1. Chemical product and company identification

A. Product name  
VERSAFLOW 60 PLUS; VERSAFLOW 60 PLUS WF

B. Recommended use and Limitations on use

Recommended use: For Industrial Use Only
Limitations on use: Users should be informed of the potential presence of respirable dust and respirable crystalline silica as well as their potential hazards. Appropriate training in the proper use and handling of this material should be provided as required under applicable regulations.

C. Supplier information

Company name: HarbisonWalker International
Address: 1305 Cherrington Parkway, Suite 100
Moon Township Pennsylvania 15108
United States

Telephone: General Phone: 412-375-6600
Email: sds@thinkhw.com
Contact person: Product Safety Specialist
Emergency telephone number: CHEMTREC 24 HOUR 1-800-424-9300

2. Hazards identification

A. Hazard category/Classification

Physical hazards: Not classified.
Health hazards:
- Carcinogenicity: Category 1A
- Specific target organ toxicity, single exposure: Category 3 respiratory tract irritation
- Specific target organ toxicity, repeated exposure: Category 2

Environmental hazards: Not classified.

B. Warning label items including precautionary statement

• Pictogram

• Signal word Danger

• Hazard statement
  - H335: May cause respiratory irritation.
  - H350: May cause cancer.
  - H373: May cause damage to organs through prolonged or repeated exposure.

• Precautionary statement

Prevention
- P201: Obtain special instructions before use.
- P202: Do not handle until all safety precautions have been read and understood.
- P260: Do not breathe dust/fume/gas/mist/vapors/spray.
- P271: Use only outdoors or in a well-ventilated area.
- P281: Use personal protective equipment as required.

Response
- P304 + P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P308 + P313: IF exposed or concerned: Get medical advice/attention.
- P312: Call a POISON CENTER or doctor/physician if you feel unwell.

Storage
- P403 + P233: Store in a manner to minimize airborne dust.

Disposal
- P501: Dispose of contents/container (in accordance with related regulations).
None known.

C. Other hazards not included in the hazard category criteria (e.g. dust explosion hazard)

Supplemental information

None.

3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Chemical identity</th>
<th>Common and alternative names</th>
<th>CAS number</th>
<th>ID number</th>
<th>Content in percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mullite</td>
<td></td>
<td>1302-93-8</td>
<td>KE-01057</td>
<td>60 - 80</td>
</tr>
<tr>
<td>Amorphous Silica</td>
<td></td>
<td>7631-86-9</td>
<td>KE-31032</td>
<td>10 - 20</td>
</tr>
<tr>
<td>Aluminium Oxide (Non-Fibrous)</td>
<td></td>
<td>1344-28-1</td>
<td>KE-01012</td>
<td>2.5 - 10</td>
</tr>
<tr>
<td>Cement, Alumina, Chemicals</td>
<td></td>
<td>65997-16-2</td>
<td>KE-00880</td>
<td>2.5 - 10</td>
</tr>
<tr>
<td>Fumes, Silica</td>
<td></td>
<td>69012-64-2</td>
<td>KE-17303</td>
<td>2.5 - 10</td>
</tr>
<tr>
<td>Titanium Dioxide</td>
<td></td>
<td>13463-67-7</td>
<td>KE-33900</td>
<td>1 - 2.5</td>
</tr>
</tbody>
</table>

Other components below reportable levels 2.5 - 10

4. First aid measures

A. In case of eye contact
Rinse with water. Get medical attention if irritation develops and persists.

B. In case of skin contact
Wash off with soap and water. Get medical attention if irritation develops and persists.

C. In case of inhalation
Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.

D. In case of swallowing
Rinse mouth. Get medical attention if symptoms occur.

E. Note to physician
Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General advice
IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

A. Suitable (and unsuitable) extinguishing media
Use fire-extinguishing media appropriate for surrounding materials.

B. Specific hazards arising from the chemical (example: hazardous combustion products)
Not available.

C. Specific methods of fire-fighting
Not available.

6. Accidental release measures

A. Personal precautions, protective equipment and emergency measures
Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the MSDS.

B. Environmental precautions
Avoid discharge into drains, water courses or onto the ground.

C. Methods and materials for containment and cleaning up
Stop the flow of material, if this is without risk. Following product recovery, flush area with water. Put material in suitable, covered, labeled containers. For waste disposal, see section 13 of the MSDS.

7. Handling and storage

A. Precautions for safe handling
Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. Do not breathe dust. Avoid prolonged exposure. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Observe good industrial hygiene practices.

