SAFETY DATA SHEET

XD 4443 RESIN

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

Identification of the substance or mixture

| Product name | 1 | XD 4443 RESIN |
|-------------------------------|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product type | : | Liquid. |
| Product description | : | Preparation |
| Use of the substance/mixture | 1 | Resin for adhesive systems |
| Supplier | : | Huntsman Advanced Materials (Europe)BVBA Everslaan 45 3078 Everberg / Belgium Tel.: +41 61 299 20 41 Fax: +41 61 299 20 40 |
| Emergency telephone number | : | EUROPE: +32 35 75 1234 France ORFILA: +33(0)145425959 ASIA: +65 6336-6011 China: +86 20 39377888 Australia: 1800 786 152 New Zealand: 0800 767 437 USA: +1/800/424.9300 |

For further Product EHS related questions concerning this document or its contents, please contact:

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2. HAZARDS IDENTIFICATION

The product is classified as dangerous according to Directive 1999/45/EC and its amendments.

| | 5 5 |
|-----------------------|-----------------------------------------------------------------------------------------------|
| Classification | : Xi; R36/38 |
| | R43 |
| | N; R51/53 |
| Human health hazards | : Irritating to eyes and skin. May cause sensitisation by skin contact. |
| Environmental hazards | : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |

See Section 11 for more detailed information on health effects and symptoms.

3. COMPOSITION/INFORMATION ON INGREDIENTS

| Ingredient name | CAS number | % | Number | Classificatio | n |
|-----------------------------------------------------------------------------------------------------------|---------------|----------|--------|--------------------------------|-----|
| reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700) | 25068-38-6 | 60 - 100 | | Xi; R36/38 R43 N; R51/53 | [1] |
| bisphenol F-epoxy resin | 9003-36-5 | 7 - 13 | | Xi; R36/38 R43 N; R51/53 | [1] |
| bisphenol A - epoxy resins, number average MW >700 - <1100 | 25068-38-6 | 1 - 3 | | Xi; R36/38 R43 | [1] |
| benzyl alcohol | 100-51-6 | 1 - 3 | | Xn; R20/22 | [1] |
| See section 16 for the full text of the R-phrases declared above | | | | | |

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3. COMPOSITION/INFORMATION ON INGREDIENTS

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

[1] Substance classified with a health or environmental hazard

[2] Substance with a workplace exposure limit

[3] PBT-substance

[4] vPvB-substance

Occupational exposure limits, if available, are listed in Section 8.

4. FIRST AID MEASURES

| First-aid measures | |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inhalation | : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. |
| Ingestion | : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. |
| Skin contact | : Wash contaminated skin with soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse. |
| Eye contact | Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention. |
| Protection of first-aiders | : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. |
| Notes to physician | : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled. |

See Section 11 for more detailed information on health effects and symptoms.

5. FIRE-FIGHTING MEASURES

| Extinguishing media | |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Suitable | : Use an extinguishing agent suitable for the surrounding fire. |
| Not suitable | : None known. |
| Special exposure hazards | : In a fire or if heated, a pressure increase will occur and the container may burst. |
| | Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. This material is toxic to aquatic organisms. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain. |
| Hazardous thermal decomposition products | : Burning produces obnoxious and toxic fumes. Carbon oxides |

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|-----------------------|-------------|------|
| revision | | |
| | | |

5. FIRE-FIGHTING MEASURES

| Special protective equipment for fire-fighters | : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents. |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6. ACCIDENTAL RE | |
| Personal precautions | : 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 spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8). |
| Environmental precautions | : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. |
| Methods for cleaning up | |
| Small spill | : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor. |
| Large spill | : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spill product. |

7. HANDLING AND STORAGE

| Handling | : | Put on appropriate personal protective equipment (see Section 8). 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. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapour or mist. Avoid release to the environment. Refer to special instructions/safety data sheet. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container. |
|--------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage | : | Store between the following temperatures: 2 to 40°C (35.6 to 104°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. |
| Storage hazard class Huntsman Advanced Materials | : | Storage class 10, Environmentally hazardous liquids |
| Packaging materials | | |
| Recommended | : | Use original container. |

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

| Exposure limit values | |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ingredient name | Occupational exposure limits |
| No exposure limit value know | |
| Recommended monitoring procedures | : If 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 European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances. |
| Exposure controls | |
| Occupational exposure controls | : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredier with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits. |
| Hygiene measures | : Wash hands, forearms and face thoroughly after handling chemical products, befor eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location. |
| Respiratory protection | : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and t safe working limits of the selected respirator. |
| Hand protection | : Material of gloves for long term application (BTT>480min): |
| | (BTT = Break Through Time) |
| | Ethyl Vinyl Alcohol Laminate (EVAL), butyl rubber |
| | Material of gloves for short term/splash application (10min <btt<480min):< td=""></btt<480min):<> |
| | neoprene, nitrile rubber |
| | Use gloves approved to relevant standards e.g. EN 374 (Europe), F739 (US). Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material and dexterity. Always seel advice from glove suppliers. Additional information can be found for instance at www.gisbau.de. |
| Eye protection | : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. |
| Skin protection | : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist befor handling this product. |
| 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 equipmer will be necessary to reduce emissions to acceptable levels. |

: 3/4/2011.

