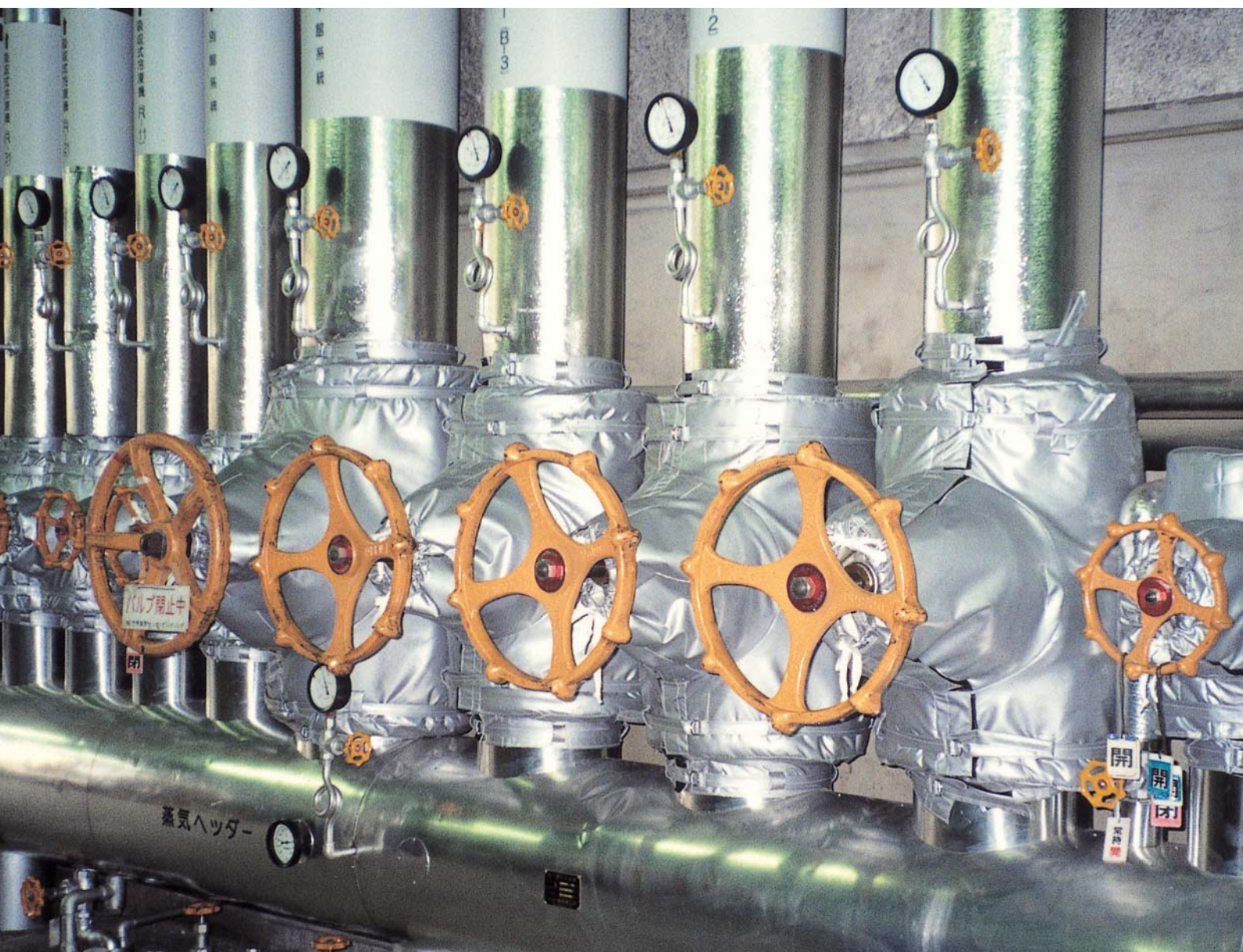


TOMBO™ BRAND

ENETHERMO™

Reusable heat insulation material



TOMBO No.4500 ENETHERMO™ series

Heat insulation material removable and reusable with ease.

Installation of this material in buildings as well as factories in energy-saving objective lead to "Global environmental protection and improvement".



Features

- Easy removability and detachability
- Reusable
- Maximum service temperature 250°C
- * Material for higher temperature use beyond 250°C can be made as per your order

Application

- Thermal insulation for valves, flanges, heat exchangers and vessels.
- Thermal insulation for towers and vessels
- Thermal insulation for heat radiation equipment.
- Thermal insulation for areas under regular repair and maintenance.

