Material Safety Data Sheet

Section 1: Chemical Product and Company Information

Product name: D-Xylose
Supplier/ Further Information: Martrex, Inc.
  P. O. Box 1709
  14525 Highway 7
  Minnetonka, Minnesota 55345-3793
  Phone: 952/933-5000
  Toll Free: 800/328-3627
  FAX: 952/933-1889
EPA Registration Number: n/a
CAS#: 58-86-6
Chemical Name: D-Xylose
Synonyms: Wood sugar; (+)-Xylose
Chemical Family:
MSDS Number: n/a

Section 2: Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Non Hazardous Components</th>
<th>CAS#</th>
<th>%</th>
<th>OSHA PEL</th>
<th>OSHA STEL</th>
<th>OSHA CEIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-Xylose</td>
<td>58-86-6</td>
<td>&gt;98%</td>
<td>not listed</td>
<td>not listed</td>
<td>not listed</td>
</tr>
</tbody>
</table>

Section 3: Hazards Identification

Main hazards: Caution! May cause respiratory tract irritation. May cause skin irritation. May cause eye irritation. This is expected to be a low hazard for usual industrial handling.

Potential Health Effects:
  Primary Routes of Exposure / Entry: Inhalation (breathing), eye contact, skin contact. (Ingestion is unlikely)
  Target Organs: None known

Acute Exposure Symptoms
  Inhalation: May cause respiratory tract irritation. Low hazard for usual industrial handling.
  Eye Contact: May cause eye irritation.
  Skin Contact: May cause skin irritation.
  Ingestion: May cause gastrointestinal irritation with nausea, vomiting and diarrhea. Low hazard for usual industrial handling.

Chronic Exposure Symptoms: no information found
Medical Conditions Aggravated By Long-Term Exposure: no data
Section 4: First Aid Measures

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Eye Exposure: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin Exposure: In case of contact, flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

Ingestion: If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical aid.

NOTE TO THE PHYSICIAN: Treat symptomatically and supportively.

Section 5: Fire Fighting Measures

Flamibility Classification:
- NFPA= (estimated) Health: 0; Flammability: 1; Instability: 0
- DOT= see Section 14
- A Flash Point (COC): Not applicable.
- Auto-ignition Temperature: Not applicable.
- Lower explosion limit (LEL): Not applicable.
- Upper explosion limit (UEL): Not applicable.
- Extinguishing Media: In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam. Use agent most appropriate to extinguish fire.

Unusual Fire and Explosive Hazards: This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.

Hazardous Decomposition Materials: Highly toxic gases may be generated by thermal decomposition or combustion.

Special Procedures: no other data

Fire-Fighting Instructions: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Personal Protective Equipment: Wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

CAUTION: no data

Section 6: Accidental Release Measures

Spill and Leak Procedures: Use proper personal protective equipment as indicated in Section 8.

Cleanup and Disposal of Spill: Vacuum or sweep up material and place into a suitable disposal container.

Clean up spills immediately, observing precautions in the Protective Equipment section. Avoid generating dusty conditions. Provide ventilation.

Environmental and Regulatory Reporting: Follow local/state/national regulations.

Section 7: Handling and Storage

Minimum/maximum Storage Temperature: no data

Handling: Use with adequate ventilation. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Keep container tightly closed. Wash clothing before reuse. Avoid breathing dust.

Storage: Store in a cool, dry place. Store in a tightly closed container.

REGULATORY REQUIREMENTS: See Section 8 for employee exposure controls and Section 15 for other regulatory requirements.
Section 8: Exposure Controls / Personal Protection

**Ventilation Protection:** Use adequate ventilation to keep airborne concentrations low.

**Exposure Limits:** OSHA/ACGIH: not listed

**Respiratory Protection (specify type):** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

**Eye Protection:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166

**Skin Protection:** Wear appropriate gloves to prevent skin exposure.

**Other Protective Clothing and Equipment:** Wear appropriate protective clothing to minimize contact with skin.

**Hygienic Work Practices:** Wash hands and other exposed areas with water before eating, drinking, smoking and when leaving work. Keep the working area as clean and tidy as possible.

