

# MATERIAL SAFETY DATA SHEET



## \*\*\*\*\* IDENTIFICATION \*\*\*\*\*

NAME: 8153                      SYNONYMS: DIELECTRIC COMPOSITION.  
CHEM.FAMILY: Mixture.                      FORMULA: Proprietary.

MANUFACTURER:                      INFORMATION & EMERGENCY TELEPHONE NOS:  
E.I.DuPont de Nemours & Co.                      INFORMATION: Product: (800)441-7515  
Electronics Department                      EMERGENCIES: Medical: (800)441-3637  
Wilmington, De 19898                      Transport (CHEMTREC): (800)424-9300

All Ingredients in This Product are TSCA Listed/Reported.

## \*\*\*\*\* PHYSICAL DATA \*\*\*\*\*

FORM: Viscous Liquid.                      ODOR: Slight.  
APPEARANCE: Light Gray.                      SOLUBILITY IN WATER: Slight.

## \*\*\*\*\* COMPONENTS \*\*\*\*\*

Material(s):	CAS#	V.P. mm Hg @ 20C	Weight %
Diethylene Glycol Monoethyl Ether Acetate.	112-15-2	0.05	30 - 60%
Titanium Dioxide.	13463-67-7		10 - 30%
Barium Titanate.	12047-27-7		30 - 60%
Acrylic Resin.			1 - 5%
Fluorinated Polymer.			10 - 30%

8153/A01  
12/14/07

\*\*\*\*\* HAZARDOUS REACTIVITY \*\*\*\*\*

INSTABILITY:

The product is normally stable.

INCOMPATIBILITY:

Avoid contact with:

Oxidizing agents; Finely divided metals; Strong bases; Ketones;  
Strong oxidizing agents; Esters.

DECOMPOSITION:

Decomposition products:

Carbon Dioxide (CO<sub>2</sub>); Methyl methacrylate; Carbon Monoxide (CO);  
Carbonyl fluoride; Carbonaceous residues; WARNING: Silica (glass  
fibers) and titanium dioxide will accelerate thermal decomposition.  
DO NOT PROCESS THIS PRODUCT AT OR ABOVE 600 F (315 C). Thermal  
decomposition begins to generate Hydrogen Fluoride (HF) at 600 F  
(315 C); the evolution of HF becomes rapid at 700 F (370 C). HF is  
corrosive, causes burns on contact with skin and other tissue;  
Titanium oxides; Water; Hydrogen fluoride; Methyl acrylate.

POLYMERIZATION:

Polymerization will not occur.

\*\*\*\*\* FIRE & EXPLOSION DATA \*\*\*\*\*

FLASHPOINT: 204 F Closed cup

FIRE & EXPLOSION HAZARDS:

The product is not an unusual fire or explosion hazard.

EXTINGUISHING MEDIA:

Water spray, dry chemical or carbon dioxide.

SPECIAL FIREFIGHTING INFORMATION:

Toxic decomposition products may form under fire conditions.  
(See Decomposition Section.);  
Wear full protective clothing and a full facepiece, positive  
pressure, self-contained breathing apparatus (SCBA);  
Decontaminate contaminated clothing and equipment with soap  
and water. Dispose of residues per federal, state, and local  
regulation. (See Waste Disposal Section.).

\*\*\*\*\* HEALTH HAZARD INFORMATION \*\*\*\*\*

OVERVIEW: The most likely routes of worker exposure to components of this product are skin contact and inhalation.

Skin irritation and/or other effects of skin contact are easily avoided by: using proper gloves (See "Protection Information" section below); not touching exposed skin (like face, neck) or clothing with contaminated gloves; using proper techniques for removing gloves; washing affected areas immediately if skin contact occurs; washing hands before leaving the work area.

Inhalation exposure would occur by breathing the volatile components of this product. Volatile components begin to evaporate at room temperature when the product container is opened. Volatile component evaporation also occurs when the worker uses the product at room temperature, such as: while "thinning" the product; when mixing the product with a spatula; while dispensing the product onto a printing screen or stencil; during the screen printing or stenciling operation; and when removing the product from the equipment. Because of the low vapor pressures of the solvents and vehicles used in this product, evaporation of volatile components at room temperature is expected to be very slow.

