
"VESPEL" POLYIMIDE PARTS AND SHAPES ALL IN SYNONYM LIST VSP001

VSP001 Revised 26-JAN-2007 Printed 02/11/2009

Substance ID :130000026921

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

"VESPEL" is a registered trademark of DuPont.

Corporate MSDS Number : DU003855

Tradenames and Synonyms

"VESPEL" SP-1,
"VESPEL" SP-3,
"VESPEL" SP-21,
"VESPEL" SP-22,
"VESPEL" SP-26
"VESPEL" SP-101,
"VESPEL" SP-102,
"VESPEL" SP-202 #
"VESPEL" SP-211,
"VESPEL" SP-214,
"VESPEL" SP-215,
"VESPEL" SP-221,
"VESPEL" SP-224,
"VESPEL" SP-262,
"VESPEL" SP-2515,
"VESPEL" SP-2624
"VESPEL" ST-2010,
"VESPEL" ST-2010G,
"VESPEL" ST-2010H,
"VESPEL" ST-2030,

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont Engineering Polymers
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS
Product Information : 1-800-441-7515
Transport Emergency : 1-800-424-9300
Medical Emergency : 1-800-441-3637

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%

POLY-N,N'-(p,p'-OXYDIPHENYLENE) PYROMELLITIMIDE	25038-81-7	30-100
GRAPHITE	7782-42-5	0-65
MOLYBDENUM DISULFIDE	1317-33-5	0-15
CARBON FIBER	70892-43-2	0-10

PRESENT IN "VESPEL" SP-21, SP-211, SP-214, SP-215, SP-26, SP-262, and SP-2624

CRYSTALLINE SILICA (QUARTZ)	14808-60-7	<1

PRESENT IN "VESPEL" SP-101, SP-211, SP-215, AND SP-221

POLYTETRAFLUOROETHYLENE	9002-84-0	5-20

Polytetrafluoroethylene heated above 400 deg C (750 deg F) can evolve as degradation products:

* Hydrogen Fluoride	7664-39-3	
Carbonyl Fluoride	353-50-4	

* Disclosure as a toxic chemical is required under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

Components (Remarks)

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 are potentially injurious 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.

HAZARDS IDENTIFICATION

Potential Health Effects

ADDITIONAL HEALTH EFFECTS

"VESPEL" polyimide parts and shapes are not hazardous as shipped.

POLYIMIDE RESIN

Machining of parts may generate dust as well as particles.

Human health effects of overexposure by skin contact may include skin irritation with discomfort or rash. Inhalation may cause irritation of the upper respiratory passages, with coughing and discomfort. No acceptable information is available to confidently predict the effects of excessive human exposure by eye contact, or ingestion. Significant skin permeation, and systemic toxicity, after contact appears unlikely. There are no reports of human

sensitization.

MOLYBDENUM DISULFIDE

No acceptable information is available to confidently predict the effects of excessive human exposure to this compound.

POLY-N,N'-(p,p'-OXYDIPHENYLENE) PYROMELLITIMIDE

Inhalation of SP Polymer dust may cause irritation of the upper respiratory passages, with coughing and discomfort.

GRAPHITE

Long-term inhalation of Graphite dust or powder may cause chronic lung disorders with symptoms of lung insufficiency.

Individuals with preexisting diseases of the lungs may have increased susceptibility to the toxicity of excessive exposures.

CARBON FIBER

Skin contact with Carbon Fibers may cause mechanical irritation of the skin with itching, redness, swelling or rash. Contact dermatitis with itching or rash, inflammatory eruptions and drying of the skin have been reported after contact with Carbon Fibers.

Eye contact with Carbon Fibers may cause eye irritation with discomfort, tearing, or blurred vision.

CRYSTALLINE SILICA (QUARTZ)

Eye contact with crystalline silica may cause eye irritation with discomfort, tearing, or blurring of vision.