9. PHYSICAL AND CHEMICAL PROPERTIES

| General information | | | |
|------------------------------|----------------------------------------------------------|---------|--------------|
| Appearance | | | |
| Physical state | : Liquid. [Paste.] | | |
| Colour | : Yellowish. | | |
| Odour | : Slight | | |
| Important health, safety and | nvironmental information | | |
| Boiling point | : >200°C (>392°F) | | |
| Flash point | : Closed cup: 245°C (473°F) [DIN 51758 EN 22719 (Pensky- | Martens | Closed Cup)] |
| Decomposition temperature | : >200°C (>392°F) | | |
| Vapour pressure | : <0.0001 kPa (<0.00075 mm Hg) [20°C] | 20 | deg C |
| Density | : 1.16 g/cm ³ [25°C (77°F)] | | |
| Water solubility | : practically insoluble | | |
| Viscosity | : Dynamic: 100000 mPa·s (100000 cP) | 25 | deg C |

10. STABILITY AND REACTIVITY

| Chemical stability | The product is stable. | |
|---------------------------------------|------------------------------------------------------------------------------------------------------|-----|
| Possibility of hazardous reactions | Jnder normal conditions of storage and use, hazardous reactions will not occu | ur. |
| Conditions to avoid | No specific data. | |
| Materials to avoid | strong acids, strong bases, strong oxidising agents | |
| Hazardous decomposition products | Under normal conditions of storage and use, hazardous decomposition produces should not be produced. | cts |
| | Burning produces obnoxious and toxic fumes. Carbon oxides | |

11. TOXICOLOGICAL INFORMATION

| Toxicokinetics | | | | | | | | |
|------------------------------------------------------------------------------------------------------------|-----------|---------------------------------|--------------------------------------------------------------------------------------------------|----------------------------|----------------------------------|--------------|--|--|
| Absorption | : | Not available. | Not available. | | | | | |
| Distribution | : | Contains mater system (CNS). | ontains material which may cause damage to the following organs: central nervous /stem (CNS). | | | | | |
| Metabolism | : | Not available. | | | | | | |
| Elimination | : | Not available. | | | | | | |
| Potential acute health effects | | | | | | | | |
| Inhalation | 1 | No known signif | ficant effects o | r critical hazards. | | | | |
| Ingestion | 1 | Irritating to mou | th, throat and | stomach. | | | | |
| Skin contact | 1 | Irritating to skin. | May cause se | ensitisation by skin | contact. | | | |
| Eye contact | 1 | Irritating to eyes | 6. | | | | | |
| Acute toxicity | | | | | | | | |
| Product/ingredient name XD 4443 RESIN | | Res LD5 | <mark>ult</mark> 0 Oral | Species Rat | <mark>Dose</mark> ≻5000 mg/kg | Exposure | | |
| reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700) | | | 0 Dermal | Rat - Male, Female | >2000 mg/kg | - | | |
| 5 5 | | LD5 | Inhalation | Rat - Female Rat - Male | >2000 mg/kg 0.00001 ppm | - 5 hours | | |
| bisphenol F-epoxy resin | | LD5 | 0 Dermal | Rat - Male, Female | >2000 mg/kg | - | | |
| | | LD5 | 0 Oral | Rat - Male, Female | >5000 mg/kg | - | | |
| Conclusion/Summary : Not available. | | | | | | | | |
| Potential chronic health effec | <u>ts</u> | | | | | | | |