Main material

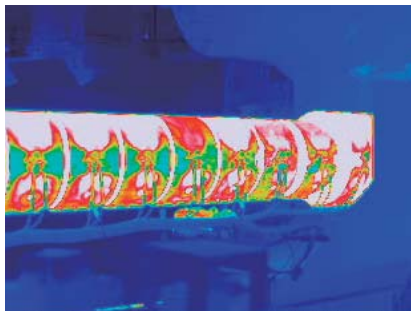
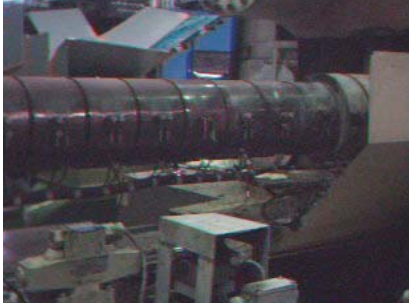
- Outer material: Silicone coating glass cloth
- Inner material: TOMBO No.4517, Glass mat
- Inside material: Glass cloth
- Yarn: Glass fiber, Fluorine coated glass fiber

* TOMBO is a registered trademark or trademark of NICHIAS Corporation.
* ENETHERMO is a trademark of NICHIAS Corporation.



- 1) Do not use ENETHERMO for any other purposes than described in the catalogue.
- 2) Never use ENETHERMO above the maximum service temperature specified in the catalogue (250°C).
- 3) ENETHERMO is made of glass fiber. Body contact with ENETHERMO could cause itching or pain to the skin, eyes, throat and/or nose.
 - Wear long-sleeved and loose clothes, protective gloves, goggles and a dust mask.
 - After handling ENETHERMO, thoroughly wash your hands with soap and warm water, and gargle your throat.
 - When cutting ENETHERMO, prevent dust from being scattered by bagging fragments immediately or by other means.
 - Wash working clothes separately from other clothing.
 - If pain or itching lasts a long time, consult a doctor for medical treatment.
- 4) For industrial hygiene-related precautions, see the SDS (Safety Data Sheet).
- 5) When disposing of ENETHERMO, follow your local laws and regulations concerning waste disposal.

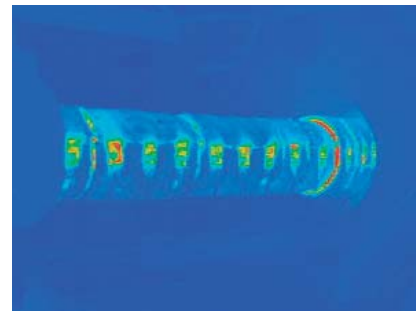
Before installation



Average surface temperature:

Approx. 180°C

After installation



Average surface temperature:

Approx. 60°C

Example of calculation of energy-saving effect

The radiation heat loss is the sum total of the heat transfer by convection (Q1) and that by radiation (Q2), expressed as $Q = Q1 + Q2$. The radiation heat loss from a non-heat-insulated surface with average surface temperature of 180°C is as follows (assuming an outside temperature of 20°C and emissivity of 0.7):

$$Q=2850W/m^2$$

In the same way, the radiation heat loss from a heat-insulated surface with average surface temperature of 60°C is as follows (assuming an outside temperature of 20°C and emissivity of 0.9):

$$Q=513W/m^2$$

Energy-saving effect

Based on the above calculation example, the energy-saving effect of ENETHERMO is: **2340W/m²**.

Specifically, if the annual operation time is 5000hr/year, unit cost of energy is ¥12/kWh, and installation area is 2m², the savings are as shown below.

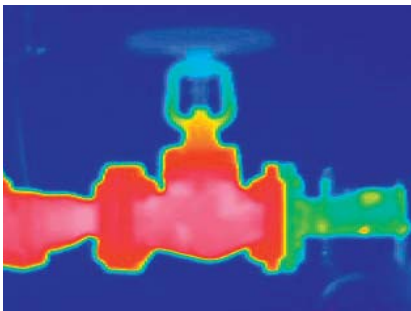
Power saving	Energy saving	Annual oil saving	CO ₂ reduction
23,400 [kWh/year per unit]	280,000 [yen/year per unit]	5.9 [kL/year per unit]	13 [ton/year per unit]

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

* If the machine has a metal cover, the radiation heat loss before installation is low, so the energy-saving effect may become one third to two thirds of the above.

