TOMBO™ BRAND

May 2025

Reusable flexible thermal insulation material, optimal for Energy Saving

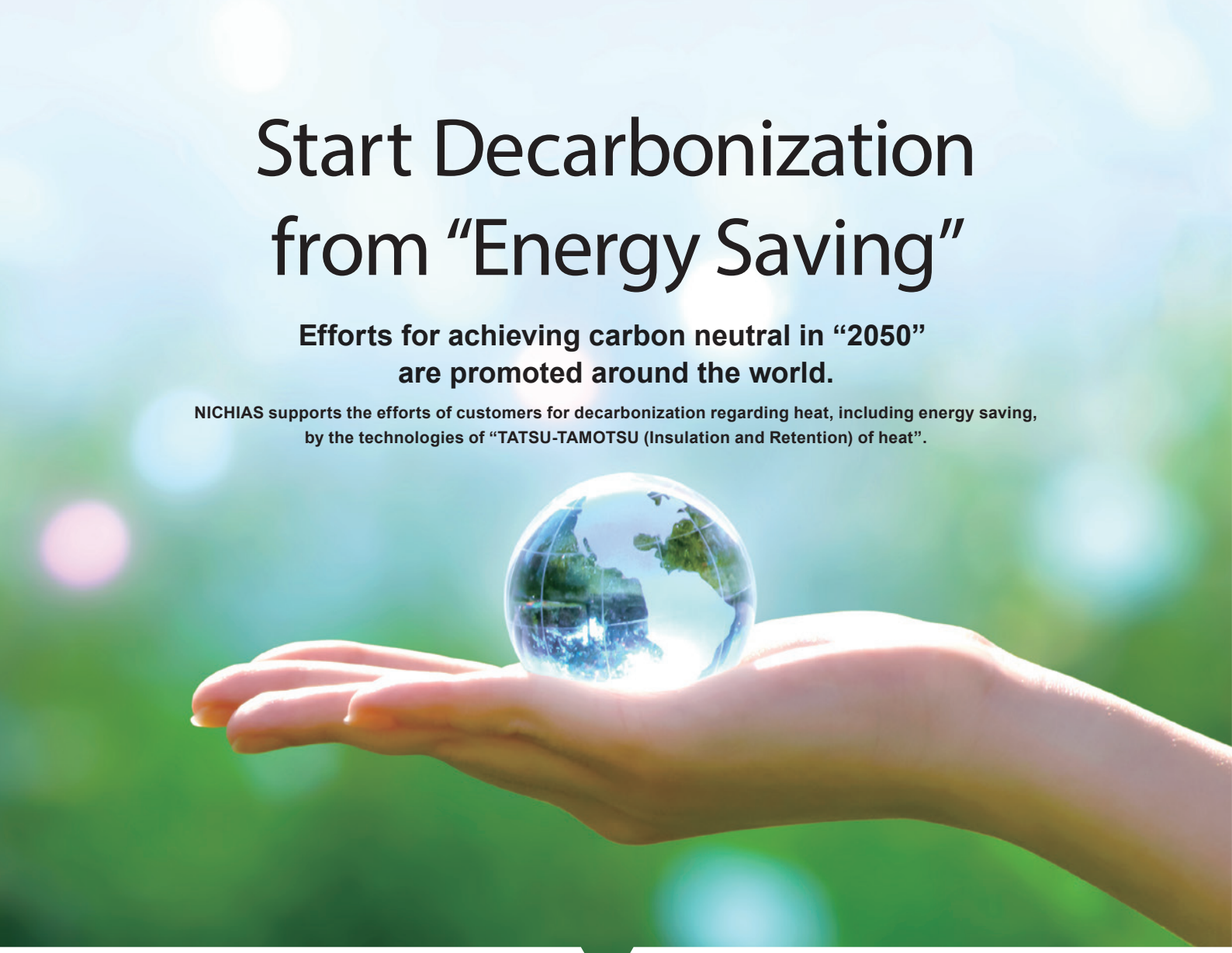
ENETHERMO™

NICHIAS

Start Decarbonization from “Energy Saving”

Efforts for achieving carbon neutral in “2050” are promoted around the world.

NICHIAS supports the efforts of customers for decarbonization regarding heat, including energy saving, by the technologies of “TATSU-TAMOTSU (Insulation and Retention) of heat”.



