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Material Safety Data Sheet

DELRIN[®]100AF, 500AF and DE588

EMERGENCY TELEPHONE: 724-746-6050 or 856-227-0500
ISSUE DATE: October 1, 1985
REVISION DATE: April 17, 2011
TRADE NAME: DELRIN[®]
PART NAME: ACETAL, PTFE FILLED
CHEMICAL NAME: Homopolymer Polyoxymethylene (POM-H)

1. Information on Ingredients

MATERIAL	CAS Number	%
Acetal Polymer		>75
Polytetrafluoroethylene (PTFE)	9002-84-0	<25
Stabilizers		<4
Formaldehyde	50-00-0	<0.005

Material is not known to contain Toxic Chemicals under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Additives in this product do not present a respiration hazard unless the product is ground to a powder of respirable size and the dust is inhaled. All dusts can cause potential injury to the respiratory tract if respirable particles are generated and inhaled in sufficiently high concentrations. Good industrial hygiene practices, as with all dusts, should include precautions to prevent inhalation of respirable particles.

2. Hazard Identification

HOMOPOLYMER ACETAL POLYMER

There are no known effects from exposure to the Acetal polymer itself. If overheated, the polymer released formaldehyde which may cause skin, eye, and respiratory irritation and allergic reactions. Significant skin permeation and systemic toxicity after contact appears unlikely. There are inconclusive or unverified reports of human sensitization.

POLYTETRAFLUOROETHYLENE (PTFE)

Inhalation of PTFE dust may cause generalized irritation of the nose, throat and lungs with cough, difficulty breathing or shortness of breath.

Heating PTFE above 300°C (572°F) may liberate a fine particulate fume. Inhalation may produce polymer fume fever, a temporary flu-like condition with fever, chills, nausea, shortness of breath, chest tightness, muscle or joint ache, and sometimes cough and elevated white blood cell count. The symptoms are often delayed 4 to 24 hours after exposure. These signs are generally temporary, lasting 24 to 48 hours and resolve without further complications. However, some individuals with repeated episodes of polymer fume fever have reported persistent pulmonary effects. Protection against polymer fume fever should also provide protection against any potential chronic effects.

Exposure to decomposition products from PTFE heated above 400°C (752°F) may cause pulmonary inflammation, hemorrhage or edema. These more serious consequences of exposure may occur from extreme thermal decomposition of PTFE which can liberate fume particles and toxic gases (carbonyl fluoride, hydrogen fluoride, and other fluorinated gases) especially under conditions of poor ventilation and/or confined spaces. The decomposition products may initially produce chest tightness or pain, chills, fever, nausea, with shortness of breath, cough, wheezing and progression into pulmonary edema. Edema may be delayed in onset and requires medical treatment. In severe cases, if medical intervention is delayed, pulmonary edema may become life threatening. Recovery is generally complete within a few days; in some rare cases, persistent lung function abnormalities have been reported. Compared to nonsmokers, polymer fume fever symptoms appear to be more prevalent and serious in smokers. Smokers must avoid contamination of tobacco with residual polymer from their hands or from fumes, and should wash their hands before smoking.

Significant skin permeation and systemic toxicity after contact with the dust appears unlikely. There are no reports of human sensitization from contact with dust.

If PTFE dusts contact the eye, mechanical irritation with tearing, pain or blurred vision may result.

Individuals with pre-existing diseases of the lungs or cardiovascular system may have increased susceptibility to the reduction in blood oxygen that may develop after excessive exposures to thermal decomposition products.

CARCINOGENICITY INFORMATION

The following components are listed by IARC, NTP OSHA or ACGIH as carcinogens

MATERIAL	IARC	NTP	OSHA	ACGIH
Formaldehyde	1	X	X	A2

3. First Aid Measures

INHALATION

No specific intervention is indicated as the compound is not likely to be hazardous by inhalation. Consult a physician if necessary. If exposed to fumes from overheating or combustion, move to fresh air. Consult a physician if symptoms persist.

SKIN CONTACT

The compound is not likely to be hazardous by skin contact, but cleansing the skin after use is advised. If molten polymer gets on skin, cool rapidly with cold water. Do not attempt to peel polymer from skin. Seek medical treatment for thermal burn.

EYE CONTACT

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician if irritation persists.

INGESTION

No specific intervention is indicated as compound is not likely to be hazardous by ingestion.

4. Fire Fighting Measures

FLAMMABLE PROPERTIES

Flash Point: Not Applicable

Homopolymer Acetal Polymer dust cloud ignition temperature is 440°C (824°F).

