Section 1 - Product and Company Identification

Hazard Label: WARNING label

Company Information
Johns Manville Engineered Products Group
Filtration and Manufacturing Division
P.O. Box 5108
Denver, CO 80127 USA

Telephone: 303-978-2000 8:00AM-5:00PM M-F
Internet Address: www.jm.com
Emergency: 800-424-9300 (Chemtrec, in English)

Trade Names: Micro-Fiber® Felt Type 475; Micro-Strand® Fiber Glass Micro-Fibers Type 475 (Bulk, Felts, Mats, and Webs)

Section 2 - Hazards Identification

Emergency Overview
Inhalation of excessive amounts of dust from the product may cause temporary upper respiratory irritation and/or congestion--remove individual to fresh air.

Summary
Breathing dust from this product may cause a scratchy throat, congestion, and slight coughing. Getting dust or fibers on the skin, or in the eyes may cause itching, rash, or redness. Additional health and safety information is provided in Section 11 of this safety data sheet.

Inhalation
Temporary mechanical irritation may occur upon exposure to dust or fibers released from cutting this product.

Skin
Temporary irritation (itching) or redness may occur.

Ingestion
This product is not intended to be ingested (eaten). If ingested, it may cause temporary irritation to the gastrointestinal (digestive) tract.

Eyes
Temporary irritation (itching) or redness may occur.

Ears
Temporary irritation (itching) or redness may occur.

Primary Routes of Entry (Exposure)
Eyes, skin, inhalation (breathing dust and fibers) and ingestion.

Target Organs
Nose (nasal passages), throat, lungs, skin, eyes

Medical Conditions Aggravated by Exposure
Pre-existing chronic respiratory, skin, or eye diseases or conditions.

Section 3 - Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>CAS #</th>
<th>Component</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Available</td>
<td>Special Purpose Glass Fiber Respirable Size</td>
<td>100</td>
</tr>
<tr>
<td>1314-13-2</td>
<td>Zinc oxide (Glass component)</td>
<td>&lt;6*</td>
</tr>
<tr>
<td>1304-28-5</td>
<td>Barium oxide (Glass component)</td>
<td>&lt;6*</td>
</tr>
</tbody>
</table>

Component Information
* Component does not exist in a chemically free state in the product.

Average fiber diameter = 0.26 - 2.70 microns.

General Product Description
White fibrous glass in bulk or in the form of felts, mats, or webs.

Section 4 - First Aid Measures

First Aid: Inhalation
If dust is inhaled in excess of exposure limits referenced in section 8 of this safety data sheet, remove individual to fresh air.
Drink water to clear throat, and blow nose to remove dust.
First Aid: Skin
Wash gently with soap and water to remove dust and fibers. Alternatively, fibers can be removed from the skin by use of ordinary masking or wrapping tape. Should irritation persist, seek medical attention.

First Aid: Ingestion
Rinse mouth with water to remove dust and fibers and drink plenty of water to help reduce irritation. If irritation persists, seek medical attention.

First Aid: Eyes
Do not rub or scratch eyes. Dust particles may cause the eye to be scratched. Flush eyes with large amounts of water until irritation subsides. If irritation persists, seek medical attention.

First Aid: Ears
Wash exposed skin with soap and water. If irritation develops in the inner ear, seek medical attention.

First Aid: Notes to Physician
Dust from the product may cause mechanical irritation of the eyes, skin, and upper respiratory tract. Treat symptomatically.

### Section 5 - Fire Fighting Measures

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Upper Flammable Limit (UFL)</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Auto Ignition</td>
<td>Not determined</td>
</tr>
<tr>
<td>Rate of Burning</td>
<td>Not determined</td>
</tr>
<tr>
<td>Extinguishing Media</td>
<td>Carbon dioxide (CO₂), water, water fog, dry chemical.</td>
</tr>
<tr>
<td>Fire Fighting Equipment/Instructions</td>
<td>No special procedures are expected to be necessary for this product. Normal fire fighting procedures should be followed to avoid inhalation of smoke and gases.</td>
</tr>
</tbody>
</table>

### Section 6 - Accidental Release Measures

**Clean-Up Procedures**
Pick up large pieces. Vacuum dusts. If sweeping is necessary, use a dust suppressant such as water. Do not dry sweep dust accumulation. These procedures will help to minimize potential exposures.

### Section 7 - Handling and Storage

**Handling Procedures**
Use protective equipment as described in Section 8 of this safety data sheet when handling uncontained material. Handle in accordance with good industrial hygiene and safety practices.

**Storage Procedures**
Warehouse storage should be in accordance with package directions, if any. Material should be kept clean, dry, and in original packaging.

### Section 8 - Exposure Controls / Personal Protection

The Occupational Safety and Health Administration (OSHA) has not adopted specific occupational exposure standards for fiber glass. Fiber glass is treated as a nuisance dust and is regulated by OSHA as a particulate not otherwise regulated (total dust) shown in CFR 1910.1000 Table Z-3.

