1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product Identifiers

Product Name: Pan Caspase Inhibitor Z-VAD-FMK
Catalog Number: FMK001

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified Uses: For Research Use Only

1.3 Details of the supplier of the safety data sheet

Company: R&D Systems, Inc. a Bio-Techne Brand
614 McKinley Place NE
Minneapolis, MN 55413, USA

Telephone: 1-800-343-7475
Fax: 1-612-656-4400
Internet: www.rndsystems.com
Email address: info@bio-techne.com

Canada: 461 North Service Rd West
Unit B37
Oakville, ON L6M 2V5

Telephone: 1-855-668-8722
Fax: 902-827-6402
Email address: Canada.inquiries@bio-techne.com

United Kingdom: 19 Barton Lane
Abingdon Science Park
Abingdon, OX14 3NB

Telephone: 44 (0)1235 529449
Fax: 44 (0)1235 533420
Email address: info.emea@bio-techne.com

China: 1193 Changning Road
Unit 1901, Raffles Changning Office
Shanghai, China

Telephone: 86-400-821-3475
Fax: 76 (021)52371001
Email address: techsupport.cn@bio-techne.com

1.4 Emergency Telephone Number

Emergency Tel: US: 612-379-2956 or 800-343-7475 / Europe: +44(0)1235-529449 / China 86-400-821-3475

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

This substance does not meet the classification criteria of the EC Directives 67/548/EEC, 1999/45/EC, 1272/2008 [CLP], GHS or 29 CFR 1910.1200 [OSHA].

2.2 Label Elements

The product does not need to be labelled in accordance with EC directives or respective national laws.

2.3 Other Hazards - None

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Not applicable.

3.2 Mixtures

This product does not contain hazardous chemicals at concentrations of 1% or greater. This product is not known to contain carcinogens at concentrations of 0.1% or greater.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General Advice
Consult a doctor and show this safety data sheet.

If Inhaled
Remove to fresh air and monitor breathing. If breathing becomes difficult, give oxygen. If breathing stops, give artificial respiration. Consult a doctor.

In Case of Skin Contact
Immediately wash skin with copious amounts of soap and water for at least 15 minutes. Remove contaminated clothing and shoes and wash before reuse. Consult a doctor.

In Case of Eye Contact
Flush with copious amounts of water for at least 15 minutes. Consult a doctor.

If Swallowed
Rinse mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Consult a doctor.

4.2 Most important symptoms and effects, both acute and delayed

To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.

4.3 Indication of immediate medical attention and special treatment needed

Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.
5. FIRE-FIGHTING MEASURES

5.1 Extinguishing Media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

In combustion, may emit toxic fumes.

5.3 Precautions for fire-fighters

Wear suitable protective clothing to prevent contact with skin and eyes and self-contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Do not take action without suitable protective clothing - see section 8 of SDS. Evacuate personnel to safe areas. Ensure adequate ventilation. Avoid breathing vapors, mist, dust or gas.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover spillage with suitable absorbent material. Hold all material for appropriate disposal as described under section 13 of SDS.

6.4 Reference to other sections

For required PPE see section 8. For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid inhalation, contact with eyes, skin and clothing. Avoid the formation of dust and aerosols. Use in a well-ventilated area. Keep away from sources of ignition. Avoid prolonged or repeated exposure.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool, well-ventilated area. Keep away from direct sunlight. Keep container tightly sealed until ready for use.

7.3 Specific end uses

Not applicable.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate Engineering Controls
Use in a fume hood where applicable. Ensure all engineering measures described under section 7 of SDS are in place. Ensure laboratory is equipped with a safety shower and eye wash station.

Personal Protective Equipment
Eye / Face Protection
Use appropriate safety glasses.

Skin Protection
Use appropriate chemical resistant gloves (minimum requirement use standard BS EN 374:2003). Gloves should be inspected before use. Wash and dry hands thoroughly after handling.

Body Protection
Wear appropriate protective clothing.

