ENETHERMOTM
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

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**WARNING**

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.
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 $Q = Q_1 + Q_2$. 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):

$$Q = 2850 \text{W/m}^2$$

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):

$$Q = 513 \text{W/m}^2$$

Energy-saving effect

Based on the above calculation example, the energy-saving effect of ENETHERMO is: $2340 \text{W/m}^2$. 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.

<table>
<thead>
<tr>
<th>Power saving [kWh/year per unit]</th>
<th>Energy saving [yen/year per unit]</th>
<th>Annual oil saving [L/year per unit]</th>
<th>CO₂ reduction [ton/year per unit]</th>
</tr>
</thead>
<tbody>
<tr>
<td>23,400</td>
<td>280,000</td>
<td>5.9</td>
<td>13</td>
</tr>
</tbody>
</table>

* 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.)
Typical example of energy saving

Installation of ENETHERMO™ on steam valve (globe valve, JIS 10K, 40A)

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%:

<table>
<thead>
<tr>
<th>Energy saving</th>
<th>Annual oil saving</th>
<th>CO₂ reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>18,300 [yen/year per unit]</td>
<td>0.25 [KL/year per unit]</td>
<td>0.66 [ton/year per unit]</td>
</tr>
</tbody>
</table>

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

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

**ENETHERMOTM R**

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

**ENETHERMOTM W**

Water-proof for outdoor use

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

1. Before installation
2. After installation