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\*\*\*\*\* IDENTIFICATION \*\*\*\*\*

NAME: 5504N                      SYNONYMS: SILVER 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: Acetic.  
APPEARANCE: Silver.                      SOLUBILITY IN WATER: Slight.

\*\*\*\*\* COMPONENTS \*\*\*\*\*

Material(s):	CAS#	V.P. mm Hg @ 20C	Weight %
Ethylene Glycol Monobutyl Ether Acetate.	112-07-2	< 1.	5 - 10%
Ethylene/Diethylene Glycol Phenyl Ether.	122-99-6	< 0.1	1 - 5%
Silver (Metallic).	7440-22-4		> 60%
Phthalic Anhydride.	85-44-9		1 - 5%
Epoxy Resin.	67924-34-9		10 - 30%

5504N/A01  
01/03/08

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

INSTABILITY:

The product is normally stable.

INCOMPATIBILITY:

Avoid contact with:

Bases; Acids; Oxidizing agents; Acetylene; Ammonia; Hydrogen peroxide; Halogens; Chlorine trifluoride; Oxidizable materials; Nitric acid; Ethanol; Combustible materials; Heat; Strong bases; Strong acids; Strong oxidizers; Peroxides; Caustics; Strong oxidizing agents; Halocarbons; Ethyleneimine; Oxalic acid; Tartaric acid; Strong alkalies; Alkali metal hydroxides; Bromoazide.

DECOMPOSITION:

Decomposition products:

Carbon Dioxide (CO<sub>2</sub>); Metal fumes; Metal oxides; Carbon Monoxide (CO); Water; Aldehydes.

POLYMERIZATION:

The product does not normally polymerize significantly.

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

FLASHPOINT: 159 F Seta CC

FIRE & EXPLOSION HAZARDS:

KEEP AWAY FROM SPARKS AND OPEN FLAMES. Do not smoke in area with open product;  
If the product may be heated above its flashpoint during processing, remove sources of ignition such as open sparks, flames or static discharge to prevent vapor ignition.

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 to exposure to this product are skin contact and inhalation. Skin irritation and/or other effects of skin contact are easily avoided by using proper gloves (see section titled GLOVES) and washing affected areas immediately if contact occurs. Volatile solvents will start evaporating during room temperature use of the product, such as thinning, pouring from container to dispensing machine, and roll coating. Mist and solvent vapors will evolve if spray application is used. During drying, 25 C - 120 C, bake out at 350 C - 400 C, and firing of tape substrate at 850 C, the remaining organics will evaporate and/or decompose. Potential overexposure to other chemicals used in the operation should also be considered. Well designed area and personal air sampling and analysis can show if exposures are within established limits. Properly designed local ventilation and process enclosure are effective ways to limit employee exposure where needed.

In addition to meeting exposure limits, it is always prudent to use all practical means to minimize employee exposure to chemicals. A significant difference in overall exposure can be made with practical measures such as:

- \* Inhalation - minimizing by keeping containers covered when not in use.
- \* Eye - avoiding contact by wearing chemical splash goggles where there is splash potential.
- \* Ingestion - avoiding by washing hands before eating, drinking or smoking, and restricting these activities to outside the work area.

PRINCIPAL HEALTH EFFECTS:

>>>Ethylene Glycol Monobutyl Ether Acetate  
\*\*\*\*Additional animal tests have shown: Developmental toxicity at dosage levels showing maternal toxicity; No animal data available to define carcinogenicity. \*\*\*\*Human health effects of overexposure may include: BY SKIN CONTACT: May cause irritation, redness or itching; Skin permeation can occur in amounts capable of producing effects of systemic toxicity; BY EYE CONTACT: Eye irritation with discomfort, tearing, or blurring of vision; BY INHALATION: Irritation of the nose and throat; Irritation of the upper respiratory passages; BY INGESTION: No known or anticipated toxic effects; BY INHALATION OR INGESTION: Central nervous system

depression with dizziness, confusion, incoordination, drowsiness, or unconsciousness; Headache; Difficulty in breathing; Nausea; Blood in urine; Red blood cell destruction. \*\*\*\*Human effects of higher level acute, repeated or chronic overexposure may include: BY INHALATION OR INGESTION: Abnormal blood-forming system function with anemia; Liver damage; Abnormal kidney function as detected by laboratory tests; Kidney damage; Coma or fatality from gross overexposure.