Section 9: Physical and Chemical Properties

**Chemical Name:** D-xylose

**Physical State:** Solid

**Color and Appearance:** White crystalline powder.

**Odor:** None reported

**Odor Threshold:** no data

**pH (in water):** no data

**Specific Gravity @ 20°C:** 1.525

**Vapor Pressure,** not applicable

**Vapor Density:** (Air=1): not applicable

**Density:** no data

**Volatile by Volume:** no data

**Boiling Point:** no data

**A Flash Point (COC):** see section 5 dust explosion hazard

**Softening Point:** no data

**Freezing/Melting Point:** 144 – 155°C

**Evaporation Rate:** not applicable

**Solubility in water:** soluble

**Other Solubilities:** alcohol

**Chemical Formula:** C_5 H_10 O_5

**Formula Wt:** 150.13

Section 10: Stability and Reactivity

**Chemical Stability:** Stable _X_ Unstable ___

**Hazardous Polymerization:** Has not been reported.

**Conditions to Avoid:** Avoid dust generation. Hazard of dust explosions.

**Chemical Incompatibility:** Strong oxidizing agents.

**Hazardous Decomposition Products:** Carbon monoxide, irritating and toxic fumes and gases, Carbon dioxide.

Section 11: Toxicological Information

**RTECS#:**

**CAS#** 58-86-6

**LD_{50}/LC_{50}**

**Oral LD_{50} (mouse)** = 23 gm/kg

24 Hour Emergency Phone - Chemtrec: 1-800-424-9300  Transportation 1-800-441-3637 Medical
Carcinogenicity Data: No evidence found.
Epidemiology: No information available.
Teratological Data: No information available.
Reproductive Data: No information available.
Mutagenicity Data: No information available.
Neurotoxicity Data: No information available.
Other Studies: No information available.

Section 12: Ecological Information

Eco-acute Toxicity: no data
Environmental Fate: no data

Section 13: Disposal Considerations

Disposal Procedures: Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

Section 14: Transport Information

USA: Not regulated as a hazardous material.

Section 15: Regulatory Information

US FEDERAL
TSCA
CAS# 58-86-6 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
CERCLA Hazardous Substances and corresponding RQs
None of the chemicals in this material have an RQ.
SARA Section 302 Extremely Hazardous Substances
None of the chemicals in this product have a TPQ.
Section 313: No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.
STATE
CAS# 58-86-6 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
California Prop 65
California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: no data
Risk Phrases: no data
Safety Phrases: no data
WGK (Water Danger/Protection)
CAS# 58-86-6: No information available.

Canada - DSL/INDSL
CAS# 58-86-6 is listed on Canada's DSL List.

Canada - WHMIS
This product has a WHMIS classification of Not controlled.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

Section 16: Other Information

ACGIH - American Conference of Governmental Industrial Hygienists
ANSI - American National Standards Institute
CAS - Chemical Abstracts Service
CERCLA - Comprehensive Environmental Response, Compensation & Liability Act of 1980
CFR - Code of Federal Regulations
CHEMTREC - Chemical Transportation Emergency Center
DOT - U.S. Department of Transportation
DSL - Canadian Domestic Substance List
EHS - Extremely Hazardous Substance
EPA - U.S. Environmental Protection Agency
HMIS - Hazardous Material Identification System
IARC - International Agency for Research on Cancer
LEL/UEL - Lower and Upper Explosive Limit
mg/m$^3$ - Milligrams per cubic meter
MSDS - Material Safety Data Sheet
NAERG - North American Emergency Response Guidebook
NIOSH - National Institute of Occupational Safety and Health
NFPA - National Fire Protection Association
NTP - National Toxicology Program
OSHA - Occupational Safety and Health Administration
PEL - Permissible Exposure Limit (set by OSHA)
PPE - Personal Protective Equipment
RCRA - Resource Conservation and Recovery Act of 1976
SARA - Superfund Amendments and Reauthorization Act

<table>
<thead>
<tr>
<th>Rating Number</th>
<th>Health Hazard</th>
<th>Flamibility Hazard</th>
<th>Instability Hazard</th>
<th>Special Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Can be lethal</td>
<td>Will vaporize and readily burn at normal temperatures</td>
<td>May explode at normal temperatures and pressures</td>
<td>ALK Alkaline</td>
</tr>
<tr>
<td>3</td>
<td>Can cause serious or permanent injury</td>
<td>Can be ignited under almost all ambient temperatures</td>
<td>May explode at high temperature or shock</td>
<td>ACID Acidic</td>
</tr>
<tr>
<td>2</td>
<td>Can cause temporary incapacitation or residual injury</td>
<td>Must be heated or high ambient temperature to burn</td>
<td>Violent chemical change at high temperatures or pressures</td>
<td>BIO BioHazard</td>
</tr>
<tr>
<td>1</td>
<td>Can cause significant irritation</td>
<td>Must be pre-heated before ignition can occur</td>
<td>Normally stable, High temperatures make unstable</td>
<td>COR Strong Corrosive</td>
</tr>
<tr>
<td>0</td>
<td>No Hazard</td>
<td>Will not burn</td>
<td>Stable</td>
<td>CRYO Cryogenic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OXY Oxidizer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>☢ Reacts violently or explosively with water</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>☢ W Reacts violently or explosively with water or oxidizer</td>
</tr>
</tbody>
</table>

24 Hour Emergency Phone - Chemtrec:  1-800-424-9300  Transportation  1-800-441-3637  Medical
TDG (Canadian): Transport of Dangerous Goods Regulations
TLV - Threshold Limit Value (set by ACGIH)
TWA - 8-hour Time Weighted Average
TSCA - US Toxic Substance Control Act
WHMIS - Workplace Hazardous Material Information System

MSDS Issue Date: n/a
Revised Date: 3-26-2010
Supersedes: n/a

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