- Respirable fraction 5 mg/m³
- Total dust 15 mg/m³

JM has adopted the fiber glass industry voluntary Product Stewardship Program (PSP), formerly the NAIMA-OSHA Health and Safety Partnership Program (HSPP). Under the PSP, JM recommends that exposures be limited to the voluntary concentration of 1 f/cc TWA for fibers longer than 5 microns with a diameter less than 3 microns. This will help minimize potential irritation effects. The PSP also includes the PPE recommendations described below.
Zinc oxide (Glass component) (1314-13-2)

OSHA: 5 mg/m³ TWA (fume); 15 mg/m³ TWA (total dust); 5 mg/m³ TWA (respirable fraction)
5 mg/m³ TWA (fume); 10 mg/m³ TWA (total dust); 5 mg/m³ TWA (respirable fraction)
ACGIH: 2 mg/m³ TWA (respirable fraction)
10 mg/m³ STEL (respirable fraction)

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes/face
Safety glasses with side shields are recommended to keep dust out of the eyes.

Personal Protective Equipment: Ears
Use ear protection (earplugs, hood, or earmuffs) to prevent airborne dust or fibers from entering the ear, if necessary.

Personal Protective Equipment: Skin
Leather or cotton gloves should be worn to protect against mechanical abrasion. See also Personal Protective Equipment: General, below.

Personal Protective Equipment: Respiratory
A respirator should be used if ventilation is unavailable, or is inadequate for keeping dust and fiber levels below the applicable exposure limits referenced in Section 8 of this SDS. Wear a NIOSH-certified disposable or reusable particulate respirator with an efficiency rating of N95 or higher (per 42 CFR 84) when dust or fiber concentrations exceed the applicable exposure limits. Operations such as sawing, blowing, tear out, and spraying may generate airborne fiber concentrations requiring a higher level of respiratory protection. For exposures up to 50 times the established exposure limits use a full-face respirator, rated N99 or higher.

Ventilation
In fixed manufacturing settings, local exhaust ventilation should be provided at areas of cutting, milling or other processing to remove airborne dust and fibers.

Personal Protective Equipment: General
Wear a cap, a loose-fitting, long-sleeved shirt and long pants to protect skin from irritation. Exposed skin areas should be washed with soap and water after handling or working with fiber glass. Clothing should be washed separately from other clothes, and the washer should be rinsed thoroughly (run empty for a complete wash cycle). This will reduce the chances of fiber glass being transferred to other clothing.

Section 9 - Physical & Chemical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>White fibrous glass in bulk or in the form of felts, mats, or webs.</td>
</tr>
<tr>
<td>Physical State</td>
<td>Solid</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>Not determined</td>
</tr>
<tr>
<td>Solubility (H₂O)</td>
<td>Nil</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Not applicable</td>
</tr>
<tr>
<td>VOC</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Odor</td>
<td>No significant odor</td>
</tr>
<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor Density</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Melting Point</td>
<td>&gt;704°C/1300°F</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>Variable</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Percent Volatile</td>
<td>0</td>
</tr>
</tbody>
</table>

Section 10 - Stability & Reactivity Information

Stability
These products are not reactive.

Hazardous Decomposition
May form carbon dioxide and carbon monoxide.

Hazardous Polymerization
Will not occur.

Section 11 - Toxicological Information

Acute Toxicity
A: General Product Information
Dust from this product is a mechanical irritant, which means that it may cause temporary irritation or scratchiness of the throat, and/or itching of the eyes and skin.
B: Component Analysis - LD50/LC50
Zinc oxide (Glass component) (1314-13-2)
Oral LD50 Rat: >5000 mg/kg

Component Carcinogenicity
Special Purpose Glass Fiber Respirable Size
ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
NTP: Reasonably Anticipated To Be A Human Carcinogen (respirable size) (Possible Select Carcinogen)
IARC: Group 2B - Possibly Carcinogenic to Humans (IARC Monograph 81 [2002] (such as E-glass and 475 glass fibres listed under Man-made vitreous fibres))

Chronic Toxicity
There is sufficient evidence in experimental animals for the carcinogenicity of special purpose glass fibers including E-glass and ‘475’ glass fibers. Many intraperitoneal studies of special-purpose glass fibers have been conducted, most of which have examined the tumorigenic potential of two compositions of special-purpose glass fibers (E-glass and ‘475’ fibers) after injection or surgical implantation of fibers at high doses (approximately 10⁹ fibers) into the peritoneal cavity of rats. All of these studies reported an increase in peritoneal tumors. (IARC VOL: 81 (2002)).