B. Conditions for safe storage (including any incompatibilities)
Avoid dust formation. Store away from incompatible materials (see Section 10 of the MSDS).
8. Exposure controls/personal protection

A. Exposure limit values, biological limit values, etc

Korea. OELs. Standards for Exposure to Chemical Substances and Physically Hazardous Factors

<table>
<thead>
<tr>
<th>Components</th>
<th>Value</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium Oxide (Non-Fibrous) (CAS 1344-28-1)</td>
<td>10 mg/m³</td>
<td>TWA</td>
</tr>
<tr>
<td>Amorphous Silica (CAS 7631-86-9)</td>
<td>10 mg/m³</td>
<td>TWA</td>
</tr>
<tr>
<td>Titanium Dioxide (CAS 13463-67-7)</td>
<td>10 mg/m³</td>
<td>TWA</td>
</tr>
</tbody>
</table>

US. ACGIH Threshold Limit Values

<table>
<thead>
<tr>
<th>Components</th>
<th>Value</th>
<th>Type</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium Oxide (Non-Fibrous) (CAS 1344-28-1)</td>
<td>1 mg/m³</td>
<td>TWA</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td>Mullite (CAS 1302-93-8)</td>
<td>1 mg/m³</td>
<td>TWA</td>
<td>Respirable fraction.</td>
</tr>
<tr>
<td>Titanium Dioxide (CAS 13463-67-7)</td>
<td>10 mg/m³</td>
<td>TWA</td>
<td>Respirable fraction.</td>
</tr>
</tbody>
</table>

Biological limit values

No biological exposure limits noted for the ingredient(s).

Exposure guidelines

Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

B. Appropriate engineering controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

C. Personal protective equipment

- **Respiratory protection**
  Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.

- **Eye protection**
  If contact is likely, safety glasses with side shields are recommended.

- **Hand protection**
  Wear appropriate chemical resistant gloves.

- **Body protection**
  Use of an impervious apron is recommended.

Hygiene measures

Observe any medical surveillance requirements. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

A. Appearance

- **Physical state**: Solid.
- **Form**: Solid.
- **Color**: Not available.

B. Odor

Not available.

C. Odor threshold

Not available.

D. pH

Not available.

E. Melting point/freezing point

Not available.

F. Boiling point, initial boiling point, and boiling range

Not available.

G. Flash point

Not available.

H. Evaporation rate

Not available.

I. Flammability (solid, gas)

Not available.

J. Upper/lower limit on flammability or explosive limits

- **Flammability limit - lower (%)**: Not available.
- **Flammability limit - upper (%)**: Not available.
Explosive limit - lower (%) Not available.
Explosive limit - upper (%) Not available.
K. Vapor pressure Not available.
L. Solubility
Solubility (water) Not available.
M. Vapor density Not available.
N. Specific gravity Not available.
O. n-octanol/water partition coefficient Not available.
P. Auto-ignition temperature Not available.
Q. Decomposition temperature Not available.
R. Viscosity Not available.
S. Molecular weight Not available.
Other data
Explosive properties Not explosive.
Oxidizing properties Not oxidizing.

10. Stability and reactivity
Reactivity
The product is stable and non-reactive under normal conditions of use, storage and transport.

A. Stability and hazardous reaction potential
Material is stable under normal conditions. No dangerous reaction known under conditions of normal use.

B. Conditions to avoid (e.g. static discharge, shock or vibration, etc)
Contact with incompatible materials.

C. Incompatible materials
Incompatibility is based strictly upon potential theoretical reactions between chemicals and may not be specific to industrial application exposure.

D. Hazardous decomposition products
No hazardous decomposition products are known.

11. Toxicological information

A. Information on likely routes of exposure
• Respiratory organs May cause irritation to the respiratory system. Prolonged inhalation may be harmful.
• Skin No adverse effects due to skin contact are expected.
• Eyes Direct contact with eyes may cause temporary irritation.
• Mouth Expected to be a low ingestion hazard.

B. Information on health hazards
• Acute toxicity (list all possible routes of exposure) Not known.
• Corrosivity or irritation to the skin Prolonged skin contact may cause temporary irritation.
• Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.
• Respiratory sensitization Not a respiratory sensitizer.
• Skin sensitization This product is not expected to cause skin sensitization.
• Carcinogenic properties
/Carcinogenicity

In 1997, IARC (the International Agency for Research on Cancer) concluded that crystalline silica inhaled from occupational sources can cause lung cancer in humans. However in making the overall evaluation, IARC noted that "carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." (IARC Monographs on the evaluation of the carcinogenic risks of chemicals to humans, Silica, silicates dust and organic fibres, 1997, Vol. 68, IARC, Lyon, France.) In June 2003, SCOEL (the EU Scientific Committee on Occupational Exposure Limits) concluded that the main effect in humans of the inhalation of respirable crystalline silica dust is silicosis. "There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and, apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore, preventing the onset of silicosis will also reduce the cancer risk..." (SCOEL SUM Doc 94-final, June 2003) According to the current state of the art, worker protection against silicosis can be consistently assured by respecting the existing regulatory occupational exposure limits. May cause cancer. Occupational exposure to respirable dust and respirable crystalline silica should be monitored and controlled.