“ENETHERMO™” most suitable for Energy Saving

ENETHERMO is a freely-detachable thermal insulation material product, which is manufactured by covering heat-insulation materials with various clothes and processing them in accordance with shapes of working objects, accompanied by parts for installation.

* The product without parts for installation is “TOMBOTM No.4447 Thermal insulating futon”.

Features

- Freely detachable and reusable with ease.
- Easy to install and the time for installation can be significantly reduced.
- No costs are necessary for installing thermal insulation materials upon maintenance.
- No waste generated at installation.
- Useful for improvement of work environment such as preventing burns and heat stroke, suppressing the rise of peripheral air temperature, etc.

* We also manufacture products for high temperature upon request.

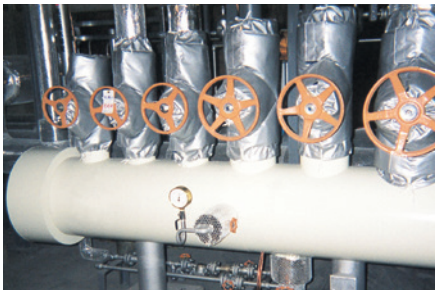
Installation locations

- Pipes, valves, flanges
- Heat exchanger, tanks
- Turbine, pump, boiler
- Injection molding machine, extrusion molding machine, heat pressing machine
- Oven, heat treat furnace, other heat radiating equipment

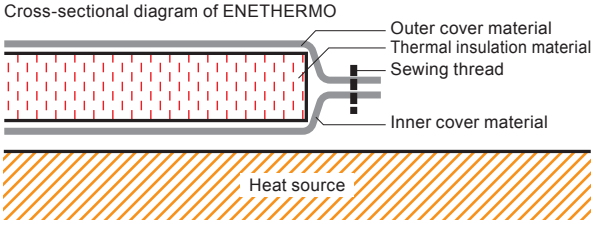
Goals and targets of main relevant SDGs

Relevant target 7.3

Relevant target 12.5



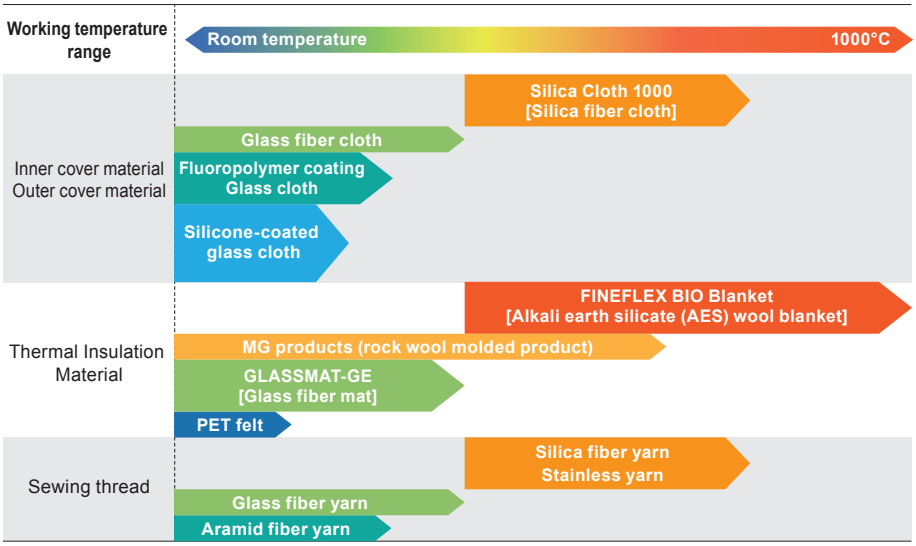
Cross-sectional diagram of ENETHERMO



Composing materials

For ENETHERMO, we propose appropriate specifications according to use conditions among a wide variety of composing materials.