Overexposure to airborne crystalline silica can cause silicosis. Silicosis in humans can be either of an acute or chronic nature. Acute silicosis is observed in subjects exposed to very high airborne concentrations of respirable crystalline silica over a short period of time (less than a few years) and is characterized by difficult breathing, fever, cough and weight loss that gets worse with time, leading to a progressive and fatal impairment of lung function. In contrast, chronic silicosis is observed in subjects exposed to lower concentrations of crystalline silica, takes a longer time period to develop (usually more than 10 years) and is characterized by the development of lung fibrosis and

corresponding impairment of lung function. Exposed individuals may not demonstrate symptoms of lung fibrosis until after many years of exposure.

In addition to silicosis, epidemiology studies show limited evidence of an excess of lung cancer in occupations involving exposures to crystalline silica, such as stonecutters and granite

industry workers.

Individuals with preexisting lung disease may have increased susceptibility to the adverse pulmonary effect related to crystalline silica exposures.

POLYTETRAFLUOROETHYLENE

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 degrees C 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 24-48 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 degrees C 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. These 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 the 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
CRYSTALLINE SILICA (QUARTZ)	1	X		A2

DuPont controls the following materials as carcinogens:
CRYSTALLINE SILICA (QUARTZ).

FIRST AID MEASURES

First Aid

INHALATION

No specific intervention is indicated, as the compound is not likely to be hazardous by inhalation. 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 washing with soap and water after handling is advisable.

EYE CONTACT

Not a probable route of exposure for finished parts. In case of contact with fibers or dusts, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION

No specific intervention is indicated as compound is not likely to be hazardous by ingestion. Consult a physician if necessary.

FIRE FIGHTING MEASURES

Flammable Properties

Will not burn without external flame.

Fire and Explosion Hazards:

Hazardous gases/vapors produced in fire are carbon monoxide, carbon dioxide, smoke.

SP-101, SP-211, SP-215, and SP-221 may also produce hydrogen

fluoride, carbonyl fluoride and low molecular weight fluorocarbons.

Extinguishing Media

Use media appropriate for surrounding material.

Fire Fighting Instructions

Wear self-contained breathing apparatus. Hydrogen fluoride fumes emitted during a fire can react with water to form hydrofluoric acid. Wear neoprene gloves when handling refuse from fire.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

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

Spill Clean Up

Recover undamaged and minimally contaminated material for reuse and reclamation. Shovel or sweep up.

HANDLING AND STORAGE

Handling (Personnel)

Avoid breathing dust or fibers. Avoid contact of fibers or dusts with eye, skin, or clothing. Wash thoroughly with soap and water after performing operations that involve fiber or dust handling.

Avoid unnecessary rehandling of scrap materials. Keep waste disposal equipment as close as possible to work areas involving operations where there is potential for generation of dust and fibers.

Disposable clothing and equipment contaminated with fibers

should be bagged in plastic and properly labeled for disposal.

Clean up fines, dusts, and/or fibers with high efficiency particulate air (HEPA) filtered vacuum equipment.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Note: Any processes that have the potential to generate dust, for example, cutting, machining or grinding, should be performed using engineering controls, such as isolation, enclosures, local exhaust ventilation, wetting with coolant, or dust collection systems, to control airborne fibers and dusts below applicable limits.

Note: Wet machining is the preferred method since the liquid both cools the parts and reduces dust generation. Aqueous-based coolants are preferred. Organic-based cutting fluids may degrade the in-use performance of the product and should not be used. Clean parts after cutting or before use.

As with any wet machining technique, mist collection systems should be used.

Skin that becomes contaminated with fibers and dusts should be promptly washed with soap and water.

Personal Protective Equipment

EYE/FACE PROTECTION
When cutting, grinding or mechanically working this product, wear safety glasses or coverall goggles.

RESPIRATORS
When cutting, grinding or mechanically working this product, wear NIOSH/MSHA approved respiratory protection if there is potential for airborne exposures in excess of applicable limits; or if there is potential for irritation of the nasal passages to occur due to the mechanical action of the fibers.

CLOTHING
When performing operations that generate airborne fibers or dusts, wear clothing and gloves to protect against potential irritation which may occur due to the mechanical action of fibers on the skin.