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11. TOXICOLOGICAL INFORMATION

| Chronic toxicity | | | | | | |
|--------------------------------------------------------------------------|------------------------------|-----------------|-------------|----------------------------|----------|------------------------------|
| Product/ingredient name | Result | Speci | | Dose | | Exposure |
| reaction product: bisphenol A- | Sub-chronic | Rat - I | , | 50 mg/kg | | 14 weeks; 7 days |
| (epichlorhydrin); epoxy resin (number | NOAEL Oral | Fema | le | | I | per week |
| average molecular weight < 700) | Sub obrasia | Det 1 | | 10 m c // c | | 12 wooker E dava |
| | Sub-chronic NOEL : Dermal | Rat - I Fema | | 10 mg/kg | | 13 weeks; 5 days oer week |
| | Sub-chronic | | e - Male | 100 mg/kg | | 13 weeks; 3 days |
| | NOAEL Dermal | mouse | | i oo mg/kg | | ber week |
| bisphenol F-epoxy resin | Sub-chronic | Rat - I | Male, | 250 mg/kg | | 13 weeks; 7 days |
| | NOAEL Oral | Fema | | 0 0 | | per week |
| Conclusion/Summary : Not availa | hlo | | | | | |
| - | DIE. | | | | | |
| Irritation/Corrosion | | | | | | |
| Conclusion/Summary : Not availa | ble. | | | | | |
| <u>Sensitiser</u> | | | | | | |
| Product/ingredient name | Route of | Speci | es | Result | | |
| | exposure | . . | | . | | |
| XD 4443 RESIN | skin | Guine | | Sensitising | | |
| reaction product: bisphenol A- | skin | Mouse | e | Sensitising | | |
| (epichlorhydrin); epoxy resin (number average molecular weight < 700) | | | | | | |
| bisphenol F-epoxy resin | skin | Mouse | 2 | Sensitising | | |
| benzyl alcohol | skin | Guine | | Sensitising | | |
| Conclusion/Summary : Not availa | | | ~ ריש | Conditioning | | |
| - | | | | | | |
| <u>Carcinogenicity</u> | | | | _ | _ | _ |
| Product/ingredient name | Result | Speci | | Dose | | Exposure |
| reaction product: bisphenol A- | Negative - Oral - | Rat - I | , | 15 mg/kg | | 2 years; 7 days |
| (epichlorhydrin); epoxy resin (number average molecular weight < 700) | NOAEL | Fema | le | | | per week |
| | Negative - | Rat - I | Female | 1 mg/kg | | 2 years; 5 days |
| | Dermal - NOEL : | i tat | omaio | i ilig/itg | | per week |
| | Negative - | Mouse | e - Male | 0.1 mg/kg | | 2 years; 3 days |
| | Dermal - NOEL : | | | 5 5 | | per week |
| Conclusion/Summary : Not availa | ble. | | | | | |
| Mutagenicity | | | | | | |
| Product/ingredient name | Test | | Experimer | ht | Resul | + |
| reaction product: bisphenol A- | - | | Experimen | | Positiv | |
| (epichlorhydrin); epoxy resin (number | | | Subject: Ba | | . 55117 | - |
| average molecular weight < 700) | | | • | activation: +/- | | |
| , | - | | Experimen | t: In vitro | Positiv | e |
| | | | • | ammalian- | | |
| | | | Animal | | | |
| | | | Cell: Soma | | | |
| | | | | activation: +/- | Nocot | ivo. |
| | - | | Experimen | ammalian- | Negati | |
| | | | Animal | | | |
| | | | Cell: Germ | 1 | | |
| | - | | Experimen | t: In vivo | Negati | ve |
| | | | | ammalian- | 5 | |
| | | | Animal | | | |
| | | | Cell: Soma | | _ | |
| bisphenol F-epoxy resin | OECD 471 Bacter | | Experimen | | Positiv | e |
| | Reverse Mutation | rest | Subject: Ba | acteria activation: +/- | | |
| | OECD 476 In vitro | | Experimen | | Positiv | |
| | Mammalian Cell (| | • | ammalian- | | 0 |
| | Mutation Test | | Animal | | | |
| | | | Cell: Soma | atic | | |
| | | | | | | |
| | | | | | | |

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: 3/4/2011.

