Material Safety Data Sheet

**ELVANOL® 51-05 polyvinyl alcohol**

Version 2.0

Revision Date 09/12/2011 Ref. 130000021504

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

### SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

<table>
<thead>
<tr>
<th>Product name</th>
<th>ELVANOL® 51-05 polyvinyl alcohol</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSDS Number</td>
<td>130000021504</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>DuPont</td>
</tr>
<tr>
<td></td>
<td>1007 Market Street</td>
</tr>
<tr>
<td></td>
<td>Wilmington, DE 19898</td>
</tr>
<tr>
<td>Product Information</td>
<td>1-800-441-7515 (outside the U.S. 1-302-774-1000)</td>
</tr>
<tr>
<td>Medical Emergency</td>
<td>1-800-441-3637 (outside the U.S. 1-302-774-1139)</td>
</tr>
<tr>
<td>Transport Emergency</td>
<td>CHEMTREC: 1-800-424-9300 (outside the U.S. 1-703-527-3887)</td>
</tr>
</tbody>
</table>

### SECTION 2. HAZARDS IDENTIFICATION

**Emergency Overview**

Resin particles, like other inert materials, are mechanically irritating to eyes. May form explosive dust-air mixture. Avoid breathing dust or solution spray.

**Potential Health Effects**

Processing temperatures that exceed those described in Section 10 (Conditions to Avoid), may evolve fumes irritating the eyes, nose and throat.

**Skin**

Experience shows no unusual dermatitis hazard from routine handling.

**Eyes**

- Methyl acetate: Corrosive, may cause permanent eye injury if not promptly treated. Severe eye irritation
- Methanol: May cause eye irritation. May cause: Tearing, redness, or discomfort.

**Inhalation**

Exposure may result in reddening, tears and itching of the eyes and soreness in the nose and throat, together with coughing.

**Ingestion**
Methyl acetate: Abdominal pain, Nausea, Vomiting, Weakness, narcosis.

Methanol: Toxic if swallowed. Causes damage to the kidneys/ liver/ eyes/ brain/ digestive system/ central nervous system if swallowed. Impairment of vision, Blindness.

Repeated exposure
Methyl acetate: Adverse effects from repeated exposure may include: Respiratory irritation Central nervous system effects cardiovascular system effects altered blood chemistry Liver effects Kidney effects

Target Organs
Methyl acetate: Central nervous system Respiratory system Cardio-vascular system Blood Mucous membranes Liver Kidney

Methanol: Central nervous system Eyes

Carcinogenicity
None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vinyl alcohol copolymer</td>
<td>25213-24-5</td>
<td>&gt;90%</td>
</tr>
<tr>
<td>Process Aids</td>
<td></td>
<td>&lt;3%</td>
</tr>
<tr>
<td>Methyl acetate</td>
<td>79-20-9</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Methanol</td>
<td>67-56-1</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>
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SECTION 4. FIRST AID MEASURES

Skin contact: In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash contaminated clothing before reuse.

Inhalation: Move to fresh air in case of accidental inhalation of dust or fumes from overheating or combustion. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion: Not a probable route of exposure. However, in case of accidental ingestion, call a physician.

SECTION 5. FIREFIGHTING MEASURES

Flammable Properties
Flash point: no data available

Fire and Explosion Hazard: Under conditions giving incomplete combustion, hazardous gases produced may consist of: Aldehydes Alcohols Carbon dioxide, Water, Carbon monoxide, Organic Acid, Disodium oxide

Suitable extinguishing media: Water, Foam, Carbon dioxide (CO2)

Firefighting Instructions: Wear self-contained breathing apparatus and protective suit. The solid polymer can only be burned with difficulty. Grounding and elimination of the static charge is recommended. Under severe dusting conditions, this material may form explosive mixtures in air. Information about special precautions needed for bulk handling is available on request.

SECTION 6. ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Spill Cleanup: Shovel or sweep up. Avoid generating dust.

Accidental Release Measures: Do not discharge to streams, ponds, lakes or sewers.

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SECTION 7. HANDLING AND STORAGE

Handling (Personnel) : Minimize the generation and accumulation of dust. Can accumulate high static electric charge during handling. Grounding and elimination of the static charge is recommended.

Storage : Keep containers dry and tightly closed to avoid moisture absorption and contamination.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls : In the event that the polymer is heated above 200°C (392°F), local ventilation should be used to avoid exposure to fumes. See Bulletin “Proper Use of Local Exhaust Ventilation During Processing of Plastics”. Good general ventilation should be provided to keep dust concentrations below the exposure limits.

Personal protective equipment

Respiratory protection : Where there is potential for airborne exposures in excess of applicable limits, wear NIOSH approved respiratory protection. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or there are any other circumstances where air purifying respirators may not provide adequate protection.