Main composing materials

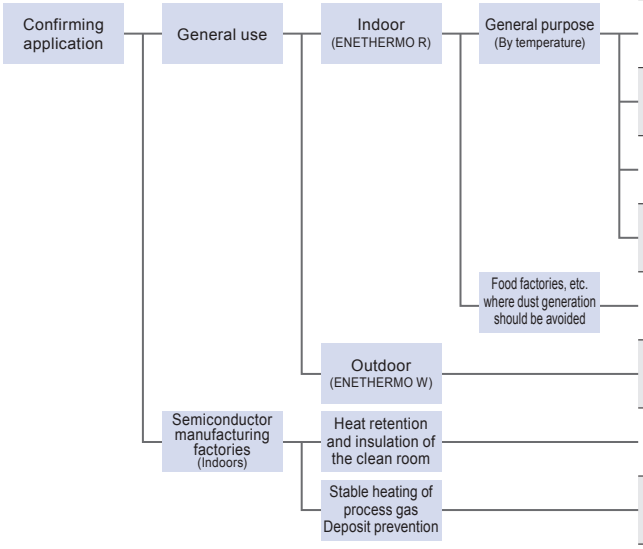


Parts for installation	Installation Example
 Hook-and-loop fasteners	
 Belts	
 Eyelets	

Product specifications

Product number	Product name	Installation Location	Corresponding cleanliness	Product Overview
TOMBO™ No.4500-R	ENETHERMO R	Indoor		Standard product.
TOMBO™ No.4500-W	ENETHERMO W	Outdoor	—	Waterproof products. Double-sided silicone-coated glass cloth with excellent water resistance is used, and the special coating is applied to sewn parts.
TOMBO™ No.4500-CR	ENETHERMO CR	Clean room	ISO14644-1 Class 6	Products available for use in the clean room. Glass cloth with fluoropolymer coating with less dust generation is used.
TOMBO™ No.4500-PH	ENETHERMO PH			Pipe heating heater in which the thermal insulation material and the heating element are integrated.

Selection flow for main specifications and the features of various specifications



No.	Composing materials				Examples of use
	Inner cover material	Thermal Insulation Material	Outer cover material	Sewing thread	
100°C or less	Single-sided silicone-coated glass cloth	PET felt	Single-sided silicone-coated glass cloth	Aramid fiber yarn	Retaining tank temperature, preventing burns, etc.
180°C or less	Single-sided silicone-coated glass cloth	GLASSMAT GE	Single-sided silicone-coated glass cloth	Aramid fiber yarn	JIS 10K Pipes and valves, etc. for steam and heat exchangers, etc.
350°C or less	Glass cloth	GLASSMAT-GE	Single-sided silicone-coated glass cloth	Glass yarn	JIS 20K Pipes and valves, etc. for steam and heat exchangers, etc.
800°C or less	Silica Cloth 1000	FINEFLEX BIO Blanket	Single-sided silicone-coated glass cloth	Silica yarn	Resin molding machine, heating furnace, etc.
250°C or less (Low dust generation)	Fluororesin-coated glass cloth (gray)	GLASSMAT-GE	Fluororesin-coated glass cloth (gray)	Aramid fiber yarn	Pipes and valves, etc., and heat exchangers, etc.
180°C or less (Waterproof treatment)	Double-sided silicone-coated glass cloth	GLASSMAT-GE	Double-sided silicone-coated glass cloth	Aramid fiber yarn	Outdoor steam pipes and equipment
250°C or less (ENETHERMO CR)	Fluororesin-coated glass cloth	GLASSMAT-GE (calcined)	Fluororesin-coated glass cloth	Fluororesin-coated glass yarn	Pipes and equipment in a clean room
200°C or less (ENETHERMO PH)	Fluororesin-coated glass cloth	GLASSMAT-GE (calcined)	Fluororesin-coated glass cloth	Fluororesin-coated glass cloth	Pipes requiring heating

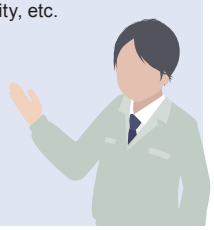
Descriptions above are only representative examples. Please contact us also for other applications and temperatures.

Procedure from inquiry to installation

The general procedure from inquily to installation of ENETHERMO is as follows. (It may change according to requests and conditions of the customer.)

Main confirmation items at the time of inquily

- Use conditions
  (installation location, temperature, type of inner fluid, etc.)
- Information of object
  Valves : type of valve, manufacturer, model, pressure × diameter, connecting method, inside screw or outside screw, single or in combination, quantity, etc.
  Equipment : name or type, model, size, with or without vibration
- Drawings, photos, and other requirements



Inquily from the customer

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Confirmation of information on use conditions and working objects
(Confirmation by e-mail, etc. or on-site investigation and thermal diagnosis, etc.)

↓

Rough estimate (+ performing energy-saving calculation, etc.)

