Unidirectional Sheet Material with a polyurethane based matrix from DSM Dyneema.

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier
Product name: Unidirectional Sheet Material with a polyurethane based matrix from DSM Dyneema.
Internal code: WW15843
Chemical formula: Not applicable.

1.2 Relevant identified uses of the substance or mixture and uses advised against
Recommended use: Ballistic protection applications; protective equipment.

1.3 Details of the supplier of the safety data sheet
Supplier: DSM Dyneema BV
PO Box 1163, 6160 BD Geleen
Mauritslaan 49, 6129 EL Urmond
The Netherlands
telephone + 31-(0)46-476 79 99
E-mail: info.dyneema@dsm.com
website http://www.dyneema.com
info.Worldwise@dsm.com
e-mail address of person responsible for this SDS

1.4 Emergency telephone number
Emergency telephone number: Netherlands: +31 46 476 55 55
Fax: +31 46 476 64 40
Remarks: For product specification data we refer to the product specification sheet.

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Product definition: Preparation
Classification according to Directive 1999/45/EC [DPD]
The product is not classified as dangerous according to Directive 1999/45/EC and its amendments.
Classification: Not classified.
Physical/chemical hazards: Combustible.
Human health hazards: Based on the available data of this product no hazardous properties are known.
Environmental hazards: Based on the available data of this product no hazardous properties are known.
Remarks: Hazard during processing: to minimise a possible safety risk of HB-type panels being squeezed out of the press during compression moulding, precautionary measures are advised, as described in Technical Bulletin LP43, which is available from your local Dyneema Sales Manager.

2.2 Label elements
Hazard symbol or symbols: 
Indication of danger: 
Safety phrases: Not applicable.
Hazardous ingredients: 

2.3 Other hazards
Other hazards which do not result in classification: Air contaminants may be formed during use of the product.
### SECTION 3: Composition/information on ingredients

**Substance/mixture:** Preparation  
**Chemical description:** Base polymer: Polyethylene (ultra-high molecular weight) > 80 %, < 20 % Polyurethane based matrix

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs or vPvBs or have been assigned a workplace exposure limit and hence require reporting in this section.

### SECTION 4: First aid measures

#### 4.1 Description of first aid measures

**Eye contact**: Not applicable  
**Inhalation**: Not applicable  
**Skin contact**: Wash with soap and water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.  
**Ingestion**: Not applicable  
**Protection of first-aiders**: No action shall be taken involving any personal risk or without suitable training.

#### 4.2 Most important symptoms and effects, both acute and delayed

**Potential acute health effects**

**Eye contact**: No known significant effects or critical hazards.  
**Inhalation**: No known significant effects or critical hazards.  
**Skin contact**: No known significant effects or critical hazards.  
**Ingestion**: No known significant effects or critical hazards.

**Over-exposure signs/symptoms**

**Eye contact**: May cause eye irritation. (redness).  
**Inhalation**: Not applicable.  
**Skin contact**: There is no known acute effect after over-exposure to this product.  
**Ingestion**: There is no known acute effect after over-exposure to this product.

#### 4.3 Indication of any immediate medical attention and special treatment needed

**Notes to physician**: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

**Specific treatments**: No specific treatment.

### SECTION 5: Firefighting measures

#### 5.1 Extinguishing media

**Small fire**  
Suitable: Use dry chemical or CO₂.

**Large fire**  
Suitable: Use dry chemical powder. Alcohol-resistant foam.

#### 5.2 Special hazards arising from the substance or mixture

**Hazards from the substance or mixture**: No specific hazard.

**Hazardous combustion products**: In case of fire, may produce hazardous decomposition products such as carbon monoxide, carbon dioxide, (dense) black smoke, aldehydes, organic acids.

#### 5.3 Advice for firefighters

**Special protective actions for fire-fighters**: No special measures required.

**Special protective equipment for fire-fighters**: Wear suitable protective clothing. Self-contained breathing apparatus.
SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel:
No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through split material. Put on appropriate personal protective equipment.

For emergency responders:
Specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also Section 8 for additional information on hygiene measures.

