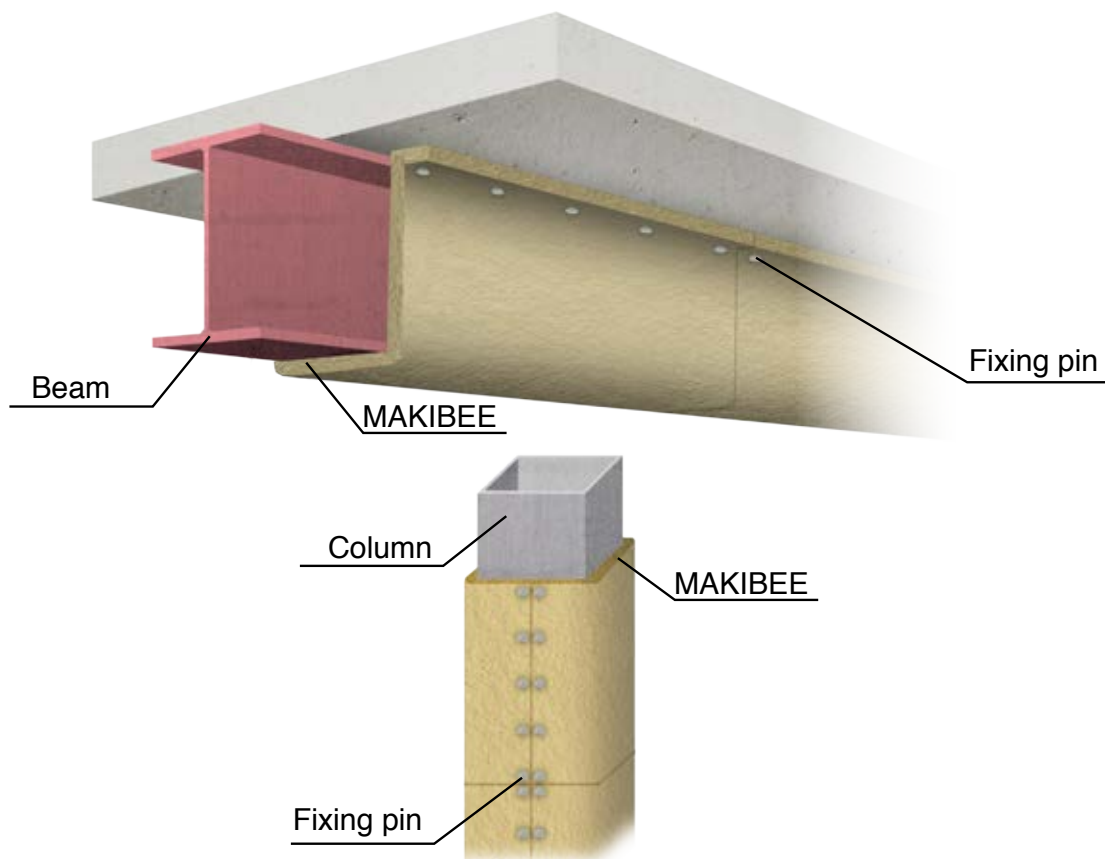


Ship lap joint processing

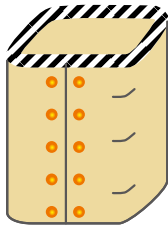
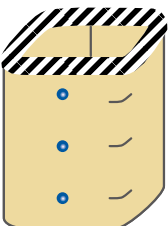
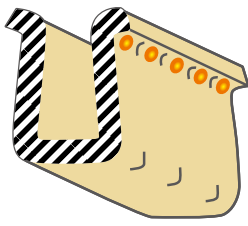
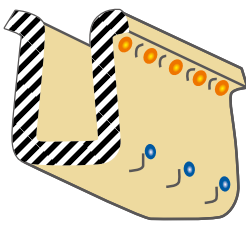
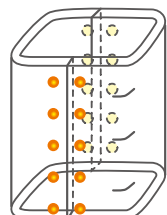
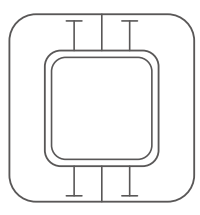
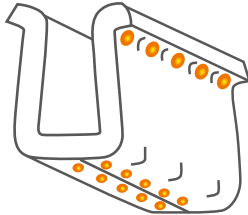
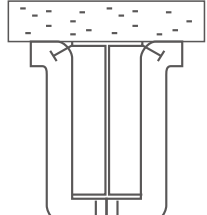
Ship lap joint processing prevents heat from entering between the joints between **insulation sheets**



Installation example



◆ Positions of pins

One Joint		No Joint	
Column		Small Beam	Large Beam
Joint side	Opposite side	Beam height (600mm or less)	Beam height (Greater than 600mm)
			
Fix both sides of the joint with 10 pins [Max interval 250mm].	Fixed with 3 pins in the opposite side of the joint [Max interval 400mm].	Fix one side of the upper flange with 5 pins [Max interval 250mm]. In case of a large beam, fix one side of the lower flange or the bottom of the beam with 3 pins [Max interval 400mm].	
Two Joint (Column)		One Joint(Beam)	
			

While additional pins are not officially required, used in order to prevent the material from being misaligned.