IARC Monographs. Overall Evaluation of Carcinogenicity

Amorphous Silica (CAS 7631-86-9) 3 Not classifiable as to carcinogenicity to humans.
Fumes, Silica (CAS 69012-64-2) 3 Not classifiable as to carcinogenicity to humans.
Titanium Dioxide (CAS 13463-67-7) 2B Possibly carcinogenic to humans.

• Mutagenic properties
/Mutagenicity

No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

• Reproductive toxicity

This product is not expected to cause reproductive or developmental effects.

• Specific target organ toxicity - single exposure

May cause respiratory irritation.

• Specific target organ toxicity - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

• Aspiration hazard

Not an aspiration hazard.

12. Ecological information

A. Ecotoxicity

The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Hazardous to the aquatic environment, acute hazard

The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

B. Persistence/degradability

No data is available on the degradability of this product.

C. Bioaccumulative potential

No data available.

D. Mobility in soil

No data available for this product.

E. Other adverse effects

No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

A. Method of disposal

This product, in its present state, when discarded or disposed of, is not a hazardous waste according to Federal regulations (40 CFR 261.4 (b)(4)). Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.

B. Disposal considerations

(including disposal of contaminated containers or packaging)

Waste code

Since this product is used in several industries, no Waste Code can be provided by the supplier. The Waste Code should be determined in arrangement with your waste disposal partner or the responsible authority.

14. Transport information

IATA

A. UN number

Not applicable.

B. UN proper shipping name

Not applicable.

C. Transport hazard class(es)

Class

Not applicable.

Subsidiary risk

- 

D. Packing group

Not applicable.

E. Environmental hazards

No.

F. Special precautions for user

Not applicable.
15. Regulatory information

A. Restrictions under the Industrial Safety and Health Law

Harmful Substances Prohibited from Manufacturing
Not regulated.

Harmful Substances Requiring Permission for Manufacture or Use
Not regulated.

Controlled Hazardous Substances
- Aluminium Oxide (Non-Fibrous) (CAS 1344-28-1)
- Mullite (CAS 1302-93-8)
- Titanium Dioxide (CAS 13463-67-7)

Harmful Substances Requiring Special Medical Examination
- Mullite (CAS 1302-93-8)
- MINERAL DUST (CAS 1344-28-1)
- MINERAL DUST (CAS 13463-67-7)

Workplace Environmental Monitoring Harmful Materials
- Mullite (CAS 1302-93-8)
- OTHER MINERAL DUST (CAS 1344-28-1)
- OTHER MINERAL DUST (CAS 13463-67-7)

Occupational Exposure Limit
- Aluminium Oxide (Non-Fibrous) (CAS 1344-28-1)
- Amorphous Silica (CAS 7631-86-9)
- Titanium Dioxide (CAS 13463-67-7)

B. Restrictions under the Chemicals Control Law (Previously Toxic Chemicals Control Law)

Accidental Release Prevention Substances
Not regulated.

Observational Chemicals
Not regulated.

C. Restrictions under the Dangerous Substance Safety Management Act

D. Restrictions under the Wastes Control Act

Halogenated Materials in Waste Organic Solvents
Not regulated.

Hazardous Substances
Not regulated

E. Restrictions under other foreign or domestic laws

Clean Air Conservation Act

Air Pollutants
- Aluminium Oxide (Non-Fibrous) (CAS 1344-28-1)
- Mullite (CAS 1302-93-8)
- Titanium Dioxide (CAS 13463-67-7)

Specific Air Pollutants
Not regulated.

Act on the Registration and Evaluation of Chemicals

Banned Toxic Chemicals
Not regulated.
Designated Existing Chemicals Subject to Registration (PEC) (MoE No. 2015-92)

Not listed.

**Restricted Chemical Substances**
Not regulated.

**Toxic Chemicals**
Not regulated.

**Further information**
This material safety data sheet was prepared in accordance with Article 41 of the Industrial Safety and Health Law.

**Inventory status**

<table>
<thead>
<tr>
<th>Country(s) or region</th>
<th>Inventory name</th>
<th>On inventory (yes/no)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea</td>
<td>Existing Chemicals List (ECL)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s).

*A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information

A. Source of information
Not available.

B. Issue date
07-20-2018

C. Number of revisions and date of most recent revision
Not applicable.

D. Other
Not available.

**Disclaimer**
This information is based on our present knowledge on creation date. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

**Revision information**
Product and Company Identification: Product Codes
Composition / Information on Ingredients: Ingredients