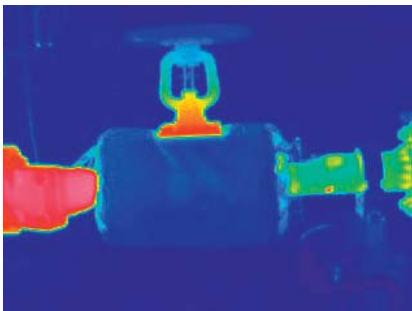
* The above data do not include the cost saving for air-conditioning. (If COP = 3, the above power saving value may be increased by approx. 1/3.)

Before installation



Average surface temperature:
Approx. 170°C

After installation



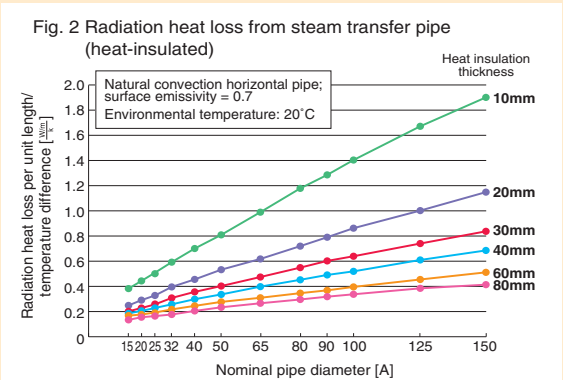
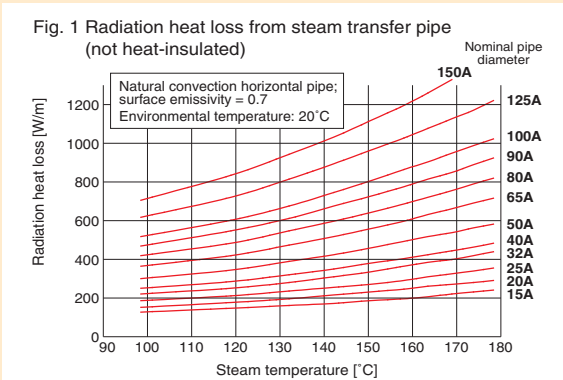
Average surface temperature:
Approx. 44°C

Example of calculation of energy-saving effect

The valve is operated under steam pressure of 0.8MPa and temperature of 170°C, and surface area of the 40A steam valve is converted 1.11m of the equivalent pipe length (surface area: 0.17m²).

Radiation heat loss from the non-heat-insulated steam pipe: **440W/m** (Fig. 1)

Radiated heat loss from heat-insulated (20mm thick cover) steam pipe: **59W/m (=0.47×(170-44))** (Fig. 2)



Energy-saving effect

As indicated by the above calculations, the energy-saving effect is **423W/unit (= (440-59W/m) × 1.11m)**

Specifically, if the annual operation time is 5000hr/year, fuel oil A is ¥75/L and boiler efficiency is 80%:

Energy saving	Annual oil saving	CO ₂ reduction
18,300 [yen/year per unit]	0.25 [kL/year per unit]	0.66 [ton/year per unit]

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

TOMBO No.4500-CR

ENETHERMO™ CR

Highly useful for improving the working environment in semiconductor manufacturing facilities, foodstuff factories and precision equipment plants where high cleanliness is essential.



Clean room

Widely used in clean rooms because of low dust generation (Class 1000).



For injection molding machines

Used for heat insulation of semiconductor manufacturing equipment, valves and heat radiating machines.

TOMBO No.4500-R

ENETHERMO™ R

Standard type for indoor use with heat resistance of 250°C (maximum service temperature)



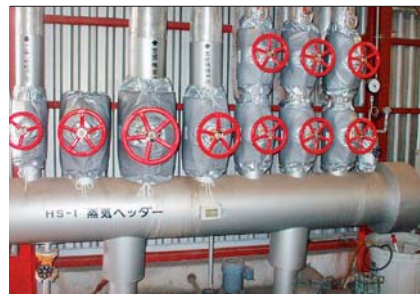
For boilers

Applicable not only to boilers and valves but to parts of various shapes.

TOMBO No.4500-W

ENETHERMO™ W

Water-proof for outdoor use



Although the seam is water-proofed, ENETHERMO W is not fully watertight.

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



Before installation



After installation



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