6/11

11. TOXICOLOGICAL INFORMATION

| | | Mami Chroi Aberr OECI Eryth Micro OECI Unsc | D 473 In vitro malian mosomal ration Test D 474 Mamm rocyte nucleus Test D 486 heduled DNA nesis (UDS) T | nalian | Experiment Subject: Ma Human Cell: Soma | ammalian- tic activation: +/- t: In vivo ammalian- tic t: In vivo | Positive Negative Negative | |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------|------------------------------------------------|
| | | with N | Mammalian L in vivo | | Cell: Soma | itic | | |
| Conclusion/Summary | : Not availa | ble. | | | | | | |
| Teratogenicity | | | | | | | | |
| Product/ingredient name reaction product: bisphenol A (epichlorhydrin); epoxy resin average molecular weight < 7 | (number | <mark>Resu</mark> Nega | lt tive - Oral | Specie Rat - F | emale | Dose >540 mg/kg NOEL : | | osure ays |
| 5 5 | , | Nega | | Rabbit | - Female | >300 mg/kg | | ays; 6 hours |
| | | Derm Nega | ial itive - Oral | | - Female | NOEL : 180 mg/kg NOAEL | per (13 d | • |
| bisphenol F-epoxy resin | | Nega Derm | | Rabbit | - Female | >300 mg/kg NOEL : | 13 d per o | ays; 6 hours day |
| Conclusion/Summary <u>Reproductive toxicity</u> | : Not availa | ble. | | | | | | |
| Product/ingredient name | Mate toxic | | Fertility | Deve toxii | elopmental າ | Species | Dose | Exposure |
| reaction product: bisphenol A- (epichlorhydrin); epoxy resin (n average molecular weight < 70 bisphenol F-epoxy resin | | | - | - | | Rat - Male, Female Rat - Male, | Oral: 540 mg/kg NOEL : Oral: 540 | 238 days; 7 days per week 238 days; 7 |
| | | | | | | Female | mg/kg NOEL : | days per week |
| Conclusion/Summary | : Not availa | ble. | | | | | | |
| Chronic effects | : Once sens | | a severe alle | ergic re | action may o | occur when s | ubsequently | exposed to |
| Carcinogenicity | : No known | signifi | cant effects c | or critica | al hazards. | | | |
| Mutagenicity | | - | cant effects c | | | | | |
| Teratogenicity | | • | cant effects c | | | | | |
| Developmental effects | | - | cant effects c | | | | | |
| Fertility effects | | signifi | cant effects c | or critica | al hazards. | | | |
| Over-exposure signs/sympton | | | | | | | | |
| Inhalation | : No specifi | | | | | | | |
| Ingestion Skin | : No specifi | | | da tha t | following: | | | |
| Skii | irritation redness | ymptoi | ms may inclu | | lonowing. | | | |
| Eyes | : Adverse s irritation watering redness | ymptor | ms may inclu | de the t | following: | | | |