 Pin fixing position
  *Additional Pin fixing position

Physical properties

Thermal conductivity

Measured the thermal conductivity(λ) according to ASTM C518: 2010, "Standard test method for steady-state thermal transmission properties by means of the heat flow meter".

$\lambda = 0.0323$ [W/mk] At an average temperature of 20°C
(0.0278 [kcal/m n K])

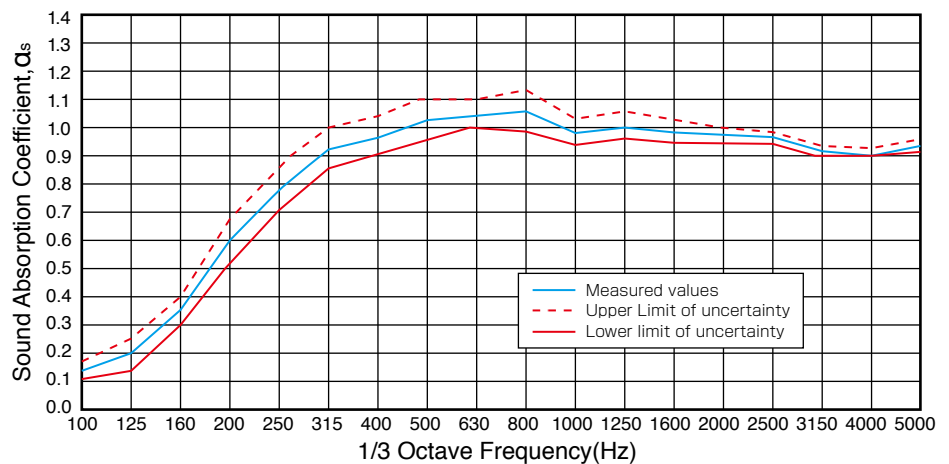
Measurement agency:TÜV SÜD PSD Singapore Pte Ltd.(April 2013)

Sound adsorption coefficients

Measured the sound absorption coefficients according to ASTM C423-09, "Standard test method for sound absorption and sound absorption coefficients by the reverberation room method".

1/3 Octave Frequency(Hz)	"MAKIBEE™" F.R. blankets(Type A mounting)		
	Sound Absorption Coefficient, α_s		Uncertainty
100	0.14		± 0.03
125	0.20	(0.23)	± 0.05
160	0.36		± 0.05
200	0.61		± 0.08
250	0.79	(0.78)	± 0.08
315	0.93		± 0.07
400	0.97		± 0.07
500	1.03	(1.02)	± 0.07
630	1.05		± 0.05
800	1.06		± 0.07
1000	0.99	(1.02)	± 0.05
1250	1.01		± 0.04
1600	0.99		± 0.04
2000	0.97	(0.98)	± 0.03
2500	0.97		± 0.03
3150	0.92		± 0.02
4000	0.91	(0.92)	± 0.02
5000	0.93		± 0.02
Noise Reduction Coefficient, NRC	0.95		
Sound Absorption Average, SAA (200Hz-2500Hz)	0.95		

Remark : Values in bracket()denotes the values of sound absorption coefficient α_s of 1/1 Octave Frequency Bands



Measurement agency:TÜV SÜD PSD Singapore Pte Ltd.(May 2013)

SINGAPORE GREEN BUILDING PRODUCT CERTIFICATE

AWARDED TO

Nichias Singapore Pte Ltd

25 International Business Park, #01-15/17 German Centre, Singapore 609916
Singapore 609916

PRODUCT BRAND

TOMBO

PRODUCT MODEL

TOMBO #5520 MAKIBEE



The values in this table are based on the Warringtonfire assessment (WF report No. 525159).

Hp/A(m ⁻¹)	3 sides(550°C) [For Vietnam]				4 sides(500°C) [For Vietnam]						
	45min	60min	90min	120min	45min	60min	90min	120min			
30	20	20	20	20	20	20	20	20			
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I/H Beams ≤ 609mm deep

Thickness is protection only.

Results are applicable to I/H beams with 3-sided box protection and concrete slab.

The values in this table are based on the Warringtonfire assessment (WF report No. 525159).