Respiratory Protection
If risk assessment indicates necessary, use a suitable respirator.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Lyophilized white powder or clear liquid</td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>Little to none</td>
<td></td>
</tr>
<tr>
<td>Odor Threshold</td>
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<td></td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Melting / Freezing Point</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Boiling Point / Range</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Flash Point</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Flammability (Solid, Gas)</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Vapor Density</td>
<td>No data available</td>
<td></td>
</tr>
<tr>
<td>Relative Density</td>
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<td></td>
</tr>
<tr>
<td>Solubility(ies)</td>
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<td>Partition Coefficient</td>
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<td>Autoignition Temperature</td>
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<tr>
<td>Decomposition Temperature</td>
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<td></td>
</tr>
<tr>
<td>Viscosity</td>
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<td></td>
</tr>
<tr>
<td>Explosive Properties</td>
<td>No data available</td>
<td></td>
</tr>
</tbody>
</table>
10. STABILITY AND REACTIVITY

10.1 Reactivity
Stable under recommended transport or storage conditions.

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Hazardous reactions will not occur under normal transport or storage conditions. Decomposition may occur on exposure to conditions or materials listed below.

10.4 Conditions to avoid
Heat, moisture.

10.5 Incompatible materials
Strong acids/alkalis, strong oxidising/reducing agents.

10.6 Hazardous decomposition products
Strong acids/alkalis, strong oxidising/reducing agents.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute Toxicity
Classified based on available data

Skin Corrosion / Irritation
Classified based on available data

Serious Eye Damage / Irritation
Classified based on available data

Respiratory or Skin Sensitization
Classified based on available data

Germ Cell Mutagenicity
Classified based on available data

Carcinogenicity
Classified based on available data

Reproductive Toxicity
Classified based on available data

Specific Target Organ Toxicity - Single Exposure
Classified based on available data

Specific Target Organ Toxicity - Repeated Exposure
Classified based on available data

Aspiration Hazard
Classified based on available data

Symptoms / Routes of Exposure

Inhalation: There may be irritation of the throat with a feeling of tightness in the chest.

Ingestion: There may be irritation of the throat.

Skin: There may be mild irritation at the site of contact.

Eyes: There may be irritation and redness.

Delayed / Immediate Effects: No known symptoms.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available.

12.2 Persistence and degradability
No data available.

12.3 Bioaccumulative potential
12.4 Mobility in soil
No data available.

12.5 Results of PBT and vPvB assessment
No data available.

12.6 Other adverse effects
No data available.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Transfer to a suitable container and arrange for collection by specialized disposal company in accordance with national, regional, or local legislation.

Contaminated Packaging
Dispose of in a regulated landfill site or other method for hazardous or toxic wastes in accordance with national, regional, or local legislation.

14. TRANSPORT INFORMATION

Classified according to the criteria of the UN Model Regulations as reflected in the IMDG Code, ADR, RID, DOT and IATA.

14.1 UN-Number
Does not meet the criteria for classification as hazardous for transport.

14.2 UN proper shipping name
Does not meet the criteria for classification as hazardous for transport.

14.3 Transport hazard class(es)
Does not meet the criteria for classification as hazardous for transport.

14.4 Packaging group
Does not meet the criteria for classification as hazardous for transport.

14.5 Environmental hazards
Does not meet the criteria for classification as hazardous for transport.

14.6 Special precautions for users
Does not meet the criteria for classification as hazardous for transport.

Additional Transport Information
Does not meet the criteria for classification as hazardous for transport.

15. REGULATORY INFORMATION

This safety datasheet complies with the requirements of Regulation (EC) No. 453/2010.

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
TSCA (Toxic Substances Control Act) : Not applicable.
SARA 313 : Not applicable.
SARA 311/312 : Not applicable.
CERCLA Reportable Quantity : Not applicable.
California Proposition 65 :

15.2 Chemical safety assessment
A Chemical Safety Assessment has not been made for this product.

16. OTHER INFORMATION

Further Information
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This company shall not be held liable for any damage resulting from handling or from contact with the above product. This material must only be handled by suitably qualified experienced scientists in appropriately equipped and authorized facilities. The above information is believed to be correct but does not purport to be all inclusive and should be used as a guide only for experienced personnel. Always consult your safety advisor and follow appropriate local and national safety legislature. The absence of warning must not, under any circumstance, be taken to mean that no hazard exists.

End of safety data sheet