Per the Toxicological Profile for Synthetic Vitreous Fibers by the Agency for Toxic Substances and Disease Registry (ATSDR), the International Agency for the Research on Cancer (IARC 2002) concluded that special purpose glass fibers (E-glass and 475 glass fibers) not used as insulating materials were classified as Group 2B, possibly carcinogenic to humans, because of their relatively high biopersistence.

The U.S. Department of Health and Human Services, National Toxicology Program (NTP 1998, 2000, 2002) classified glass wool (respirable size) as reasonably anticipated to be a human carcinogen, based on sufficient evidence of carcinogenicity in animals. This assessment was originally prepared in 1993-1994 for the 7th Report on Carcinogens (NTP 1994), but has not been updated since then in the 8th, 9th, or 10th Reports on Carcinogens (NTP 1998, 2000, 2002).
B: Component Analysis
This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

**Barium oxide (Glass component) (1304-28-5)**

SARA 313: 1.0 % de minimis concentration (does not include Barium sulfate CAS 7727-43-7, Chemical Category N040)

State Regulations
A: General Product Information
The glass fibers in this product are not known to be regulated. Other state regulations may apply. Check individual state requirements.

B: Component Analysis - State
The following components appear on one or more of the following state hazardous substances lists:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>CA</th>
<th>FL</th>
<th>MA</th>
<th>MN</th>
<th>NJ</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc oxide (Glass component)</td>
<td>1314-13-2</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Barium oxide (Glass component) (related to Barium compounds)</td>
<td>1304-28-5</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

**WARNING!** This product contains a chemical known to the state of California to cause cancer.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Purpose Glass Fiber Respirable Size</td>
<td>Not Available</td>
</tr>
</tbody>
</table>

TSCA Status
This product and its components are listed on the TSCA 8(b) inventory.

None of the components listed in this product are listed on the TSCA Export Notification 12(b) list.

International Regulations
A: General Product Information
These products are considered articles under both U.S. and international product regulations and as such, these products do not require registration or notification on the various country-specific inventories.

B: Component Analysis - WHMIS IDL
The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS #</th>
<th>Minimum Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Purpose Glass Fiber Respirable Size</td>
<td>Not Available</td>
<td>1% (related to Fibrous glass)</td>
</tr>
<tr>
<td>Zinc oxide (Glass component)</td>
<td>1314-13-2</td>
<td>1%</td>
</tr>
</tbody>
</table>

WHMIS Classification
Controlled Product Classification: D2A
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations. This SDS contains all the information required by the Controlled Products Regulations.

Section 16 - Other Information

Prepared for:
Johns Manville Engineered Products Group
Filtration and Manufacturing Division
P.O. Box 5108
Denver, CO 80217-5108

Prepared by:
Johns Manville Technical Center
P.O. Box 625005
Littleton, CO USA 80162-5005
The information herein is presented in good faith and believed to be accurate as of the effective date given. However, no warranty, expressed or implied, is given. It is the buyer’s responsibility to ensure that its activities comply with Federal, State or provincial, and local laws.

<table>
<thead>
<tr>
<th>Date</th>
<th>MSDS #</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/13/00</td>
<td>1004-1.0000</td>
<td>New MSDS authoring system. Corrected CAS # for barium and zinc oxides (Sect. 2) to agree with new MSDS 1116 for 475 CF.</td>
</tr>
<tr>
<td>01/08/01</td>
<td>1004-1.0100</td>
<td>Minor regulatory update per LOLI.</td>
</tr>
<tr>
<td>1/09/02</td>
<td>1004-1.0101</td>
<td>Update Sections 1 and 11 to reflect IARC 2001 review of fiber glass.</td>
</tr>
<tr>
<td>06/06/02</td>
<td>1004-1.0200</td>
<td>Sect. 15: SARA 313 information for Zinc oxide inserted.</td>
</tr>
<tr>
<td>10/08/03</td>
<td>1004-1.0300</td>
<td>Minor edits. Entered RR# for special purpose glass fiber.</td>
</tr>
<tr>
<td>10/22/03</td>
<td>1004-1.0400</td>
<td>Update section 15 for zinc.</td>
</tr>
<tr>
<td>02/22/05</td>
<td>1004-1.0401</td>
<td>Minor regulatory update.</td>
</tr>
<tr>
<td>07/13/05</td>
<td>1004-1.0402</td>
<td>Updated Section 8 exposure; Updated Section 15 SARA, CERCLA, WHMIS, and State.</td>
</tr>
<tr>
<td>03/01/06</td>
<td>1004-1.0403</td>
<td>Updated composition in Section 2. Minor edits throughout.</td>
</tr>
<tr>
<td>09/18/06</td>
<td>1004-1.0404</td>
<td>Updated MSDS for TSCA article exemption.</td>
</tr>
<tr>
<td>10/21/08</td>
<td>1004-1.0405</td>
<td>Regulatory update. SDS updated to GHS format. Updated composition of glass to include zinc and barium.</td>
</tr>
</tbody>
</table>

End of Sheet 1004