↓

Budget secured by the customer

↓

Tentative order

↓

Measurement on site

↓

Design

↓

Official estimate

↓

Order

↓

Manufacturing

↓

Installation

Standard products

Standard products not requiring designing are also available in our line-up. Standard products require no costs or time for designing and measurement of new design.

TOMBO™ No. / Product name	Nominal pressure (maximum working temperature)	Size	Valves				Flange	Blank flange
			Connecting method	Globe valve	Y-shaped strainer	Check valve		
4500-R / ENETHERMO R 4500-W / ENETHERMO W	10K (180°C)	15-50A	Flange or screwed					
		65-200A	Screwed					
4500-R / ENETHERMO R	20K (350°C)	15-200A	Flange					

* Please inform us of the manufacturer and the model number upon confirmation. For objects other than above, it may be possible to provide a rough estimate without measurement if we have manufactured them in the past.
* Descriptions above are applicable only for single units, and the units in which valves or flanges are connected together or which are accompanied by supports are not included within the standard.

Installation method

ENETHERMO is shaped according to the working part, and can also be easily installed by anyone using the parts for installation such as hook-and-loop fasteners and belts. With hook-and-loop fasteners, it can be installed quickly in a single operation, as shown in the picture.

Installation procedure of ENETHERMOTM ™ (on globe valve, flange type, 65A)

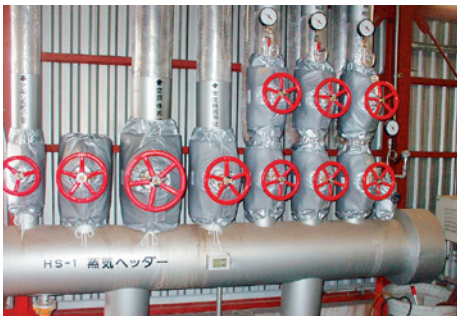
Comparison with lagging
(heat insulation with sheet metal, etc.)

	ENETHERMO		Lagging	
Processed shape	◎	This product also supports complex shapes	△	Only simple shape
Workability Maintainability	◎	Freely detachable and can be installed by anyone	×	Necessary to make a request to the provider of heat retention
Installation cost/ installation time	◎	Can be installed in a short time	×	Installation must be requested from a thermal insulation contractor.
Environmental burden	○	Can be used repeatedly → Waste reduction	△	Exchange every time → Large amount of waste
Appearance				

Detachability and responsiveness to complex shapes due to individual design are the Streng Points of **ENETHERMO**

Various installation examples

Through custom-made designs tailored to the customer's requirement and shapes, we achieve excellent adhesion and a visually appealing finish. Used for a wide variety of purposes, not only for energy saving but also for improving work environment (preventing burns and heat stroke), etc.



Valves in the boiler chamber and around the steam header


Medical center A Hot water pump


Outer periphery of heat exchanger


Food manufacturing device A Main body


Food manufacturing device B Main body and piping

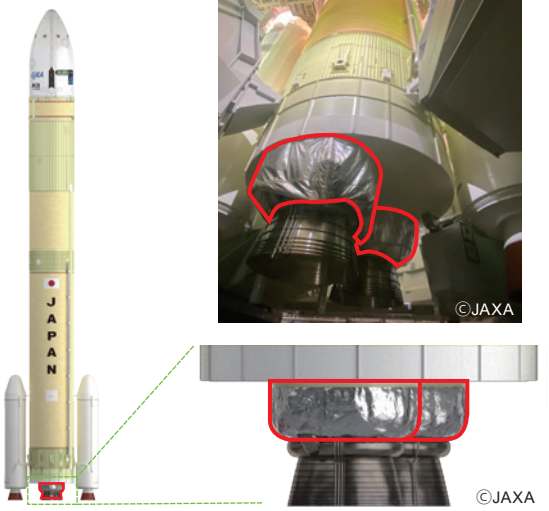
Heat supply plant Steam header valve
(Marunouchi Heat Supply, Co., Ltd.)


Resin products manufacturing plant Injection molding machine

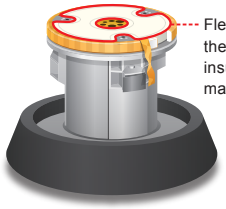

Home appliance manufacturing plant Injection molding machine

Thermal insulation materials of ENETHERMO type are also used in the space industry section requiring advanced technologies including rocket engines, as NICHIAS's high engineering skills, design responsiveness, and quality control ability have been highly evaluated.