Eye protection : Wear tightly fitting chemical splash goggles and face shield when possibility exists for eye and face contact due to spattering or splashing of molten material.

Skin and body protection : If there is a potential for contact with hot/molten material wear heat resistant clothing and footwear.

Exposure Guidelines

Exposure Limit Values

Dust (inhalable and respirable fraction)

PEL: 5 mg/m³ (OSHA)

Remarks

8 hr. TWA: Respirable fraction.

All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are
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covered by the Particulates Not Otherwise Regulated (PNOR) limit which is the same as the inert or nuisance dust limit of Table Z-3.

<table>
<thead>
<tr>
<th></th>
<th>OSHA</th>
<th>ACGIH</th>
<th>TWA</th>
<th>8 hr. TWA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PEL:</strong></td>
<td>15 mg/m³</td>
<td>10 mg/m³</td>
<td>3 mg/m³</td>
<td>8 hr. TWA</td>
</tr>
<tr>
<td><strong>TLV:</strong></td>
<td>15 mg/m³</td>
<td>10 mg/m³</td>
<td>3 mg/m³</td>
<td>TWA</td>
</tr>
<tr>
<td><strong>TLV:</strong></td>
<td>15 mg/m³</td>
<td>10 mg/m³</td>
<td>3 mg/m³</td>
<td>TWA</td>
</tr>
</tbody>
</table>

**Methanol**

<table>
<thead>
<tr>
<th></th>
<th>OSHA</th>
<th>ACGIH</th>
<th>TWA</th>
<th>8 hr. TWA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PEL:</strong></td>
<td>200 ppm</td>
<td>260 mg/m³</td>
<td>260 mg/m³</td>
<td>8 hr. TWA</td>
</tr>
<tr>
<td><strong>TLV:</strong></td>
<td>200 ppm</td>
<td>TWA</td>
<td>TWA</td>
<td></td>
</tr>
<tr>
<td><strong>TLV:</strong></td>
<td>250 ppm</td>
<td>STEL</td>
<td>STEL</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>DUPONT</th>
<th>200 ppm</th>
<th>8 &amp; 12 hr. TWA,</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AEL:</strong></td>
<td>Skin designation</td>
<td>Skin designation</td>
<td></td>
</tr>
</tbody>
</table>

**Methyl acetate**

<table>
<thead>
<tr>
<th></th>
<th>OSHA</th>
<th>ACGIH</th>
<th>TWA</th>
<th>8 hr. TWA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PEL:</strong></td>
<td>200 ppm</td>
<td>610 mg/m³</td>
<td>610 mg/m³</td>
<td>8 hr. TWA</td>
</tr>
<tr>
<td><strong>TLV:</strong></td>
<td>200 ppm</td>
<td>TWA</td>
<td>TWA</td>
<td></td>
</tr>
<tr>
<td><strong>TLV:</strong></td>
<td>250 ppm</td>
<td>STEL</td>
<td>STEL</td>
<td></td>
</tr>
</tbody>
</table>

**Sodium acetate**

<table>
<thead>
<tr>
<th></th>
<th>DUPONT</th>
<th>10 mg/m³</th>
<th>8 &amp; 12 hr. TWA</th>
<th>Total dust</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AEL:</strong></td>
<td>Skin designation</td>
<td>Skin designation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>DUPONT</th>
<th>5 mg/m³</th>
<th>8 &amp; 12 hr. TWA</th>
<th>Respirable dust.</th>
</tr>
</thead>
</table>

**Biological Exposure Indices**

<table>
<thead>
<tr>
<th></th>
<th>ACGIH</th>
<th>15 mg/l methanol/Urine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BEI:</strong></td>
<td>5 / 11</td>
<td></td>
</tr>
</tbody>
</table>
Sampling time: End of shift.

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>dry, free flowing granules, powder</td>
</tr>
<tr>
<td>Color</td>
<td>clear or pigmented</td>
</tr>
<tr>
<td>Odor</td>
<td>mild</td>
</tr>
<tr>
<td>Melting point</td>
<td>200 °C (392 °F)</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>&gt; 1</td>
</tr>
<tr>
<td>Water solubility</td>
<td>partly soluble</td>
</tr>
</tbody>
</table>

SECTION 10. STABILITY AND REACTIVITY

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability</td>
<td>Stable at normal temperatures and storage conditions.</td>
</tr>
<tr>
<td>Conditions to avoid</td>
<td>Temperature 200 °C (392 °F) Stable at normal temperatures and storage conditions.</td>
</tr>
<tr>
<td>Incompatibility</td>
<td>None reasonably foreseeable.</td>
</tr>
<tr>
<td>Hazardous decomposition products</td>
<td>Decomposition is a function of both processing temperature and time at that temperature. Decomposition can occur below the recommended processing temperature limit. At temperatures above the &quot;conditions to avoid&quot; temperature, thermal decomposition of the resin becomes rapid. Hazardous decomposition products: Carbon monoxide, Hydrocarbons, Organic acids, Alcohols, Aldehydes, Disodium oxide</td>
</tr>
</tbody>
</table>