However, the concentration of volatile components may increase under other conditions. Printing very large substrate surfaces or processing higher volumes or parts may increase the amount of available volatile components. Also, during drying (90 - 150 deg Celsius), elevated temperatures cause more rapid generation of volatile components from the printed substrates. Consideration should also be given to over-exposure to other chemicals used in the operation, for example, solvents used to clean equipment or to thin the product are additional sources of volatile substances.

Local ventilation, "plumbed-in" equipment ventilation and well-designed enclosures around equipment -like mixers, drying ovens, screen printers and laser trimmers- are effective ways to limit worker inhalation exposure where necessary. Also, hand-mixing of product should be done with local ventilation or in a fume hood where vapors and volatile components would be kept out of the worker's breathing zone. Personal protective equipment (e.g. cartridge respirator) also may be effective in reducing exposure if necessary. Well-designed area and personal air-sampling and analysis can show if exposures are within established limits. Discharge from the ventilation system(s) should comply with all local, state and federal laws, regulations and permits.

In addition to meeting exposure limits, significant differences in overall exposure can be made by practical steps:

- \* Inhalation - minimize by keeping closed containers of products, solvents, and solvent-dampened clean wipes;
- \* Skin - avoid contact by selecting proper gloves and using them properly;
- \* Eyes - wear chemical safety glasses when handling product, solvents and waste materials, and where there is potential for splashing, wear chemical goggles or face shield.
- \* Ingestion - avoid by washing hands before eating, drinking or smoking and restricting these activities to outside the work area.

#### PRINCIPAL HEALTH EFFECTS:

>>>Diethylene Glycol Monoethyl Ether Acetate  
 \*\*\*\*Toxic effects described in animals include: BY INHALATION: Kidney effects; Lung effects; BY INGESTION: Kidney effects; Liver effects; Testicular effects; Spleen effects. \*\*\*\*Additional animal tests have shown: Mutagenicity negative in Ames Test; No animal test reports are available to define carcinogenic, mutagenic, embryotoxic or reproductive hazards. \*\*\*\*Human health effects of overexposure may include: BY SKIN CONTACT: Skin irritation with discomfort or rash; BY EYE CONTACT: Eye irritation with discomfort, tearing, or blurring of vision. \*\*\*\*Human effects of higher level acute, repeated or chronic overexposure may include: Temporary central nervous system depression with anaesthetic effects: dizziness, headache, confusion, incoordination, and loss of consciousness; Abnormal kidney function as detected by laboratory tests.

>>>Titanium Dioxide  
 \*\*\*\*Additional animal tests have shown: No genetic damage in animals, bacterial or mammalian cell cultures; No animal data available to define reproductive toxicity; No animal data available to define developmental toxicity; BY INHALATION: In lifetime inhalation studies of respirable Titanium Dioxide ("TiO2") at levels up to 250 mg/m3, the following conclusions were made: \_\_1) No compound-related clinical signs of toxicity were seen in the exposed animals \_\_2) Slight pulmonary fibrosis was seen at 50 and 250 mg/m3 respirable dust levels but not at 10 mg/m3. \_\_3) There was no evidence of cancer in animals exposed to 10 or 50 mg/m3 respirable TiO2. \_\_4) Microscopic lung tumors were seen in 17 percent of the rats exposed to 250 mg/m3 respirable TiO2. The lung tumors seen in the rat are of questionable biological relevance for humans; BY INGESTION: In lifetime animal feeding tests at levels up

to 50,000 ppm, Titanium Dioxide ("TiO<sub>2</sub>") showed no evidence of cancer or other significant adverse effects in either rats or mice. \*\*\*\*Human health effects of overexposure may include: BY EYE CONTACT: Eye irritation with discomfort, tearing, or blurring of vision; BY INHALATION: Temporary lung irritation effects with cough, discomfort, difficulty breathing or shortness of breath; Irritation of the nose and throat. \*\*\*\*Human effects of higher level acute, repeated or chronic overexposure may include: BY SKIN CONTACT: Defatting (drying) of the skin; Cracking. \*\*\*In addition: BY INHALATION: A DuPont epidemiology study showed that employees who had been exposed to Titanium Dioxide (TiO<sub>2</sub>) were at no greater risk of developing lung cancer than were employees who had not been exposed to TiO<sub>2</sub>. No pulmonary fibrosis was found in any of the employees and no association was observed between TiO<sub>2</sub> exposure and chronic respiratory disease or x-ray abnormalities. DuPont classifies TiO<sub>2</sub> as not likely to be a human carcinogen. Keep concentrations below required and/or recommended limits (See "Exposure Limits" Section below).