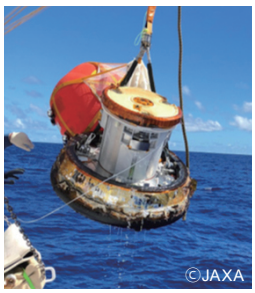
Engine blanket
for the H3 rocket



Small Re-entry Capsule



Small Re-entry Capsule loaded on the "Space Station Resupply Vehicle (KOUNOTORI 7)"



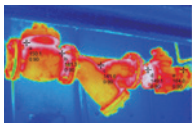
Utilization of heat diagnosis and energy saving calculation

We are able to provide support towards the efforts of customers promoting energy saving, not only by manufacturing and sales of thermal insulation materials, but also by **heat diagnosis** and **energy saving calculation**.

Thermal diagnosis

We will identify the locations with increased heat leakage and energy loss using thermography, etc., to propose the most suitable installation of heat-insulation.

- Even for boiler chambers where thermal insulation materials seem to have been installed, in several cases the thermal images show that a large amount of heat has been lost from uninstalled valves, etc.
- By lending the thermography, the customers can check the high-temperature parts by themselves.

Photographing point	Photo	Thermal image
Boiler upper part		
Header upper part		

Energy-saving calculation

Heat calculation is performed by the result of thermal diagnosis and use conditions, and the simulation of energy saving efficiency by installation of ENETHERMO (CO_2 emissions, fuel cost, reduction amount of dissipated heat, etc.) is carried out. By quantifying the effect, the customers can use it for reference documents for considering cost efficiency or applying for the budget within their company.

Inputs (required information)

- Used fuel : A heavy oil, electricity, etc.
- Fuel unit price : ○○yen/ℓ, etc.
- Annual working time : ○○○○hr/year
- Outdoor temperature : ○○°C
- Surface temperature before installation : ○○○°C
- Type of working object : ○○valve, pipe, etc.
- Size, quantity, etc. : JIS10K○○A ○ pieces
  (for equipment, the surface area of installation part)
- Installing thermal insulation material[Note 1] : Glass mat GE, etc.

Outputs (calculation results)

- Amount of CO_2 reduction : ○○ ton/year
- Amount of reduction : ○○○ thousand yen/year
- Amount of crude oil reduction: ○ kL/year

Note 1: Conditions of thermal insulation materials to be installed are determined according to the design standards of NICHIAS unless otherwise specified.

Example of the energy saving calculation sheet

Messrs. ○○○○ Co., Ltd.

Name of business partner	Mr./Mrs. □□□□ Co., Ltd.
Date of measurement	2024 Month Date
Site name	△△△△ plant ×××× room
Special note	

Outputs (calculation results)

Crude oil reduction	CO_2 reduction	Amount of reduction
7.05 kℓ/year	19.35 ton/year	597,000 yen/year

Trail calculation of effects

(Amount of A heavy oil reduction)	Energy Saving effect [kW] × 3.6[MJ/kWh] ÷ (calorific value [MJ/ℓ]) × 0.9)
Amount of crude oil reduction	Amount of A heavy oil reduction [ℓ/h] × Annual working hours [h/year] × Crude oil conversion coefficient [Kℓ/kℓ] ÷ 1000
Amount of CO_2 reduction	Amount of A heavy oil reduction [ℓ/h] × Annual working hours [h/year] × CO_2 Emission calculation coefficient [ton/kℓ] ÷ 1000
Amount of reduction	Energy Saving effect [kW] × Annual working hours [h/year] × Energy unit price [yen/kWh]

High-level calorific value	38.9 MJ/ℓ
Crude oil conversion coefficient*1	1.004 Kℓ/kℓ
CO_2 emission calculation coefficient*2	2.753 ton/kℓ

*1: High-level calorific value × 0.0258 kℓ/GJ
*2: Carbon emission coefficient × high-level calorific value × 44/12
(44/12 is the particle conversion value from C to CO_2)

Use conditions

Used fuel	Fuel oil A
Fuel price	85 yen/ℓ
Boiler efficiency	90%
Outdoor temperature	20°C
Thermal Insulation Material	GLASSMAT GE