12. ECOLOGICAL INFORMATION

| reaction product: bisphenol A- (epichlohydnini): epoxy resin bisphenol F-epoxy resin bisphenol F-epoxy resin Conclusion/Summary : Not available. Conclusion/Summary : Not available. Conclusio | | : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Water polluting material. May be harmful to the environment if released in large quantities. | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|-------------------------|-----------|-----------------------------|--|
| Productifugredient name reaction product: bisphenol A- (apichlohydnin), epoxy resin (number average molecular weight < 700) Test - Result Acute EC50 9.4 mg/L Fresh water mg/L Fresh water Species Algae Exposur 72 hours OECD 202 Daphnia sp. Acute Immobilisation Test Acute EC50 1.7 mg/L Fresh water Daphnia 48 hours OECD 202 Daphnia sp. Acute Immobilisation Test - Acute IC50 > 100 mg/L Fresh water Daphnia 3 hours 5 mg/L Fresh water bisphenol F-epoxy resin OECD 201 Alga, Acute Chronic NOEC 02C D211 Daphnia Magna Reproduction Test Chronic NOEC 02C D211 Daphnia sp. Acute EC50 1.8 CPCD 201 Alga, Cerce L201 Alga, Acute EC50 1.8 CPCD 201 Alga, Acute EC50 1.8 Acute EC50 1.8 Mg/L Fresh water Algae 72 hours 72 hours bisphenol F-epoxy resin OECD 201 Alga, CPCD 201 Alga, Acute Test Acute EC50 1.8 Mg/L Fresh water Algae 72 hours Decord 201 Fresh water OECD 201 Alga, Acute Toxito DECD 203 Fish, Acute EC50 1.6 Daphnia sp. Acute EC50 1.6 Daphnia sp. Acute EC50 1.6 Mg/L Fresh water Algae 72 hours OECD 203 Fish, Acute Toxito DECD 203 Fish, Acute EC50 1.6 Daphnia Magna Reproduction Test Acute IC50 -100 mg/L Fresh water Bacteria 3 hours 5 mg/L Fresh water 3 hours 5 mg/L Fresh water OECD 203 Fish, Acute EC50 1.8 Conclusion/Summary I to available. Daphnia 21 days 5 S hour readily 20 mg/L Oxygen consumption 1 days 5 Conclusion/Summ | Aquatic ecotoxicity | | | | | | |
| OECD 202 Daphnia sp. Acute EC50 1.7 Acute IC50 >100 Daphnia sp. mg/L Fresh water Daphnia sp. mg/L Fresh water Daphnia sp. Acute IC50 >100 Bacteria 3 hours 5 mg/L Fresh water bisphenol F-epoxy resin - Acute IC50 >100 Daphnia Magna OECD 201 Fish, Acute IC50 1.5 Acute IC50 1.5 Acute IC50 1.5 Daphnia Magna OECD 211 Chronic NOEC Daphnia Magna OECD 211 Daphnia 21 days 5 mg/L Fresh water 3 hours 5 mg/L Fresh water bisphenol F-epoxy resin OECD 201 Alga, Growth Inbition Test Acute EC50 1.8 OECD 201 Alga, Acute EC50 1.6 Daphnia sp. Acute IC50 >100 DECD OECD Acute EC50 1.6 Daphnia Daphnia 48 hours bisphenol F-epoxy resin OECD 201 Alga, Growth Inbition Test Acute EC50 1.6 DECD OECD Daphnia Algae 72 hours Conclusion/Summary : Not acute (Biodegradability Product/ingredient name reaction product: bisphenol A- (gioholorythin): epox resin water Not readily Acute S %- Not readily Dashnia S adys 21 days 5 adys bisphenol F-epoxy resin Test OECD 201 Fish, Acute Toxicity Test Chronic NOEC OECD 201 Fish, Acute IC50 0.55 Fish Daphnia 21 days 5 adys bisphenol F-epoxy resin Test OECD 201 Fish, Acute Test Chronic NOEC OECD 201 Fish, Acute Test Daphnia 21 days 5 adys bisphenol F-epoxy resin Test OECD 201 Fish, Acute Test Dose Consumption Dose Consumption Dose Consumption bisphenol F-epoxy resin Matrealible. < | Product/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (num) | | Test - | Acute EC50 9.4 | | Exposure 72 hours Static | |
| mg/L Fresh water mg/L Fresh waterSince Fish96 hours mg/L Fresh waterbisphenol F-epoxy resinAcute Toxicity TestChronic NOEC OECD 211 OECD 211 OECD 211, Chronic NOECDaphnia21 days 3 staticbisphenol F-epoxy resinOECD 211 OECD 201 Aliga, Growth Inhibition TestChronic NOEC OECD 201 Aliga, Acute EC50 1.8 Mg/L Fresh waterAligae72 hours staticbisphenol F-epoxy resinOECD 201 Aliga, OECD 201 Aliga, Acute EC50 1.6 OECD OECD 202: Part I (Daphnia sp., Acute IC50 >100 mg/L Fresh waterAligae72 hours mg/L Fresh waterOECD 203 Fish, Acute Toxicity Test-Acute IC50 >100 mg/L Fresh waterBacteria mg/L Fresh water3 hours 5 staticOECD 203 Fish, Acute Toxicity Test-Acute IC50 >100 mg/L Fresh waterBacteria static3 hours 5 staticOECD 201 Sish, Acute Toxicity Test-Acute IC50 >100 mg/L Fresh waterBacteria static3 hours 5 staticOECD 211 Daphnia Magna Reproduction TestOECD 211 Daphnia Magna Reproduction TestChronic NOEC 0.3 mg/L Fresh waterDaphnia staticBiodegradability Product/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700) TestOECD Darived from OECD 301F (Sidegradabili Fresh water 4.83 days Fresh water 7.1 days3 mg/L Oxygen oonsumptionActivated oonsumptionDisphenol F-epoxy resin reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number reaction product: bisphenol A- (ep | | | <i>Daphnia</i> sp. Acute Immobilisation | | Daphnia | 48 hours Static | |