Where there is potential for airborne fibers or dusts in excess of applicable exposure limits or for skin irritation from contact with the fibers, workers should be required to

shower following a workshift and prior to putting on street clothes. Clean work clothing should be provided daily. Non-disposable clothing contaminated with fibers should be laundered separately from other clothing. Rinse washing machine thoroughly after use.

For general handling of the product, wear gloves to protect against cuts or abrasions which may occur from contact with the sharp edges.

Exposure Guidelines

Exposure Limits
"VESPEL" POLYIMIDE PARTS AND SHAPES ALL IN SYNONYM LIST VSP001

PEL	(OSHA)	: Particulates (Not Otherwise Regulated) 15 mg/m3, 8 Hr. TWA, total dust 5 mg/m3, 8 Hr. TWA, respirable dust

Other Applicable Exposure Limits
POLY-N,N'-(p,p'-OXYDIPHENYLENE)

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: None Established
AEL *	(DuPont)	: 10 mg/m3, 8 & 12 Hr. TWA, total dust 5 mg/m3, 8 & 12 Hr. TWA, respirable dust

GRAPHITE

PEL	(OSHA)	: 5 mg/m3, respirable dust, 8 Hr. TWA
TLV	(ACGIH)	: 2 mg/m3, respirable dust, 8 Hr. TWA
AEL *	(DuPont)	: None Established

MOLYBDENUM DISULFIDE

PEL	(OSHA)	: 5 mg/m3, and soluble compounds, as Mo Insoluble compounds: 15 mg/m3, Total Dust as 8 Hr TWAs
TLV	(ACGIH)	: 0.5 mg/m3 (Soluble compounds), as Mo, A3 10 mg/m3 (Metal and Insoluble Compounds) (Inhalable fraction) 3 mg/m3 (Respirable fraction)
AEL *	(DuPont)	: None Established

CARBON FIBER

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: None Established
AEL *	(DuPont)	: 1 Fiber/cc, 8 and 12 hour TWA, respirable fibers 3.5 mg/m3, 8 and 12 hour TWA, non-fibrous particulate or non-respirable fibers

CRYSTALLINE SILICA (QUARTZ)

PEL	(OSHA)	: Total dust, (30 mg/m3 / % SiO2 + 2) Respirable dust, (10 mg/m3 / % SiO2 + 2) as 8 Hr TWA's
TLV	(ACGIH)	: 0.025 mg/m3, respirable dust, 8 Hr. TWA, A2
AEL *	(DuPont)	: 0.1 mg/m3, 8 Hr. TWA, respirable dust 0.05 mg/m3, 12 Hr. TWA, respirable dust

POLYTETRAFLUOROETHYLENE

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: None Established
AEL *	(DuPont)	: 10 mg/m3, 8 Hr. TWA, total dust

5 mg/m3, 8 Hr. TWA, respirable dust

Hydrogen Fluoride
PEL (OSHA) : 3 ppm, 8 Hr. TWA, as F
TLV (ACGIH) : 0.5 ppm, 8 Hr. TWA, as F
Ceiling 2 ppm, as F
AEL * (DuPont) : 3 ppm, 15 minute TWA

Carbonyl Fluoride
PEL (OSHA) : None Established
TLV (ACGIH) : 2 ppm, 5.4 mg/m3, 8 Hr. TWA
STEL 5 ppm, 13 mg/m3
AEL * (DuPont) : None Established

* 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.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Melting Point : None
Solubility in Water : Insoluble
Odor : None
Form : Solid parts & shapes
Specific Gravity : >1.0

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Decomposition

Decomposes with heat.

For SP-101, SP-211, SP-215, and SP-221, trace amounts of hydrogen fluoride, carbonyl fluoride, and other fluorinated gases may be evolved at 400 C (752 F) with larger amounts at higher temperatures.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data

SP Polymer
  Inhalation 4 hour ALC: > 5.0 mg/L in rats

SP Polymer is not a skin irritant or a skin sensitizer in tests on animals.

Single high inhalation exposure caused transient body weight loss in rats.

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

Graphite
  Oral LD50: > 5,000 mg/kg in rats

Graphite was not an eye irritant when tested in animals.