Low-level calorific value	37.145 MJ/ℓ
kWh-converted energy unit price	9.3[yen/kWh]

9.3 [yen/kWh]=85 yen/ℓ 3.6 [MJ/kWh] (36.7 MJ/ℓ × 0.90)

Inputs (required information)

Calculation of thermal conductivity in a constant state based on JIS A 9501 standard practice for installation contract of industrial thermal insulation: vertical plane, natural convection

Details of installation part				Working conditions							Total			
No.	Name of installation part	Size	Connecting method	Surface area [m²]	Number of pieces Total 13 pieces	Annual working hours [h/year]	Surface temperature before installation [°C]	Installation thickness [mm]	Surface temperature after installation (Simulation) [°C]	Energy saving effect [kW]	Surface area [m²]	Energy saving effect [kW]	Reduction amount [thousand yen/year]	Remark
1	Globe valve	10K-25A	Flange type	0.13	4	8760	180	20	49	0.33	0.52	1.30	106	
2	Gate valve	10K-80A	Flange type	0.37	3	8760	180	30	42	0.95	1.10	2.86	232	
3	Reducing valve	10K-50A	Flange type	0.30	4	8760	180	20	49	0.73	1.18	2.94	238	
4	Flange	10K-50A		0.05	2	8760	180	20	49	0.13	0.11	0.27	22	
Total											2.91	7.37	597	

Coefficients used for calculation are reviewed as required.

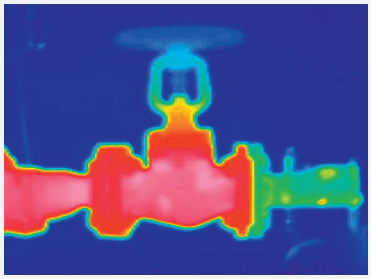
Energy-saving calculation example

* The above figures are calculated based on heat simulations, and are not guaranteed.

Example 1

Steam valve

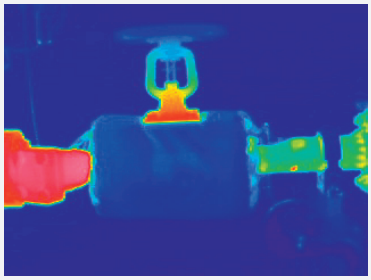
Before installation



Average surface temperature:

Approx. 170˚C

After installation



Average surface temperature:

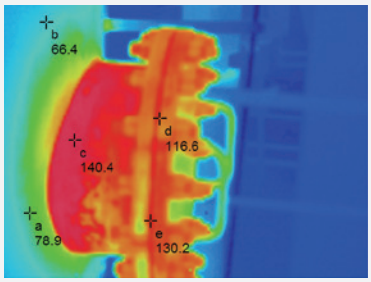
Approx. 44˚C

<Energy Saving effect> Use conditions	Energy saving amount	Crude oil reduction	CO_2 reduction
• Where the 10K Globe valve 40A operates at the pressure force of 0.8MPa (temperature 170°C) • With outdoor temperature at 20°C, annual operational hours at 5000 hr/year, A heavy oil @85 yen/ℓ, and the boiler efficiency 80%	**20.0** [thousand yen/piece·year]	**0.24** [kℓ/piece·year]	**0.66** [t-CO_2/piece·year]

Example 2

Manhole on the pressure container

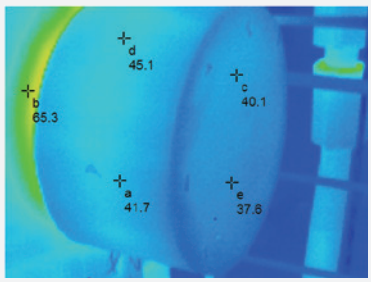
Before installation



Average surface temperature:

Approx. 140˚C

After installation



Average surface temperature:

Approx. 45˚C

<Energy Saving effect> Usage conditions	Energy saving amount	Crude oil reduction	CO_2 reduction
• Where ENETHERMO is installed at a manhole on the pressure container with the installation area of 0.5m^2 • Outdoor temperature at 20°C, annual operational hours at 5760hr/year, A heavy oil@85yen/ℓ, and the boiler efficiency 80%,	**48.0** [thousand yen/piece·year]	**0.56** [kℓ/piece·year]	**1.54** [t-CO_2/piece·year]

May 2025

NICHIAS 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)
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(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

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