Amino Modified Silicone Fluid
TSF4703

TSF4703 is an amino modified silicone fluid developed for textile softener use. It can be easily emulsified to a stable micro emulsion, which gives durable softness and smoothness to cotton, blending cotton woven fabrics and knitted products.

KEY FEATURES
♦ Good affinity to fabrics
♦ Easy to formulate
♦ Imparts durable softness to many fabrics

APPLICATIONS
♦ Textile softener

TYPICAL PROPERTY DATA

<table>
<thead>
<tr>
<th>PROPERTIES</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Light yellow, transparent</td>
</tr>
<tr>
<td>Specific gravity (25°C)</td>
<td>0.98</td>
</tr>
<tr>
<td>Viscosity (25°C) mPa·s (cP)</td>
<td>1,000 {1,000}</td>
</tr>
<tr>
<td>Refractive index (nD 25)</td>
<td>1.408</td>
</tr>
<tr>
<td>Amino equivalent g/mol</td>
<td>1,600</td>
</tr>
</tbody>
</table>

Typical property data values should not be used as specifications.

CHEMICAL STRUCTURE

A: CH₃ or OR"
**SOLUBILITY**

<table>
<thead>
<tr>
<th>Soluble</th>
<th>Toluene, Mineral sprits, Methyl ethyl ketone, Isopropanol, Dimethyl silicone fluid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insoluble</td>
<td>Methyl cellosolve, Water, Liquid paraffin</td>
</tr>
</tbody>
</table>

**EMULSIFICATION INSTRUCTIONS**

1. Blend the following ingredients using an overhead stirrer.
   - TSF4703 15.0 parts
   - DOBANOX 23E (Lion Corporation)* 7.5 parts
   - Ethylene glycol monobutyl ether 7.5 parts
   - *C_{12-13}H_{25-27}O(CH_2CH_2O)_5H (HLB9.9)

2. Slowly add 69.7 parts of ion exchanged with good agitation.
   - Note: if desired, biocides may be added in this step.

3. Slowly add 0.3 parts of acetic acid. Agitate well for 5-10 minutes to insure homogeneity.

**APPLICATION EXAMPLE AS A SOFTENER**

**TEST CONDITION**

<table>
<thead>
<tr>
<th>Treating bath</th>
<th>2% effective content (TSF4703+DOBANOX 23E) of above emulsion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test fabrics</td>
<td>Cotton woven</td>
</tr>
<tr>
<td>Treating condition</td>
<td>Padding (pick up 100% for Cotton); Drying (130°C, 3min)</td>
</tr>
</tbody>
</table>

**Evaluation of softness**

- Pure Bending Tester (KES-FB2: KATO TECH Co., LTD)
  - Softness*: (B+2HB)/2
  - B: Bending rigidity (g·cm²/cm), 2HB: Hysteresis of B (g·cm/cm)

**Evaluation of smoothness**

- Surface Tester (KES-FB4: KATO TECH Co., LTD)
  - MIU*: Mean friction coefficient
  - MMD*: Mean deviation of friction coefficient

**Yellowing**

- Δb measured after heating at 175°C for 30min. with color differential tester based on untreated fabric color

**Washing durability**

- Residual Si rate (%) measured with X-ray Fluorescence Spectrometer (Washing condition: JIS L-0217 103 method)

**Water absorption**

- Water absorbing capacity measured height (mm) of drawn up water for 10 minutes (JIS L-1018 B-method)

**TEST RESULTS**

<table>
<thead>
<tr>
<th>Softener</th>
<th>Handling touch</th>
<th>Softness*¹</th>
<th>Smoothness MIU<em>²/MMD</em>³</th>
<th>Yellowing Δb</th>
<th>Washing durability %</th>
<th>Water absorption mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSF4703</td>
<td>Slippery</td>
<td>0.043</td>
<td>0.08/0.012</td>
<td>+1.6</td>
<td>94</td>
<td>30</td>
</tr>
<tr>
<td>Untreated</td>
<td>Rough</td>
<td>0.070</td>
<td>0.14/0.015</td>
<td>0</td>
<td>0</td>
<td>71</td>
</tr>
</tbody>
</table>

Note

*1: A smaller number means softer touch.
*2, *3: A smaller number means smoother touch.
*4: A larger number means better durability.
*5: A smaller number means less yellowing.
HANDLING AND SAFETY
♦ Maintain adequate ventilation in the work area at all times.
♦ Wear eye protection, protective gloves at all times when working with this product.
♦ In case of skin contact, wash skin with soap and plenty of water. If irritation occurs, contact a physician.
♦ A study of the chemical in rats, using fumes, shows very high lethal dose. Do not use in aerosol applications.

STORAGE
♦ Store in a cool, dry place out of direct sunlight.
♦ Keep out of the reach of children.

PACKAGING
♦ 1kg can available in cases of 10
♦ 15kg can available
♦ 200kg drum available

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