| DescriptionOECD 203 Fish, Acute Toxicity TestAcute LCS0 1.5 mg/L Fresh waterFish96 hoursbisphenol F-epoxy resinOECD 211 Daphnia Magna Reproduction TestChronic NOEC Daynnia Magna WaterDaphnia21 days 5 staticbisphenol F-epoxy resinOECD 201 Alga, Growth Inhibition TestAcute ECS0 1.8 Mg/L Fresh waterAlgae mg/L Fresh water72 hoursbisphenol F-epoxy resinOECD 201 Alga, Growth Inhibition TestAcute ECS0 1.6 Mg/L Fresh waterDaphnia48 hoursOECD 202 Part I (Daphnia sp., Acute DECD 203 Fish, Acute Toxicity TestAcute ICS0 >100 mg/L Fresh waterDaphnia3 hours S mg/L Fresh waterOECD 203 Fish, Acute Toxicity TestOECD 203 Fish, Acute ICS0 0.55Daphnia21 days S staticOECD 203 Fish, Acute Toxicity TestOECD 211 Daphnia Magna WaterChronic NOEC DaphniaDaphnia21 days S staticOther ecological information BiodegradabilityTest TestOECD Derived from OECD 301F -28 daysSmg/L Fresh staticDase consumptionIncoulur ocusBiodegradabilityProduct/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700) | | | - | | Bacteria | 3 hours Static | |
| Daphnia Magna Reproduction TestOaghnia Magna Reproduction TestOECD 201 Alga, Growth Inhibition TestCute EC50 1.8 mg/L Fresh waterAlgae T2 hours72 hoursDisphenol F-epoxy resinOECD OECD 202: Part I (Daphnia sp., Acute Mobilisation test)Acute EC50 1.6 mg/L Fresh waterDaphnia DaphniaAlgae mg/L Fresh water72 hours-Acute EC50 1.6 mg/L Fresh waterDaphnia mg/L Fresh waterDaphnia Mater48 hoursAcute EC50 1.6 mg/L Fresh waterDaphnia Mg/L Fresh water3 hours S mg/L Fresh waterAcute IC50 > 100 mg/L Fresh waterBacteria Mg/L Fresh water3 hours S mg/L Fresh waterAcute Toxicity mg/L Fresh waterDaphnia Mg/L Fresh water21 days S staticOECD 203 Fish, Acute Toxicity TestOECD 211 OLS 0.55 mg/L Fresh waterDaphnia S mg/L Fresh water21 days S staticOther ecological information BiodegradabilityTest (Biodegradatoin Test)Dese S Not available.Inoculum S Not available.Occlusion/Summary (epichlorhydrin); epoxy resin (number average molecular weight < 700) | | | Acute Toxicity | Acute LC50 1.5 | Fish | 96 hours Static | |
| bisphenol F-epoxy resin bisphenol F-epoxy resin bisphenol F-epoxy resin CECD 201 Alga, Growth Inhibition Test OECD OECD 202: Part I (Daphnia sp., Acute Immobilisation test) OECD 203 Fish, Acute IC50 >1.6 mg/L Fresh water OECD 203 Fish, Acute IC50 >100 mg/L Fresh water Fish Static OECD 203 Fish, Acute IC50 0.55 Market OECD 203 Fish, Market OECD 201 Fresh water Test OECD 203 Fish, Market OECD 203 Fish, Market OECD 201 Fresh water Test OECD 203 Fish, Water Test OECD 201 Fresh Water Test OECD Derived from OECD 301F (Biodegradation Test) Dose Omg/L Oxygen consumption Pactive Omg/L Oxygen Conclusion/Summary EU Disphenol F-epoxy resin fresh water 7.1 days Fresh water 7.1 | | | OECD 211 Daphnia Magna Reproduction | 0.3 mg/L Fresh | Daphnia | 21 days Semi- static | |
| OECD OECD 202: Part I (Daphnia sp., Acute Immobilisation test)Acute EC50 1.6 mg/L Fresh waterDaphnia48 hours MainAcute Immobilisation test)-Acute IC50 >100 mg/L Fresh waterBacteria3 hours S MainAcute Immobilisation test)-Acute IC50 >100 mg/L Fresh waterBacteria3 hours S MainAcute OECD 203 Fish, Acute Toxicity Test-Acute IC50 >55Bacteria3 hours S MainOECD 201 Dephnia Dephnia Reproduction TestChronic NOEC Daphnia WaterDaphnia21 days S staticOther ecological information Biodegradability Product/ingredient name reaction product: bisphenol A- (epichlorhydrini); epoxy resin (number average molecular weight < 700) | bisphenol F-epoxy resin | | OECD 201 Alga, Growth Inhibition | | Algae | 72 hours Static | |
| - Acute IC50 > 100 mg/L Fresh water Acute IC50 0.55 mg/L Fresh water Bacteria 3 hours S OECD 203 Fish, Acute Toxicity Test Acute IC50 0.55 mg/L Fresh water Fish 96 hours static OECD 211 Daphnia Magna Reproduction Chronic NOEC 0.3 mg/L Fresh water Daphnia 21 days S Other ecological information Test Test Chronic NOEC 0.3 mg/L Fresh water Daphnia 20 mg/L Oxygen consumption 1 hours S Biodegradability Product/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700) | | | OECD OECD 202: Part I (Daphnia sp., Acute Immobilisation | | Daphnia | 48 hours Static | |