Hp/A(m ⁻¹)	3 sides(620°C) [For Singapore]					4 sides(550°C) [For Singapore]				
	60min	90min	120min	150min	180min	60min	90min	120min	150min	180min
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I/H Beams ≤ 609mm deep

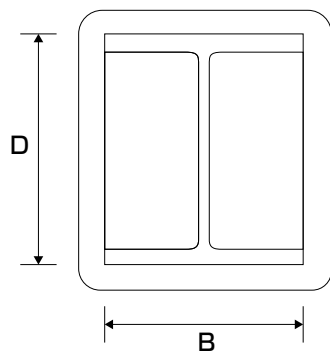
Thickness is protection only.

Results are applicable to I/H beams with 3-sided box protection and concrete slab.



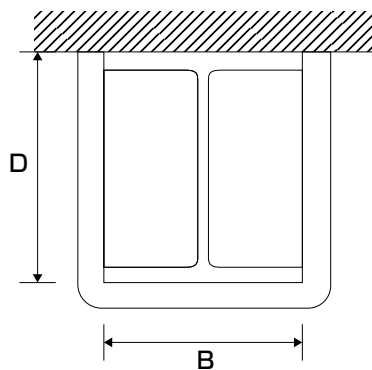
How to calculate H_p/A

4 Sides



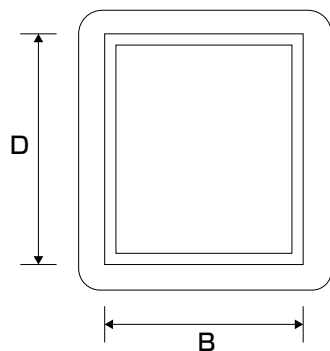
$$H_p = 2B + 2D$$

3 Sides



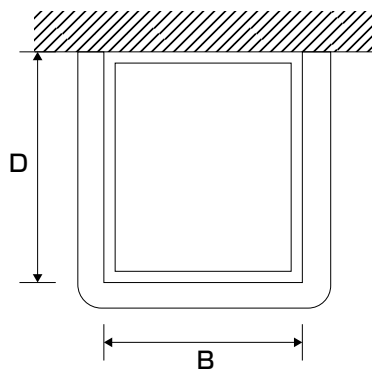
$$H_p = B + 2D$$

4 Sides



$$H_p = 2B + 2D$$

3 Sides



$$H_p = B + 2D$$

A: Area of section

Caution

-  **Wear a dust mask when handling.**
If you inhale a large amount of rock wool over a long period of time, it may damage your respiratory system.
-  **Make sure to wear long-sleeved work clothes and protective gloves when handling the product.**
Failure to do so may result in accidentally burning your skin.
-  **For cutting, use a manual tool such as a cutter knife.**
If using electric tools, install local ventilation equipment / dust-removal equipment.
-  **If a pin falls on the ground when welding, pick it up immediately.**
The pin may cause an injury if you or someone else steps on it.

■ General Precautions

● About the design

- Do not use MAKIBEE products for any applications other than those stated in this catalog.
- Do not use MAKIBEE products outdoors.
- Fireproofing covering materials (including spray-on rock wool) may be pecked at by birds, so you may need to take measures against this.
- MAKIBEE undergoes a fire-resistance test under heating conditions according to the formula of $T = 345 \log_{10} (8t + 1) + 20$ [T = the mean temperature of the oven (°C), t = the test duration (min)] to check its fire-resistance performance.
- If you are considering usage under heating conditions that exceed these conditions, please consult us.
- Do not use MAKIBEE in locations where it may be rained on directly or splashed with water after installation.
- If subject to an outside force or excessive shocks, the fixing pins or MAKIBEE may fall off.
- Please consult us if you wish to install MAKIBEE in a location where objects will make contact with it or it will be subject to constant vibrations such as in an indoor sports hall or mechanical warehouse.

● Transportation and storage

- To prevent water leakage, place the product on top of a rack or palette and not directly on the ground.
- When storing, store the product on its side and do not stack it any higher than 2.0 m to prevent it from collapsing.
- Store the product in an environment that is not subject to splashing water and high humidity.

● Installation

- When handling the product, wear a helmet, fall harness, safety boots (fitted with an anti-slip insole), a dust mask, cut-resistant gloves, protective goggles, and long-sleeved work clothes.
- If rust or slag is on the surface of the steel frames, this may cause a pin welding defect, so remove any rust or slag.
- For cutting, use a safety ruler and manual tool such as a cutter knife.
- For work at heights, make sure to use a fall harness to prevent accidents from falling.
- If damage to MAKIBEE or gaps between joints occur, reinstall the MAKIBEE product.
- After installing the fixing pins, make sure to check each of them by hand.
- Install the product according to the certified specifications.
- Be aware that if a spiral duct is used as the inner core material of MAKIBEE Sleeve, in some cases, it may not be possible to pass a spiral duct with the same diameter as MAKIBEE Sleeve when carrying out equipment construction work.
- If MAKIBEE Sleeve is used as the actual pipe, install suspension bolts in positions within 200 mm on both sides of the steam frame beam.
- Do not install by pressing finishing materials such as gypsum board onto the entire MAKIBEE surface as doing so adversely affects the heat resistance performance.
- Do not coat the surface as doing so may degrade the flame-retardant performance of the surface decorative material.
- While wrinkles may occur on the surface decorative material due to manufacturing reasons, this does not negatively affect its performance.