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

MOLYBDENUM DISULFIDE

Skin absorption LD50 >16,000 mg/kg in rabbits Oral LD50 >16,000 mg/kg in rats

Repeated inhalation exposures of animals produced only an increase in respiration rate. A single ingestion exposure produced only marked diarrhea in animals. Repeated exposures produced no signs of toxicity.

Carbon Fibers
Carbon fiber, tested as filament bundles, was not a skin irritant in rabbits, but was a severe eye irritant in rabbits.

Guinea pigs exposed repeatedly by inhalation to approximately the AEL had no abnormal histopathology. Long term exposure of rats produced a reduction in body weight gain and a decrease in absolute lung weights, but there was no effect suggesting systemic toxicity or pulmonary dysfunction.

Tests in animals demonstrate no carcinogenic activity. Tests for developmental or reproductive toxicity have not been performed.

Carbon Fibers did not produce genetic damage in bacterial or mammalian cell cultures.

Crystalline Silica
  Oral ALD: > 11,000 mg/kg in male rats

Crystalline Silica is not a skin irritant or a skin sensitizer in animals, but is a mild eye irritant.

Single doses of 50 mg of Crystalline Silica administered by intratracheal instillation have resulted in pulmonary fibrosis at 60 and 120 days post exposure in rats. Repeated and chronic

exposures as low as 0.7 mg instillation and 12 mg/m3 by inhalation resulted in pulmonary fibrosis, inflammation, edema and emphysema in animals exposed to Crystalline Silica.

Lung tumors were observed in rats exposed for up to two years by inhalation to 12.4 or 51.6 mg/m3 Crystalline Silica. Lung tumors have been observed in other long-term inhalation exposures to concentrations as low as 1 mg/m3. Animals exposed for 29 days or up to 13 weeks and then removed from exposure and observed for up to 2 years also developed lung tumors. Lung tumors were also observed in rats administered quartz by intratracheal instillation. Crystalline Silica was positive in mammalian cell cultures for cell transformation and chromosomal effects. It was negative in cell culture assays for gene mutation in bacteria and DNA damage in mammalian cells and in a whole animal assay for chromosomal effects. Other tests for genetic damage have produced both positive and negative results.

No animal test reports are available to define developmental, or reproductive toxicity.

PTFE

Animal testing indicates that PTFE is not a skin irritant.

Repeated exposure to 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 of no toxicological significance.

In rats, single exposure to dusts of undegraded 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 to freshly formed low molecular weight polymer fragments (fume) produced by continuous heating of the polymer above 400 degrees 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.

ECOLOGICAL INFORMATION

Ecotoxicological Information

AQUATIC TOXICITY:

Toxicity is expected to be low based on insolubility in water.

DISPOSAL CONSIDERATIONS

Waste Disposal

Dispose of in compliance with federal, state and local regulations. Preferred options for disposal are (1) incineration with energy recovery, and (2) landfill. The high fuel value of this product makes option 1 very desirable, but incinerator must be capable of scrubbing out acidic combustion products.

TRANSPORTATION INFORMATION

Shipping Information

Not regulated in transportation by DOT/IMO/IATA.

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)- Graphite, Polytetrafluoroethylene, Crystalline Silica.

Polytetrafluoroethylene is listed, but we believe it was listed in error and have petitioned to have it delisted.

WARNING - SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM- None known.

The State of California, under Proposition 65, regulates Crystalline silica - airborne particles of respirable size as a carcinogen. In this product, crystalline silica is not supplied

in the form regulated in California.

SUBSTANCES ON THE NEW JERSEY WORKPLACE HAZARDOUS SUBSTANCE LIST PRESENT AT A CONCENTRATION OF 1% OR MORE (O.1% FOR SUBSTANCES IDENTIFIED AS CARCINOGENS, MUTAGENS OR TERATOGENS)- Molybdenum disulfide, Crystalline Silica.

OTHER INFORMATION

Additional Information

MEDICAL USE: CAUTION: Do not use in medical applications involving permanent implantation in the human body. For other medical applications see DuPont CAUTION Bulletin No. H-50102.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : REGULATORY AFFAIRS
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# Indicates updated section.

End of MSDS