6.2 Environmental precautions:
No special measures required.

6.3 Methods and materials for containment and cleaning up

Large spill:
Vacuum or sweep up material and place in a designated, labelled waste container. Recycle, if possible. Prevent formation of dust clouds. Clean up affected area with a large amount of water.

Small spill:
Vacuum or sweep up material and place in a designated, labelled waste container. Clean up affected area with a large amount of water.

6.4 Reference to other sections:
See Section 1 for emergency contact information. See Section 8 for information on appropriate personal protective equipment. See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

7.1 Precautions for safe handling

Protective measures:
Use with adequate ventilation.

Advice on general occupational hygiene:
Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage, including any incompatibilities

Store in a fireproof location. Keep away from incompatible materials and avoid specific conditions (See section 10). Keep away from oxidizing substances. Take precautionary measures against electrostatic discharges.

7.3 Specific end use(s)

Recommendations:
Not available.

Industrial sector specific solutions:
Not available.

Remarks:
Keep away from oxidizing substances. Take precautionary measures against electrostatic discharges.

SECTION 8: Exposure controls/personal protection

The information in this section contains generic advice and guidance. Information is provided based on typical anticipated uses of the product. Additional measures might be required for bulk handling or other uses that could significantly increase worker or exposure or environmental releases.

8.1 Control parameters

Occupational exposure limits

<table>
<thead>
<tr>
<th>Compound</th>
<th>[Air contaminant - General manufacturing process]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>STEL: 17 mg/m³ 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>TWA: 2 ppm 8 hours.</td>
</tr>
<tr>
<td></td>
<td>TWA: 8 mg/m³ 8 hours.</td>
</tr>
<tr>
<td></td>
<td>STEL: 4 ppm 15 minutes.</td>
</tr>
</tbody>
</table>
Recommended monitoring procedures

This product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

DNELs/DMELs
No DNELs/DMELs available.

PNECs
No PNECs available

8.2 Exposure controls

Appropriate engineering controls

Use only with adequate ventilation.

Individual protection measures

Hygiene measures

When using do not eat, drink or smoke. Wash hands after handling compounds and before eating, smoking and using the lavatory and at the end of the day.

Eye/face protection

Safety glasses with side shields.

Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Skin and body

Working clothes.

Respiratory protection

No special protection is required. In case of insufficient ventilation, wear suitable respiratory equipment.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Advice on personal protection is applicable for high exposure levels. Select proper personal protection based on a risk assessment of the actual exposure situation.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state
Solid. [sheets]

Colour
translucent - White.

Odour
Slight Amine-like.

Odour threshold
Not available.

pH
Not available.

Melting point/freezing point
150 to 200 °C

Initial boiling point and boiling range
Decomposes. >300 °C

Softening range
Not available.

Flash point
>400 °C

Evaporation rate
Not available.

Flammability (solid, gas)
Not available.

 Burning time
Not available.

 Burning rate
Not available.

Upper/lower flammability or explosive limits
Not available.

Vapour pressure
Not available.

Vapour density
Not available.

Relative density
0.95 to 0.98 (Water = 1)

Density ( g/cm³ )
0.95 to 0.98 g/cm³

Bulk density
Not available.

Solubility
Insoluble in the following materials: cold water.

Solubility in water
Not available.

Partition coefficient: n-octanol/water
Not available.
Auto-ignition temperature : Not available.
Decomposition temperature : >300°C
Viscosity : Not available.
Explosive properties : Not available.
Oxidising properties : Not available.

9.2 Other information
Remarks : Physical and chemical properties based on Polyethylene (ultra-high molecular weight)

SECTION 10: Stability and reactivity

10.1 Reactivity : No specific test data related to reactivity available for this product or its ingredients.
10.2 Chemical stability : Stable under recommended storage and handling conditions (see Section 7).
10.3 Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.
10.4 Conditions to avoid : Keep away from heat, sparks and flame.
10.5 Incompatible materials : No special recommendations.
10.6 Hazardous decomposition products : No specific data.