Fire and Explosion Hazards :

Like most organic materials in powder form, dust generated from this product may form a flammable dust-air mixture. Potential for a dust explosion may exist. Minimize the generation and accumulation of dust. Keep away from sources of ignition. Burns with invisible flame. Hazardous gases/vapors produced in fire are carbon monoxide, formaldehyde, hydrogen fluoride (HF), and carbonyl fluoride.

EXTINGUISHING MEDIA

Water, Foam, Dry Chemical, CO₂

FIRE FIGHTING INSTRUCTIONS

Keep personnel removed and upwind of fire. Wear self-contained breathing apparatus.

5. Handling and Storage

HANDLING (Personnel)

See FIRST AID and PERSONAL PROTECTIVE EQUIPMENT Sections

HANDLING (Physical Aspects)

Minimize the generation and accumulation of dust.

STORAGE

Store in a cool dry place. Keep away from heat and sunlight.

6. Exposure Controls / Personal Protection

ENGINEERING CONTROLS

VENTILATION: If hot processing this material, use local and/or general exhaust ventilation to control the concentration of vapors and fumes below exposure limits.

In cutting, grinding, or machining operations with this material, use local exhaust to control the concentration of dust below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION

Wear safety glasses. Wear overall chemical splash goggles and face shield when possibility exists for eye or face contact with molten material. A full face mask positive-pressure air-supplied respirator provides protection from eye irritation.

RESPIRATORS

When temperatures exceed 230°C and ventilation is inadequate to maintain concentrations below exposure limits, use a positive-pressure air-supplied respirator. Air-purifying respirators may not provide adequate protection.

During grinding, sawing, routing, drilling or sanding operations use a NIOSH/MSHA approved air-purifying respirator with dust/mist cartridge or canister if airborne particulate concentrations are expected to exceed permissible exposure levels.

PROTECTIVE CLOTHING

If there is potential contact with hot/molten materials, wear heat resistant clothing and footwear. Wear leather or cotton gloves when grinding, sawing, routing, drilling or sanding.

EXPOSURE GUIDELINES

EXPOSURE LIMITS

ACETAL POLYMER/PTFE BLENDS

PEL (OSHA):	Particulates (Not Otherwise Regulated) 15 mg/m ³ , 8 hr. TWA, total dust 5 mg/ m ³ , 8 hr. TWA, respirable dust
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OTHER APPLICABLE EXPOSURE LIMITS

POLYTETRAFLUOROETHYLENE (PTFE)

PEL (OSHA)	None Established
TLV (ACGIH)	None Established
AEL*	10 mg/m ³ , 8 Hr. TWA, total dust 5 mg/m ³ , 8 Hr. TWA, respirable dust

FORMALDEHYDE

PEL (OSHA)	0.75 ppm, 0.92 mg/m ³ , 8 Hr., TWA
STEL	2 ppm, 2.5 mg/m ³
TLV (ACGIH)	Ceiling 0.3 ppm, A2 Sensitizer
AEL*	0.5 ppm, 8 & 12 Hr. TWA 1 ppm, 15 minute TWA

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

7. Physical and Chemical Properties

PHYSICAL DATA

Melting Point:	175 - 183°C (347 - 361°F)
Solubility in Water:	Insoluble
Odor:	Slight Formaldehyde
Color:	Light Brown or Dark Brown
Form:	Rod, Plate, Sheet or Tube (stock shape product)
Specific Gravity:	> 1

8. Stability and Reactivity

CHEMICAL STABILITY

Stable at normal temperatures and storage conditions.

CONDITIONS TO AVOID

Maintain polymer melt temperatures below 230°C (446°F). Avoid prolonged exposure at or above the recommended processing temperatures.

INCOMPATIBLY WITH OTHER MATERIALS

Incompatible with strong acids and bases (decomposes forming formaldehyde) and strong oxidizing agents. At melt temperatures, Acetal resins are incompatible with halogenated polymers such as PVC and PVDC and any elastomers containing halogenated polymers. Even small amounts of such contaminants can cause sudden and spontaneous formaldehyde gas formation. Workplace fume concentrations well above threshold levels are likely result. Unsafe pressurization of equipment, e.g. extruders, molds, can also result.

Do not contaminate either virgin resin or rework. Do not mix this resin with pigments or additives other than those designated by the manufacturer. Do not mix this grade with other grades of Acetal, nor with any other resin, without first consulting the manufacturer. Doing any of the above may change the thermal stability of this resin and potentially cause decomposition.

