What is FINEFLEX\textsuperscript{\textregistered}-E?

FINEFLEX\textsuperscript{\textregistered}-E products consist of biosoluble fibers that are high in safety and excellent in thermal resistance. They have been developed in response to increasing awareness of environmental issues. The main chemical composition is silica, magnesia and calcia-based materials. It can be for use in thermal insulating, sealing, packing and sound absorption materials, etc. for a wide range of fields such as steel, non-ferrous metal, petrochemical and ceramic industries, etc.

FINEFLEX-E fibers were tested at RCC Ltd., a testing institute in Switzerland, in a biopersistence study and a low biopersistence of FINEFLEX-E fibers was confirmed. The safety of FINEFLEX-E products is enhanced to minimize an adverse biological effect on the human body as much as possible. FINEFLEX-E is exonerated from any carcinogenic classification under nota Q of directive 97/69 EC.

**RCC certificate**

- RCC Nos. 847117 and 847118

Advantages

- Biosoluble fibers with enhanced safety
- Excellent in heat resistance
- Excellent thermal insulating effect with low thermal conductivity
- Low heat storage reduces heat loss by heat storage to the furnace walls.
- Excellent in resistance to thermal shock
- Easy to handle due to its lightweight

Applications

- Thermal insulation materials for general home electric appliances
- Fire-resistant and thermal insulation materials for industrial applications (Lining materials and backup insulation materials)
- Thermal insulation materials for automotive parts

⚠️ Cautions for handling

Comply with your local regulations for occupational safety and health. Since inhalation of large amounts of fibers could produce an adverse effect on health, comply with the following cautions. Refer to Material Safety Data Sheet (MSDS) for more detailed information on occupational safety and health during handling.

1. In order to prevent dust dispersal during indoor handling, take appropriate measures such as the local exhaust ventilation.
2. In case where dust dispersal cannot be prevented, use dust respirators.
3. Wear dust-proof glasses and protective gloves if needed.
4. Remove the fibers from work clothes while preventing dispersal.
5. It is recommended to gargle and wash hand after handling.
6. Dispose the waste properly in accordance with your local regulations.

Other cautions:

Test results show the possibility that solubility of FINEFLEX-E fibers with normal saline solution start declining gradually after heating at temperature above approximately 800°C.
TOMBO® No. 5610
FINEFLEX®-E Bulk Fibers

FINEFLEX-E Bulk Fibers consist of a mass of silica, magnesia and calcia-based biosoluble refractory fibers. It is excellent in flexibility and resistance to thermal shock.

**Applications**
- Filling materials for thermal insulation purposes for use in ceilings and walls of a variety of furnaces.
- Packing for expansion allowance purposes for use in ceilings and walls of a variety of furnaces.
- Packing for expansion joint for use in a variety of furnaces.

**Physical properties**

<table>
<thead>
<tr>
<th>Properties</th>
<th>TOMBO No. 5610</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>White</td>
</tr>
<tr>
<td>Average diameter of fibers (μm)</td>
<td>4</td>
</tr>
<tr>
<td>Upper temperature limit (℃)</td>
<td>1260</td>
</tr>
<tr>
<td>Chemical composition (%)</td>
<td></td>
</tr>
<tr>
<td>SiO₂</td>
<td>75-80</td>
</tr>
<tr>
<td>MgO + CaO</td>
<td>19-25</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>1-3</td>
</tr>
</tbody>
</table>

*These figures are test results and should not be used for specification purposes.

TOMBO® No. 5620
FINEFLEX®-E Blanket

FINEFLEX-E Blanket is made of FINEFLEX-E Bulk Fibers stacked continuously. It is available in needled blanket form.

**Applications**
- General heat insulation materials.
- Thermal insulation lining and backup materials for use in ceilings and walls of furnaces.
- Packing for expansion allowance purposes for various locations inside the furnace.

**Physical properties**

<table>
<thead>
<tr>
<th>Properties</th>
<th>TOMBO No. 5620</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk density (kg/m³)</td>
<td>100 130</td>
</tr>
<tr>
<td>Linear heat shrinkage</td>
<td></td>
</tr>
<tr>
<td>1100℃×24hr</td>
<td>1.3</td>
</tr>
<tr>
<td>1260℃×24hr</td>
<td>2.7</td>
</tr>
</tbody>
</table>

*These figures are test results and should not be used for specification purposes.

**Standard dimensions**

<table>
<thead>
<tr>
<th>Type</th>
<th>Thickness (mm)</th>
<th>Width×Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.100</td>
<td>6, 12.5, 25</td>
<td>600×1200</td>
</tr>
<tr>
<td>No.130</td>
<td>50</td>
<td>600×1200</td>
</tr>
</tbody>
</table>

*Please contact us for availability of other sizes.