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute toxicity
Concentration/Summary : Not available.
Acute toxicity estimates: Not available.
Irritation/Corrosion
Conclusion/Summary
Eyes : Not available.
Skin : Not available.
Respiratory : Not available.
Sensitisation
Conclusion/Summary
Skin : Not available.
Respiratory : Not available.
Mutagenicity
Conclusion/Summary : Not available.
Carcinogenicity
Conclusion/Summary : Not available.
Reproductive toxicity
Conclusion/Summary : Not available.
Teratogenicity
Conclusion/Summary : Not available.
Potential acute health effects
Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics
Eye contact : No specific data.
Inhalation: No specific data.
Skin contact: No specific data.
Ingestion: No specific data.
General: No known significant effects or critical hazards.
Carcinogenicity: No known significant effects or critical hazards.
Mutagenicity: No known significant effects or critical hazards.
Teratogenicity: No known significant effects or critical hazards.
Developmental effects: No known significant effects or critical hazards.
Fertility effects: No known significant effects or critical hazards.

SECTION 12: Ecological information

12.1 Toxicity
Conclusion/Summary: Not available.

12.2 Persistence and degradability
Conclusion/Summary: Not available.

<table>
<thead>
<tr>
<th>Product/ingredient name</th>
<th>Aquatic half-life</th>
<th>Photolysis</th>
<th>Biodegradability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unidirectional Sheet Material with a polyurethane based matrix from DSM Dyneema.</td>
<td>-</td>
<td>-</td>
<td>Not readily</td>
</tr>
</tbody>
</table>

12.4 Mobility in soil
Soil/water partition coefficient (K_{OC}): Not available.
Mobility: Not available.

12.5 Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

12.6 Other adverse effects
Remarks: No known significant effects or critical hazards.
Remarks: Is not biodegradable and not toxic to aquatic organisms.

SECTION 13: Disposal considerations

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

13.1 Waste treatment methods
Product
Methods of disposal: Waste must be disposed of in accordance with national and local environmental regulations.

Hazardous waste: Within the present knowledge of the supplier, this product is not regarded as hazardous waste, as defined by EU Directive 91/689/EEC.

Packaging
Methods of disposal: The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions: This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spill material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information
14.1 UN number: Not regulated.  
14.2 UN proper shipping name: Not regulated.  
14.3 Transport hazard class(es): Not regulated.  
14.4 Packing group: Not regulated.  
14.5 Environmental hazards: Not regulated.  
14.6 Special precautions for user: Transport within user’s premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.  
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not available.  
Remarks: Not regulated.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture  
EU Regulation (EC) No. 1907/2006 (REACH)  
Annex XIV - List of substances subject to authorisation  
None of the components are listed.  
Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles  
Not applicable.

15.2 Chemical Safety Assessment: Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]  
Not classified.

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]  
Not classified.

<table>
<thead>
<tr>
<th>Classification</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not classified.</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Full text of abbreviated H statements</td>
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<tr>
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<tr>
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<tr>
<td>Full text of classifications [DSD/DPD]</td>
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</tr>
</tbody>
</table>
Unidirectional Sheet Material with a polyurethane based matrix from DSM Dyneema.

Alterations compared to the previous version:
Alterations compared to the previous version are marked with a little (blue) triangle.

Abbreviations and acronyms:
- ATE = Acute Toxicity Estimate
- CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
- DMEL = Derived Minimal Effect Level
- DNEL = Derived No Effect Level
- EUH statement = CLP-specific Hazard statement
- PBT = Persistent, Bioaccumulative and Toxic
- PNEC = Predicted No Effect Concentration
- RRN = REACH Registration Number
- vPvB = Very Persistent and Very Bioaccumulative

Sources of key data:
Literature data and/or investigation reports are available through the manufacturer.

Internal code:
WW15843

Training advice:
Before handling this substance/preparation, the personnel involved should be instructed by means of this safety data sheet.

Notice to reader:
The information contained in the Safety Data Sheet is based on our data available on the date of publication. The information is intended to aid the user in controlling the handling risks; it is not to be construed as a warranty or specification of the product quality. The information may not be or may not altogether be applicable to combinations of the product with other substances or to particular applications. The user is responsible for ensuring that appropriate precautions are taken and for satisfying themselves that the data are suitable and sufficient for the product's intended purpose. In case of any unclarity we advise consulting the supplier or an expert.

History:
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- Date of issue: 30 August 2013
- Version: 2