● Welding

- When welding (energized), be careful as sparks may occur from the ground and steel frame installation parts.
- Do not perform welding work if the steel frame surface or MAKIBEE is wet, as doing so may cause electric shock.
- Do not perform welding work near materials that are prohibited from contact with open flames such as organic solvents because doing so may cause a fire.
- Stud welding work may negatively impact computer equipment (disruption to the CRT display, etc.), so do not place computer equipment near where the stud welding work is performed.
- If the tip of the welding gun is in contact with metal (excluding washers) and you press the weld button, sparks will occur. Be careful as sparks may cause burns or a fire.
- If the coating thickness is 70 μm or more, stud welding may become difficult.
- Consult with the construction site manager and perform a test strike before installing.

● How to dispose of a MAKIBEE product

- If disposing of a MAKIBEE product, comply with your local legislation.

*Product names with TM are trademarks of NICHIA Corporation



■ 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

Singapore

NICHIAS SINGAPORE PTE. LTD.

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

Vietnam

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

Thailand

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

NICHIAS (SHANGHAI) TRADING CO., LTD.

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,
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1702室 邮编200051
Phone: +86-21-6236-2668 Fax: +86-21-6236-2667

■ Overseas Construction Companies

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

Thailand

THAI-NICHIAS ENGINEERING CO., LTD.

45 Huaypong-Nongbon Road, Huaypong, Muang Rayong,
Rayong Province 21150, Thailand
Phone: +66-38-682-242 Fax: +66-38-691-156

■ Overseas Factories

Indonesia

PT. NICHIAS ROCKWOOL INDONESIA

PT. NICHIAS METALWORKS INDONESIA

Malaysia

NICHIAS FGS SDN. BHD.

NT RUBBER-SEALS SDN. BHD.

Vietnam

NICHIAS HAIPHONG CO., LTD.

China

SUZHOU NICHIAS INDUSTRIAL PRODUCTS CO., LTD.

(苏州霓佳斯工业制品有限公司)

SUZHOU NICHIAS SEAL MATERIAL CO., LTD.

(苏州霓佳斯密封材料有限公司)

SHANGHAI XINGSHENG GASKET CO., LTD.

(上海兴盛密封垫有限公司)

SUZHOU SHUANGYOU AUTOPARTS CO., LTD.

(苏州双友汽车零部件有限公司)

India

NICHIAS INDUSTRIAL PRODUCTS PRIVATE LTD.

Czech

NICHIAS AUTOPARTS EUROPE a.s.

Mexico

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

⚠ Cautions

- The products included in this catalog are intended for common use, including those presented in the catalog. If you intend to use any of the products in a way that requires extremely high quality and reliability such that any possible defect may directly affect the safety of human lives, please make sure to consult with our company in advance and take necessary measures at your responsibility.
- Because the stated material values may vary according to actual usage environments or circumstances, please consider such figures as indications for reference.
- The content of the catalog explains the features of the products when they are used alone. When actually using the products, please start using them after testing them under the actual usage environment.
- The content of the explanation of the products may be modified without any advance notice, and the production of the product may also be discontinued without advance notice. Please obtain the latest version of the catalog, and confirm the content thereof. The date of issuance of this catalog is printed on this page.
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- Please be informed that, in the case where any problem involving a third party's industrial property right arises due to the use of any product included in the catalog, our company shall not be responsible for any problems other than the problems arising strictly due to reasons related to only such products.

- Please be aware that our company will not bear any responsibility for the following damage related to our products:

- Damage arising due to natural disasters or accidents occurring for reasons that are not attributable to our company;
- Damage arising due to remodeling, repairing or other acts by a third party;
- Damage arising due to the willful intent or negligence of the customer or the user, or due to the improper use or use under abnormal conditions of the products;
- Damage arising due to the failure to carry out regular checkups and appropriate repairs, maintenance and part replacements, considering various conditions, such as the usage conditions, usage environment and usage period, etc., of the product;
- Indirect damage (including any operational damage, lost profits, opportunity losses, etc.) arising due to the use of or inability to use our company's product;
- Damage arising due to a situation which was unforeseeable under the technical standards at the time of the shipment of our company's product; or
- Damage arising due to reasons that are not attributable to our company.