| OECD 203 Fish, Acute Toxicity TestAcute LC50 0.55 mg/L Fresh waterFish96 hours staticOECD 211 Daphnia Magna Reproduction TestChronic NOEC 0.3 mg/L Fresh waterDaphnia21 days 0 staticConclusion/Summary: Not available.Other ecological information BiodegradabilityTestOECD 2011 0.3 mg/L Fresh waterDoseInoculurProduct/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resinTestDose 5 % - Not readily - 28 daysInoculur - consumptionbisphenol F-epoxy resinEU0 % - Not readily - 28 days3 mg/L Oxygen consumption- consumptionConclusion/Summary: Not available.Activated consumption- consumption- consumptionBiodegradability (epichlorhydrin); epoxy resin (number average molecular weight < 700) | | | - | | Bacteria | 3 hours Static | |
| Daphnia Magna Reproduction Test0.3 mg/L Fresh waterstaticConclusion/Summary: Not available.Other ecological information BiodegradabilityTestProduct/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700) | | | Acute Toxicity | Acute LC50 0.55 | Fish | 96 hours Semi- static | |
| Other ecological information Biodegradability Product/ingredient name Test Result Dose Inoculur reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700) | | | Daphnia Magna Reproduction | 0.3 mg/L Fresh | Daphnia | 21 days Semi- static | |
| BiodegradabilityProduct/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700)Test OECD Derived from OECD 301F (Biodegradation Test)Dose 5 % - Not readily - 28 daysInoculum -bisphenol F-epoxy resinEU0 % - Not readily - 28 days3 mg/L Oxygen consumption-Conclusion/Summary (epichlorhydrin); epoxy resin (number average molecular weight < 700) | Conclusion/Summary : | Not availat | ole. | | | | |
| Product/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700)Test OECD Derived from OECD 301F (Biodegradation Test)Result 5 % - Not readily 28 daysDose 20 mg/L Oxygen consumptionInoculum -bisphenol F-epoxy resinEU0 % - Not readily - 28 days3 mg/L Oxygen consumptionActivated consumptionConclusion/Summary: Not available.Product/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700) | | | | | | | |
| reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700)OECD Derived from OECD 301F (Biodegradation Test)5 % - Not readily - 28 days20 mg/L Oxygen consumption-bisphenol F-epoxy resinEU0 % - Not readily - 28 days3 mg/L Oxygen consumption-Activated consumptionConclusion/Summary: Not available.Product/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700) | | | _ | | _ | | |
| (epichlorhydrin); epoxy resin (number average molecular weight < 700)from OECD 301F (Biodegradation Test)28 daysconsumptionbisphenol F-epoxy resinEU0 % - Not readily - 28 days3 mg/L Oxygen consumptionActivated consumptionConclusion/Summary: Not available.Product/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700) | | | | | | | |
| average molecular weight < 700) | | | | | | - | |
| bisphenol F-epoxy resinEU0 % - Not readily - 28 days3 mg/L Oxygen consumptionActivated consumptionConclusion/Summary: Not available.Product/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700) bisphenol F-epoxy resinAquatic half-life Fresh water 3.58 days Fresh water 7.1 days -Photolysis -Biodegradabil Not readilyBioaccumulative potentialNot readily | | | (Biodegradation | | | | |
| Product/ingredient name reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700)Aquatic half-life Fresh water 4.83 days Fresh water 3.58 days Fresh water 7.1 daysPhotolysis -Biodegradabil Not readilybisphenol F-epoxy resinNot readilyBioaccumulative potentialNot readily | bisphenol F-epoxy resin | | , | | | Activated sludge | |
| reaction product: bisphenol A- (epichlorhydrin); epoxy resin (number average molecular weight < 700)Fresh water 4.83 days Fresh water 3.58 days Fresh water 7.1 days -Not readilybisphenol F-epoxy resinNot readilyBioaccumulative potentialNot readily | Conclusion/Summary : | Not availat | ole. | | | | |
| Bioaccumulative potential | reaction product: bisphenol A- (epichlorhydrin); epoxy resin (num | on product: bisphenol A- Fresh wate lorhydrin); epoxy resin (number Fresh wate | | <u>Photolysi</u> : - | | | |
| | | - | | - | Not | readily | |
| - あい しっかい いい ひっかい しん あい 二日 あい 二日 あい 二日 あい 二日 かい しょうせい たいしょう しょうせい たいしょう しょうしょう ひょうしょう しょうしょう ひょうしょう しょうしょう しょう | | | | | | | |
| Product/ingredient name LogPow BCF Potential | Product/ingredient name | <u>Log</u> l | Pow. | BCF | <u>Pc</u> | otential | |

