Introducing 3M™ Thinsulate™ Acoustic Insulation TF Series

The science behind the silence.
About 3M
Our Vision

3M Technology Advancing Every Company
3M Products Enhancing Every Home
3M Innovation Improving Every Life
46 core technology platforms

Successful new product growth builds on uncommon connections
Air Borne

Dissipates...

Sound Energy

Structure Borne

Vibration Energy

Absorbers

Damping

NOISE CONTROL

Barriers

Isolators

Reduces Transmission of...

Sound Energy

Vibration Energy

Expanding the portfolio
A True Global Supplier
Regional Supply in 5 Continents....

...Same High Quality Products
A True NVH Partner

GLOBAL R&D

Leading Locations

- USA
- Japan
- China
- South Korea
- India
- Germany

INDUSTRY LEADING TESTING CAPABILITY

Material

- Large Room
- Component
- In-Vehicle
- Modeling
Product Overview
Design flexibility to meet your needs

*When compared to 3M™ Thinsulate™ Acoustic Insulation TC series portfolio, we offer...*

- Reduced cost and weight without sacrificing performance
- Improved performance at a given weight and thickness
3M™ Thinsulate™ Acoustic Insulation TF Series
When compared to our TC series portfolio, we offer:

- Improved design flexibility
- Better acoustic performance without adding weight
- Reduced weight and cost without sacrificing acoustic performance
- Allows easy changeover from current 3M™ Thinsulate™ Acoustic Insulation TC Series to new TF series
- Available in same weights and thicknesses as Thinsulate TC Series, allowing the OEM to use existing part designs
- Identical handling characteristics which allows the use of existing assembly methods and cutting tools
Building on our history of excellent acoustic performance we continue to develop better products.
# Features, Advantages, Benefits – Customer Version

## 3M™ Thinsulate™ Acoustic Insulation TF Series

When compared to our TC series portfolio, we offer:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Advantage</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved microfiber technology</td>
<td>Elongated and refined fibers at same weight</td>
<td>Improved acoustic performance at the same weight</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reduced weight and cost with the same acoustic performance</td>
</tr>
<tr>
<td>Optimized product construction</td>
<td>Better durability</td>
<td>Continuity of acoustic performance</td>
</tr>
<tr>
<td></td>
<td>Low density and improved compression recovery</td>
<td>Reduced weight and cost with the same acoustic performance</td>
</tr>
<tr>
<td>Double-sided scrim</td>
<td>Higher uniformity of microfiber</td>
<td>Good workability at production line</td>
</tr>
</tbody>
</table>
Physical Properties and Product Composition

Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Unit</th>
<th>TF1500</th>
<th>TF1800</th>
<th>TF2300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight A</td>
<td>g/m²</td>
<td>150</td>
<td>185</td>
<td>232</td>
</tr>
<tr>
<td>Thickness B</td>
<td>mm</td>
<td>16</td>
<td>21</td>
<td>27</td>
</tr>
<tr>
<td>Density</td>
<td>Kg/m³</td>
<td>9.375</td>
<td>8.810</td>
<td>8.593</td>
</tr>
</tbody>
</table>

**Thermal Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Unit</th>
<th>TF1500</th>
<th>TF1800</th>
<th>TF2300</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-Value</td>
<td>M² K/W</td>
<td>0.373</td>
<td>0.464</td>
<td>0.560</td>
</tr>
<tr>
<td>k-Value</td>
<td>W/mK</td>
<td>0.043</td>
<td>0.045</td>
<td>0.047</td>
</tr>
</tbody>
</table>

FMVSS 302: Pass

**Product Composition**

- Sound absorption and Thermal Insulation material
- Cover material (white)

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**Notes:**

A Weight is the mass per unit area of the entire absorber composite.

B Nominal thickness is measured using a 12 in² plate with 0.002 psi (= 14N/m²) applied to the sample per SAE J1355.

C R-Value is the thermal resistance of the insulation measured at the corresponding thickness per ASTM C518.

D k-value is thermal conductivity of the insulation material per ASTM C518.
Applications

Headliners

Door panels

Instrument panels

Pillars

Package trays
Attachment Methods

- Clips
- Ultra sonic welding
- Heat staking
- Hot Melt Adhesives
- Double-Sided Tape
Technical Overview

Note: The following technical information and data is based upon limited 3M testing conditions and should not be used for specification purposes. The information contained herein is believed to be reliable and correct, but the accuracy or completeness thereof is not guaranteed. Please use independently informed judgment before applying the information to your intended use. Nothing contained herein is to be construed as a recommendation for uses of such information which infringe any patent.
Technical Benefits

3M™ Thinsulate™ Acoustic Insulation TF Series

- Improved acoustic performance at given weight over other Thinsulate TC Series products
- Lighter weight product with comparable performance compared to other Thinsulate TC Series products
  - Products: 150~232 gsm, 16~27 mm
- Advanced fiber technology
- Lower density with good compression and recovery
- Passes customer requirements for durability
- Flammability: passes FMVSS302 (horizontal flammability resistance)
Acoustic Performance Improvement – Thinsulate TF Series

Performance improvement 20~30% over Thinsulate TC Series for same basis weight

![Graph](image-url)

3M™ Thinsulate™ Acoustic Insulation TF Series

- TF1500 (150 g/m², t16)
- TF1800 (185g/m², t21)
- TF2300 (232g/m², t27)
Thinsulate TF Series maintains acoustic performance after heat aging.
Reverberation Room Test Results

3M™ Thinsulate™ Acoustic Insulation
TF1500, 150 g/m², t16

3M™ Thinsulate™ Acoustic Insulation
TF1800, 185 g/m², t21

3M™ Thinsulate™ Acoustic Insulation
TF2300, 232 g/m², t27

Sound Absorption Coefficient
Random Incident

1/3 Octave Band Center Frequency [Hz]
3M™ Thinsulate™ Acoustic Insulation TF Series

- Improved acoustic performance at given weight over other Thinsulate TC Series products
- Lighter weight product with comparable performance compared to other Thinsulate TC Series products
- Advanced fiber technology
- Lower density with good compression and recovery for gap filling applications
- Passes customer requirements for durability
Thank you!
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