TOMBO No. 5620 (No.130) Thermal conductivity

![Graph showing thermal conductivity over temperature range](image)
FINEFLEX®-E Paper

FINEFLEX-E Paper is made of FINEFLEX-E Bulk Fibers mixed with a small amount of organic binder and formed through paper making process. It is highly flexible.

- **Applications**
  - Gaskets for burning appliances.
  - Thermal insulation materials for burning appliances and home electric appliances.
  - Cushioning materials for a variety of heating equipment.

### Physical properties

<table>
<thead>
<tr>
<th>Properties</th>
<th>TOMBO No. 5630</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk Density (kg/m³)</td>
<td>230</td>
</tr>
<tr>
<td>Tensile Strength (N/25mm)</td>
<td>30</td>
</tr>
<tr>
<td>Ignition Loss (%)</td>
<td>Less than 4.5</td>
</tr>
</tbody>
</table>

*These figures are test results and should not be used for specification purposes.

- **Standard dimensions**

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>Width×Length (mm)</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>600 × 1200</td>
<td>100 sheets per carton</td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td>50 sheets per carton</td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td>33 sheets per carton</td>
</tr>
<tr>
<td>4.0</td>
<td></td>
<td>25 sheets per carton</td>
</tr>
</tbody>
</table>

*Please contact us for availability of other thicknesses and dimensions.

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TOMBO® No. 5612
FINEFLEX®-E Hardboard

FINEFLEX-E Hardboard is made from FINEFLEX-E Bulk Fibers formed to slabs with inorganic and organic binders.

- **Applications**
  - General heat insulation materials.
  - Thermal insulation lining and backup materials for use in ceilings and walls of furnaces.
  - Packing for expansion allowance purposes for various locations inside the furnace.

### Physical properties

<table>
<thead>
<tr>
<th>Properties</th>
<th>TOMBO No. 5612-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulk Density (kg/m³)</td>
<td>270</td>
</tr>
<tr>
<td>Modulus of Rupture (MPa)</td>
<td>0.60</td>
</tr>
<tr>
<td>Linear Heat Shrinkage (%)</td>
<td>2.8</td>
</tr>
</tbody>
</table>

*These figures are test results and should not be used for specification purposes.

- **Standard dimensions**

<table>
<thead>
<tr>
<th>Thickness (mm)</th>
<th>Width×Length (mm)</th>
<th>Packaging</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>600 × 900</td>
<td>4 each per carton</td>
</tr>
<tr>
<td>50</td>
<td></td>
<td>2 each per carton</td>
</tr>
</tbody>
</table>

*Please contact us for availability of other thicknesses and dimensions.
FINEFLEX®-E Molded Shapes

FINEFLEX-E Molded Shapes are made from FINEFLEX-E Bulk Fibers vacuum formed in a wide variety of shapes. Various thickness, hardness and bulk density are available.

- **Applications**
  - Tap out cones for the molten aluminum tap hole, Plug covers.
  - Thermal insulation materials for applications with specific configurations.

- **Bulk Density**

| Bulk Density (kg/m³) | 250-400 |

*Please contact us for availability of a variety of configurations.*

FINEFLEX®-E Textiles

FINEFLEX-E Textiles are made from FINEFLEX-E Bulk Fibers with organic fibers added. They are available in yarns, cloths, etc.

- **Products**
  - **Cloth (TOMBO No. 8460)**
    - Reinforcement | Weave  | Weight   | Thickness (mm) | Length (m) |
    - Ferrochrome wire | Plain-woven | 1.1 (kg/m²) | 2  | 30 |
    - Stainless steel wire | Plain-woven | 1.1 (kg/m²) | 2  | 30 |
    - Fiberglass yarn | Plain-woven | 1.0 (kg/m²) | 2  | 30 |
  - **Tape (TOMBO No. 8461)**
    - Reinforcement | Thickness (mm) | Width (mm) | Length (m) |
    - Stainless steel wire | 2 | 25, 50, 75, 100 | 30 |
  - **Yarn (TOMBO No. 8462)**
    - Reinforcement | Thickness (mm) | No. of ply | Weight |
    - Ferrochrome wire | 1 | 2 | 1kg/coil |
  - **Cord (TOMBO No. 8463)**
    - Reinforcement | Diameter (mm) | Weight |
    - Ferrochrome wire | 3.25-12.7 | 1kg/coil |
  - **Braided rope (TOMBO No. 8464)**
    - TOMBO No. | Overbraided with | Size |
    - 8464-S | Stainless steel wire SUS304, 0.3mm diameter (Coarse mesh) | Diameter: 15-60mm |
    - 8464-G | Fiberglass yarn (Coarse mesh) | Length: 30m |
    - 8464-G Soft | Fiberglass yarn (Fine mesh) |

*These figures are test results and should not be used for specification purposes.*
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