SECTION 11. TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl acetate Dermal LD50</td>
<td>&gt; 5,000 mg/kg, rabbit</td>
</tr>
</tbody>
</table>
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Oral LD50 : 6,970 mg/kg, rat

Inhalation 4 h ALC : 97.6 mg/l, rat
   Central nervous system effects
   Cardiovascular system effects
   Lung effects

Skin irritation : rabbit irritant

Eye irritation : rabbit Corrosive

Repeated dose toxicity : Inhalation
   dog
   Respiratory tract irritation
   Inhalation
   rat
   Respiratory tract damage, Weight loss, altered blood chemistry, Liver effects, Kidney effects
   Inhalation
   cat
   Weight loss, altered blood chemistry, Eye irritation, Central nervous system depression

Mutagenicity : Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

Methanol

Dermal Acute toxicity estimate : 300 mg/kg
Dermal : animals (unspecified species)
   Target Organs: Central nervous system
   Central nervous system effects
   Narcosis
   Eye effects

Oral Acute toxicity estimate : 100 mg/kg
Oral : animals (unspecified species)
   Target Organs: Central nervous system

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Central nervous system effects
narcosis
eye effects

Inhalation Acute toxicity estimate
Inhalation:
3 mg/l
animals (unspecified species)
Target Organs: Central nervous system
Central nervous system effects
narcosis
eye effects

Skin irritation
Slight or no skin irritation, rabbit

Eye irritation
slight irritation, rabbit

Skin sensitization
Did not cause sensitization on laboratory animals, guinea pig

Carcinogenicity
Overall weight of evidence indicates that the substance is not carcinogenic.

Mutagenicity
Overall weight of evidence indicates that the substance is not mutagenic.
Did not cause genetic damage in animals.
Genetic damage in cultured mammalian cells was observed in some laboratory tests but not in others.
Genetic damage in cultured bacterial cells was observed in some laboratory tests but not in others.

Reproductive toxicity
Evidence suggests the substance is not a reproductive toxin in animals.

Teratogenicity
Evidence suggests the substance is not a developmental toxin in animals.

SECTION 12. ECOLOGICAL INFORMATION
Aquatic Toxicity
Methyl acetate
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**96 h LC50**: Pimephales promelas (fathead minnow) 320 mg/l

**48 h EC50**: Daphnia magna (Water flea) 1,027 mg/l

**Methanol**

**96 h LC50**: Pimephales promelas (fathead minnow) 28,100 mg/l

**96 h LC50**: Selenastrum capricornutum (green algae) 22,000 mg/l

**48 h EC50**: Daphnia > 10,000 mg/l

**Environmental Fate**

**Methanol**

**Biodegradability**: Readily biodegradable.

**Bioaccumulation**: Bioaccumulation is unlikely.

**Additional ecological information**: No data is available on the product itself. Toxicity is expected to be low based on insolubility in water.

**SECTION 13. DISPOSAL CONSIDERATIONS**

**Waste Disposal**: Preferred options for disposal are recycling, incineration with energy recovery, and landfill. The high fuel value of this product makes incineration very desirable for material that cannot be recycled. Treatment, storage, transportation, and disposal must be in accordance with applicable federal, state/provincial, and local regulations.

**SECTION 14. TRANSPORT INFORMATION**

Not classified as dangerous in the meaning of transport regulations.
SECTION 15. REGULATORY INFORMATION

TSCA Status: In compliance with TSCA Inventory requirements for commercial purposes.

SARA 313 Regulated Chemical(s): SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

CERCLA Reportable Quantity: 33,333 lbs
Based on the percentage composition of this chemical in the product:
Methyl acetate

California Prop. 65: Chemicals known to the State of California to cause cancer, birth defects or any other harm: none known

PA Right to Know Regulated Chemical(s): Substances on the Pennsylvania Hazardous Substances List present at a concentration of 1% or more (0.01% for Special Hazardous Substances): None known.

NJ Right to Know Regulated Chemical(s): Substances on the New Jersey Workplace Hazardous Substance List present at a concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens): None known.

SECTION 16. OTHER INFORMATION

Restrictions for use: Do not use DuPont materials in medical applications involving implantation in the human body or contact with internal body fluids or tissues unless the material has been provided from DuPont under a written contract that is consistent with DuPont policy regarding medical applications and expressly acknowledges the contemplated use. For further information, please contact your DuPont representative. You may also request a copy of the DuPont POLICY Regarding Medical Applications H-50103-3 and DuPont CAUTION Regarding Medical Applications H-50102-3.

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Significant change from previous version is denoted with a double bar.