Date of issue/Date of : 3/4/2011. revision

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8/11

| XD 4443 RESIN | | | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|----|------|--|--|--|--|--|
| 12. ECOLOGICAL INFORMATION | | | | | | | | |
| reaction product: bispheno (epichlorhydrin); epoxy resi average molecular weight | in (number | 31 | low | | | | | |
| bisphenol F-epoxy resin | 2.7 to 3.6 | - | high | | | | | |
| Other adverse effects | Other adverse effects : No known significant effects or critical hazards. | | | | | | | |
| 13. DISPOSAL CO | NSIDERATIONS | | | | | | | |
| Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the | | | | | | | | |

| | requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| este catalogue | • The relevant ELL Directives and local regional and national regulations must be |

European waste catalogue (EWC)
 The relevant EU Directives and local, regional and national regulations must be complied with. It is among the tasks of the end user to assign the waste to waste codes specific to industrial sectors and processes according to the European Waste catalogue. It is recommended that the details be agreed with the waste disposer responsible.
 07 02 08*

07 02 08* other still bottoms and reaction residues

Hazardous waste

: Yes.

14. TRANSPORT INFORMATION

International transport regulations

Proper shipping name

| ADR | : | Environmentally hazardous substance, liquid, n.o.s. | BISPHENOL A EPOXY RESIN |
|------|---|-------------------------------------------------------------------------------------------|-----------------------------------|
| IMDG | 1 | Environmentally hazardous substance, liquid, n.o.s. pollutant (Bisphenol A epoxy resin,) | (BISPHENOL A EPOXY RESIN). Marine |

ΙΑΤΑ

: Environmentally hazardous substance, liquid, n.o.s. (BISPHENOL A EPOXY RESIN)

| Regulatory information | UN number | Classes | Packing group | Label | Additional information |
|----------------------------------------------|-----------|---------|------------------|------------------------------------------------------------------------------|--------------------------------------------------------------|
| Land - road/railway ADR/RID Class | UN3082 | 9 | | ₹ ₹ 2 1 1 1 1 1 1 1 1 1 1 1 1 1 | Classification code M6 Hazard identification 90 number |
| Sea IMDG Class | UN3082 | 9 | | | Emergency schedules (EmS) F-A, S-F |
| Date of issue/Date of: 3/4/2011.9/11revision | | | | | |

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| XD 4443 RESIN | | | | | | | |
|-------------------|-----------|---------|----|---|--------------------------------------------------------------------------------------------------------------------------------------|--|--|
| 14. TRANS | PORT INFO | ORMATIC | DN | | | | |
| Air IATA Class | UN3082 | 9 | | × | Passenger and Cargo AircraftQuantity limitation: 450 LPackaging instructions: 914Cargo Aircraft Only450 LPackaging instructions: 914 | | |

15. REGULATORY INFORMATION

EU regulations

Classification and labeling have been determined according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and take into account the intended product use.

| Hazard symbol or symbols | |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Xi, | N Irritant, Dangerous for the environment |
| Risk phrases | R36/38- Irritating to eyes and skin. R43- May cause sensitisation by skin contact. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |
| Safety phrases | S24- Avoid contact with skin. S37- Wear suitable gloves. S61- Avoid release to the environment. Refer to special instructions/safety data sheet. |
| Contains | reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700) bisphenol F-epoxy resin bisphenol A - epoxy resins, number average MW >700 - <1100 |
| Exceptional labelling of special preparations | : Contains epoxy constituents. See information supplied by the manufacturer. |
| International regulations International lists | |
| Europe inventory | : All components are listed or exempted. |

16. OTHER INFORMATION

| Full text of R-phrases referred to in sections 2 and 3 - United Kingdom (UK) | : | R20/22- Harmful by inhalation and if swallowed. R36/38- Irritating to eyes and skin. R43- May cause sensitisation by skin contact. R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. |
|------------------------------------------------------------------------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Full text of classifications referred to in sections 2 and 3 - United Kingdom (UK) | - | Xn - Harmful Xi - Irritant N - Dangerous for the environment |

References

History

Epoxy Resins and Curing Agents; Toxicology, Health, Safety and Environmental Aspects (Plastics Europe, May 2006) The provision of Safety Data Sheets comes under Regulation 6 of CHIP (CHIP is the recognised abbreviation for the Chemicals Hazard Information and Packaging Regulations). This is an addition to the Health and Safety at Work Act 1974.

Users of products supplied by Huntsman Advanced Materials should take appropriate measures to ensure working practices are in accordance with the Control of Substances Hazardous to Health Regulations (COSHH).

| Date of printing | : 3/16/2011. | |
|------------------------------------|---------------------------|-------|
| Date of issue/ Date of revision | : 3/4/2011. | |
| Date of previous issue | : No previous validation. | |
| Date of issue/Date of revision | : 3/4/2011. | 10/11 |

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16. OTHER INFORMATION

Version

Indicates information that has changed from previously issued version.

: 1

Notice to reader

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IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.

Enquiries should be addressed to your nearest Huntsman sales office or to:

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