DECOMPOSTION

Decomposition of this material depends on the length of time it is exposed to elevated temperatures. At the recommended processing temperature of 210 - 220°C (410 - 428°F), decomposition should not be significant until after 30 minutes. Decomposition may be accelerated by contaminants, pigments, and/or other additives.

Autoclaving with pressurized steam may lead to a rapid decomposition and should be done for only minimum amounts of time. **COOL COMPLETELY BEFORE OPENING** the autoclave.

Hazardous gas/vapor produced is formaldehyde.

POLYMERIZATION

Polymerization will not occur.

9. Toxicological Information

ANIMAL DATA

HOMOPOLYMER ACETAL

Inhalation 6 hour LC50:	>22,000 mg/m ³ in rats
Oral LD50:	>11,000 mg/kg in rats

Homopolymer Acetal is not a skin irritant in tests with animals.

Single or repeated inhalation exposures to high concentrations of Homopolymer Acetal dust resulted in collapse of some areas of the lungs, other areas were over-inflated. This effect was seen as late as 11 to 19 days post-exposure.

No toxic effects were observing in animals ingesting Homopolymer Acetal

No animal test reports are available to define carcinogenic, mutagenic, developmental, or reproductive hazards.

PTFE

Animal testing indicates that PTFE is not a skin irritant. Repeated exposure of PTFE by ingestion caused no significant toxicological effects. Possible effects on white blood cell counts were found in rats fed 25% PTFE in the diet for 90 days; however any changes were within normal variability and were considered to be on no toxicological significance.

In rates, single exposure to dusts of un-degraded PTFE by inhalation caused irritation of the lungs. Exposure to thermal decomposition products of PTFE caused lung injury whose severity depends upon the temperature and exposure conditions. Birds appear to be especially susceptible to the toxic effects of fluoropolymer decomposition products. In rats, exposure of freshly formed low molecular weight polymer fragments (fume) produced by continuous heating of the polymer above 400°C may produce acute pulmonary inflammation. When the concentration of fluoropolymer fragment fumes increases, deaths may occur from pulmonary edema and hemorrhage. Exposure to fume aged for several minutes markedly reduces the toxicity. At higher temperatures involving gross thermal decomposition of the polymer, deaths occurred due to pulmonary edema from lethal concentrations of fluoropolymer fume and/or fluorinated gas decomposition products.

No adequate animal data are available to define the carcinogenicity or developmental hazards of PTFE. No adequate reports of genetic testing were found. No animal data are available to define the reproductive toxicity of PTFE.

10. Ecological Information

AQUATIC TOXICITY

No information is available. Toxicity is expected to be low based on insolubility in water. Do not discharge to streams, ponds, lakes or sewers.

11. Disposal Considerations

WASTE DISPOSAL

Preferred options for disposal are (1) recycling, (2) incineration with energy recovery, and (3) landfill. The high fuel value of this product makes option 2 very desirable for material that cannot be recycled, but incinerator must be capable of scrubbing out acidic combustion products. Treatment, storage, transportation, and disposal must be in accordance with applicable federal, state/provincial, and local regulation.

12. Transportation Information

SHIPPING INFORMATION

Not regulated in transportation by DOT/IMO/IATA.

13. Regulatory Information

U.S. FEDERAL REGULATIONS

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

STATE REGULATIONS (U.S.)

STATE RIGHT-TO-KNOW

No substances on the state hazardous substances list, for the states indicated below, are used in the manufacture of products on this Material Safety Data Sheet, with the exceptions indicated.

Substances on the Pennsylvania Hazardous Substances List present at a concentration of 1% or more (0.01% for special hazardous substances) ☐ None known.

WARNING ☐ Substances known to the state of California to cause cancer, birth defects or other reproductive harm ☐ Formaldehyde

Substances on the New Jersey workplace hazardous substance list present at the concentration of 1% or more (0.1% for substances identified as carcinogens, mutagens or teratogens) ☐ None known.

14. Other Information

ADDITIONAL INFORMATION

MEDICAL USE: CAUTION ☐ Do not use in medical applications involving permanent implantation in the human body.

This Material Safety Data Sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our company. We believe this information to be correct but cannot guarantee its accuracy or completeness. Health and safety precaution in this data sheet may not be adequate for all individuals and/or situations. It is the user's responsibility to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in the data sheet shall be construed as a permission or recommendation for the use of any product in a manner that may infringe existing patents. No warranty is made, either expressed or implied.