>>>Barium Titanate

\*\*\*\*Toxic effects described in animals include: BY SKIN OR EYE CONTACT: Slight skin irritation; No eye irritation. \*\*\*\*Additional animal tests have shown: BY CONTACT, INHALATION, OR INGESTION: No animal data available to define the carcinogenicity, developmental, reproductive or mutagenic hazards of this material. \*\*\*\*Human health effects of overexposure may include: BY EYE CONTACT: May cause mechanical eye irritation; Eyes may become red and scratchy and may tear; BY INHALATION: Irritation of the upper respiratory passages with coughing and discomfort. \*\*\*\*Human effects of higher level acute, repeated or chronic overexposure may include: BY SKIN CONTACT: Skin irritation with discomfort or rash. \*\*\*In addition: Barium titanate (BaTiO<sub>3</sub>) (1) contains barium (Ba) which has been fused at high temperature; (2) Ba is not freely available; and (3) trained employees are not expected to be exposed to Ba during the foreseeable use of this product. BaTiO<sub>3</sub> structure is insoluble in aqueous solutions, but if exposed to acidic conditions, free Ba may be liberated. See Ba exposure limits table below; BY INHALATION: Prolonged inhalation exposure to dust composed of barium or its compounds may cause "baritosis", which is the formation of harmless nodule granules in the lung. Baritosis has no effect on lung function, and disappears gradually after exposure is discontinued; BY INGESTION: According to the Agency for Toxic Substances and Disease Registry, the health effects of barium compounds depend on how well the compound dissolves in water.

Barium compounds that do not dissolve well in water are not generally harmful to health. Even though this substance does not dissolve well in water (and thus might be considered as potentially not harmful to health), workers should use good hygiene practices, personal protective equipment and/or process engineering controls to prevent exposure.

>>>Acrylic Resin

\*\*\*\*Additional animal tests have shown: BY CONTACT, INHALATION, OR INGESTION: No animal data available to define the carcinogenicity, developmental, reproductive or mutagenic hazards of this material. \*\*\*\*Human health effects of overexposure may include: BY SKIN CONTACT: Not expected to cause irritation; BY EYE CONTACT: May cause mechanical eye irritation; Redness; BY INHALATION: Dust may cause irritation to upper respiratory tract; At elevated temperatures, vapors may irritate respiratory tract; BY INGESTION: No known or anticipated toxic effects. \*\*\*\*Human effects of higher level acute, repeated or chronic overexposure may include: BY CONTACT, INHALATION, OR INGESTION: No acceptable information to confidently predict effects of chronic human exposure. \*\*\*In addition: BY INHALATION OF VAPORS OR FUMES FROM HEATED MATERIALS: Acrylic Polymer may evolve irritating fumes containing methyl methacrylate (MMA) upon heating above ambient temperatures. May decompose if heated above 200 deg C (>420 F) producing larger quantities of MMA. Inhaling MMA irritates the upper respiratory tract and lungs, may cause cough, difficulty in breathing, shortness of breath, nausea, headache, weakness, kidney effects, temporary changes in blood pressure. SKIN: MMA is a skin irritant, may cause skin allergies, and may permeate the skin to produce the effects of systemic toxicity. EYE: MMA vapors cause severe eye irritation and may cause corneal damage. CANCER REPORTS: There is one report that extremely high exposure to MMA vapors may cause colon and rectal cancer, but follow up studies reported no increased risk of cancer.

>>>Fluorinated Polymer

\*\*\*\*Toxic effects described in animals include: BY SKIN CONTACT: No skin irritation. \*\*\*\*Additional animal tests have shown: BY CONTACT, INHALATION, OR INGESTION: No animal data available to define the carcinogenicity, developmental, reproductive or mutagenic hazards of this material. \*\*\*\*Human health effects of overexposure may include: BY INHALATION OF VAPORS OR FUMES FROM HEATED MATERIALS: Temporary lung irritation effects with cough, discomfort, difficulty breathing or shortness of breath; BY SKIN CONTACT: Significant skin permeation appears unlikely; BY EYE CONTACT:

Eye irritation with discomfort, tearing, or blurring of vision; Nuisance particulate may cause eye irritation. \*\*\*Human effects of higher level acute, repeated or chronic overexposure may include: BY INHALATION OF VAPORS OR FUMES FROM HEATED MATERIALS: Pulmonary edema (fluid in the lungs) with cough, wheezing, abnormal lung sounds, possibly progressing to severe shortness of breath and bluish discoloration of the skin (symptoms might be delayed) requiring prompt medical attention. \*\*\*In addition: BY INHALATION OF VAPORS OR FUMES FROM HEATED MATERIALS: DO NOT PROCESS THIS PRODUCT AT OR ABOVE 600 F (315 C); polymer will degrade and emit hazardous hydrogen fluoride (HF). HF decomposition by-product is extremely corrosive and can cause severe burns which may not be immediately visible or painful. Exposure to HF may be fatal if absorbed through skin, inhaled or swallowed. Major HF exposure (including skin burns the size of the palm of a hand) may result in depletion of calcium (hypocalcemia). Burns about the face and neck, or signs of respiratory irritation, may result in delayed pulmonary edema and swelling of the upper airway with respiratory obstruction. HF has a TLV of 3 ppm; BY SKIN CONTACT: There are no reports on human sensitization; Molten material will produce thermal burns.

Individuals may have increased susceptibility to the hazards of overexposure to ingredient(s) of this product if they have pre-existing diseases of the:

Kidneys.

#### ANIMAL DATA:

>>>Diethylene Glycol Monoethyl Ether Acetate  
Inhalation 4 hr LC50 [Rat]: No information found  
Skin Absorption LD50 [Rabbit]: 15.1 mL/kg  
Oral LD50 [Rat]: 11,000 mg/kg.

>>>Titanium Dioxide  
Inhalation 4 hr ALC [Rat] : > 6,820 mg/m3 (~96% TiO2)  
Skin absorption LD50 [Rabbit]: >10,000 mg/kg  
Oral LD50 [Rat] : >24,000 mg/kg.

>>>Barium Titanate  
Inhalation 1 hr ALC [Rat]: > 59.6 mg/L  
Skin Absorption LD50 [Rabbit]: No information found  
Oral LD50 [Rat]: >25,000 mg/kg.

>>>Acrylic Resin

Inhalation 4 hr LC50 [Rat]: No information found  
 Skin Absorption LD50 [Rabbit]: No information found  
 Oral LD50 [Rat]: No information found.

>>>Fluorinated Polymer

Inhalation 4 hr LC50 [Rat]: No information found  
 Skin Absorption LD50 [Rabbit]: No information found  
 Oral ALD [Rat]: >5,000 mg/kg.

CARCINOGENICITY LISTING:

The following ingredients are listed as potential carcinogens:

INGREDIENT	ACGIH	IARC	NTP	OSHA	DUPONT
Titanium Dioxide		X			

EXPOSURE LIMITS:

Workplace exposures should be kept below the following limits:

Name/Units	AIHA		ACGIH		OSHA	
	8hr	15min	8hr	15min	8hr	15min
Barium, soluble cmpds, as Ba						
Units: mg/m3			0.5		0.5	
Particulates (N.O.S.), respirable						
Units: mg/m3			3		5	
Particulates (N.O.S.), total dust						
Units: mg/m3			10		15	
Titanium Dioxide, total dust, as Ti						
Units: mg/m3			10		15	
METHYL ACRYLATE						
Units: ppm			2	(S)	10	(S)

Also, DuPont has established and observes the following limits:

Name/Units	12 hr	8hr	15min	Ceiling
Diethylene Glycol Monoethylether Acetate				
Units: ppm	10	10		
Titanium Dioxide, respirable dust as Ti				
Units: mg/m3		5		
Titanium Dioxide, total dust, as Ti				
Units: mg/m3		10		
METHYL ACRYLATE				
Units: ppm	2	2		(S)



NOTES ON EXPOSURE LIMITS:

PELs - OSHA Permissible Exposure Limits - 29 CFR 1910.1000, Subpart Z, or specific substance standards;  
TLVs - ACGIH Threshold Limit Values - published by American Conference of Governmental Industrial Hygienists, 6500 Glenway Avenue, Cincinnati, OH 45211;  
WEELs- AIHA Workplace Environmental Exposure Limits - published by the American Industrial Hygiene Association, 2700 Prosperity Avenue, Suite 250, Fairfax, VA 22031;  
AELs - Dupont Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits are lower than AEL in effect, government limits shall take precedence;  
(C) = "ceiling", limit not to be exceeded for any time period;  
(S) = "skin" , skin absorption may contribute significantly to the ingredient's internal toxicity.

\*\*\*\*\* FIRST AID INSTRUCTIONS \*\*\*\*\*

Skin Contact: For skin contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash contaminated clothing before reuse.  
Eye Contact: For eye contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.  
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.  
Ingestion: If swallowed, do not induce vomiting. Immediately give two glasses of water. Never give anything by mouth to an unconscious person. Call a physician.

NOTES TO PHYSICIAN: Aspiration into the lungs will cause pulmonary edema and chemical pneumonitis which may be fatal. Ingestion may cause damage to the esophageal mucosa which would contraindicate insertion of a nasogastric tube. Measures against circulatory shock and respiratory depression may be necessary.

\*\*\*\*\* PROTECTION INFORMATION \*\*\*\*\*

Respiratory Protection:

If respirators are needed to meet applicable limits, a respiratory protection program up to the level of OSHA Standard 29 CFR 1910.134 is mandatory. This includes air monitoring, selection, medical approval, training, fit testing, inspection, maintenance, cleaning, storage, etc..

Selection of a suitable respirator will depend on the properties of the contaminant(s) and their actual or expected air concentration(s) versus applicable limits. Consult ANSI Standard Z88.2 for decision logic to select appropriate NIOSH/MESA approved respirators;

Gloves:

Gloves should be used when the possibility of skin contact exists;

The suitability of a particular glove and glove material should be determined as part of an overall glove program. Considerations may include chemical breakthrough time; permeation rate; abrasion, cut and puncture resistance; flexibility; duration of contact; etc.

Recommended glove materials:

NBR (nitrile-butadiene rubber), polyethylene or vinyl for very limited exposure based on Du Pont experience. Because the product is a complex mixture, glove testing may be appropriate as part of the glove selection process.

Other Protection Practices:

Appropriate eye protection such as chemical splash goggles should be used if the possibility of eye contact exists;

Protective outer clothing should be used where the possibility of body contact exists. Contaminated work clothing should not be allowed out of the workplace; Do not smoke, consume or store food or drinks in areas where the product is handled or stored. After handling the product, wash hands thoroughly before leaving the work area;

Additional engineering controls, work practices and training may be required depending on exposure levels. These are discussed in the OSHA Respiratory Protection Standard (29 CFR 1910.134) and OSHA Hazard Communication Standard (29 CFR 1910.1200);

Do not breath dust. Avoid contact with eyes, skin, or clothing. Wash thoroughly after handling.

\*\*\*\*\* DISPOSAL INFORMATION \*\*\*\*\*

Spill, Leak or Release:

FOR SMALL SPILLS, absorb on rags, sand or other absorbant material;

FOR LARGE SPILLS, get workers out of affected area. If flammable liquids or vapors may be present, turn off electrical devices or other sources of sparks or flames. WEAR PROTECTIVE EQUIPMENT. Use supplied-air respiratory protection

if vapor concentrations are not known;  
Contain spill at source by diking or absorbing with sand. Do not allow spill to spread to or intentionally flush to sewer or ground. Wash area thoroughly. Adequately ventilate area; Spill residue, cleaning rags and absorbant may be considered hazardous. (See Waste Disposal Section.).

Waste Disposal:

Components of this product may be considered hazardous; Consult applicable Federal, State, and local regulations for allowable disposal methods.

\*\*\*\*\* PRODUCT INFORMATION \*\*\*\*\*

Contaminated Items:

Empty product containers, contaminated clothing and cleaning materials, etc. should be considered hazardous until decontaminated or properly disposed of. (See Waste Disposal Section.).

\*\*\*\*\* ADDITIONAL INFORMATION \*\*\*\*\*

SPECIAL NOTES:

The following ingredients are subject to the reporting requirements of section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

INGREDIENT(S)	Weight %
Glycol Ether(s)	30 - 60%
Barium Compound(s)	30 - 60%

CALIFORNIA PROPOSITION 65: WARNING: This product does not contain chemical known to the state of California to cause cancer, birth defects, or other reproductive harm.

This product is a physical mixture. The health effects information about this product is based on the individual ingredients; The data in this Material Safety Data Sheet relates only to the specific product designated herein and does not relate to its use in combination with any other material or in any process.

Canadian WHMIS Classification (untested mixture):

Class D, Division 2, Subdivision A  
Class D, Division 2, Subdivision B.

Date of latest MSDS revision: 12/14/07

Person Responsible for MSDS:

Environmental Engineer - MSDS

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