>>>Ethylene/Diethylene Glycol Phenyl Ether  
\*\*\*\*Toxic effects described in animals include: BY SKIN CONTACT: Skin irritation; BY EYE CONTACT: Eye irritation.  
\*\*\*\*Human health effects of overexposure may include: BY CONTACT, INHALATION, OR INGESTION: Irritation of the upper respiratory passages; Skin irritation with discomfort or rash; Eye irritation with discomfort, tearing, or blurring of vision. \*\*\*In addition: BY SKIN CONTACT: Excessive exposure may cause hemolysis, thereby impairing the blood's ability to transport oxygen; Significant skin permeation appears unlikely.

>>>Silver (Metallic)  
\*\*\*\*Toxic effects described in animals include: Liver damage.  
\*\*\*\*Additional animal tests have shown: Genetic damage in mammalian cell cultures; No genetic damage in bacterial cell cultures; No animal test reports are available to define carcinogenic, developmental, or reproductive hazards.  
\*\*\*\*Human health effects of overexposure may include: BY SKIN CONTACT: May cause irritation; BY EYE CONTACT: May cause irritation; Photophobia; BY INHALATION: Irritation of the respiratory tract; BY INGESTION: Irritation of digestive tract; BY CONTACT, INHALATION, OR INGESTION: Argyria, a blue-gray discoloration of the skin, mucous membranes, inner surface of eyelids, cornea or lens. \*\*\*\*Human effects of higher level acute, repeated or chronic overexposure may include: BY SKIN CONTACT: Dermatitis. \*\*\*In addition: There is no effective treatment for argyria. Cases of argyria have not resulted from exposure to silver concentrations in air of less than 0.01 mg/m<sup>3</sup>; Inhalation of fumes of this metal may cause metal fume fever.

>>>Phthalic Anhydride  
Toxic effects of repeated or prolonged animal exposures include: BY INGESTION: Lower weight gain; Liver effects;  
\*\*\*\*Additional animal tests have shown: No carcinogenic toxicity; No mutagenic toxicity in bacterial or mammalian cell cultures; No animal data available to define

reproductive toxicity; No animal data available to define developmental toxicity. \*\*\*\*Human health effects of overexposure may include: BY SKIN CONTACT: Severe skin irritation; Allergic skin rashes; May cause skin sensitization; BY EYE CONTACT: Severe eye irritation with tearing, pain or blurred vision; BY INHALATION: Temporary lung irritation effects with cough, discomfort, difficulty breathing or shortness of breath; Asthma-like reactions with shortness of breath, wheezing, or cough, and possibly occurring on subsequent re-exposure to concentrations below established exposure limits; Irritation of the upper respiratory passages; Loss of sense of smell (anosmia); BY INGESTION: Gastrointestinal irritation. \*\*\*\*Human effects of higher level acute, repeated or chronic overexposure may include: BY SKIN OR EYE CONTACT: Skin burns or ulceration; Eye corrosion with corneal or conjunctival ulceration.

>>>Epoxy Resin

\*\*\*\*Toxic effects described in animals include: BY SKIN CONTACT: Not an irritant; BY EYE CONTACT: Not an irritant. \*\*\*\*Human health effects of overexposure may include: BY SKIN CONTACT: May cause irritation; BY INHALATION: May cause irritation. \*\*\*\*Human effects of higher level acute, repeated or chronic overexposure may include: BY SKIN CONTACT: May cause sensitization; BY EYE CONTACT: Eye irritation with discomfort, tearing, or blurring of vision; Allergic reaction.

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

Skin; Eyes; Spleen; Liver; Kidneys; Lungs.

#### ANIMAL DATA:

>>>Ethylene Glycol Monobutyl Ether Acetate  
Inhalation 4 hours ALC [Rats]: >400 ppm  
Skin LD50 [Rabbits]: 1,500 mg/kg  
Oral LD50 [Rats]: 2,400 - 3,000 mg/kg.

>>>Ethylene/Diethylene Glycol Phenyl Ether  
SKIN ABSORPTION LD50 (RABBIT): >2000 mg/kg  
ORAL LD50 (RAT): 1400-3000 mg/kg.

>>>Silver (Metallic)  
Inhalation 4 hr LC50 [Rat]: No information found  
Skin Absorption LD50 [Rabbit]: >2,000 mg/kg

Oral LD50 [Mouse]: >5,000 mg/kg.

>>>Phthalic Anhydride

Inhalation 15 min LC50 [Rat]: > 0.21 mg/L  
Inhalation 1 hr LC50 [Rat]: > 210 mg/m3  
Skin Absorption LD50 [Rabbit]: >10,000 mg/kg  
Oral LD50 [Rat]: 1,530 mg/kg  
Oral LD50 [Mouse]: 1,500 mg/kg.

>>>Epoxy Resin

Oral LD50 [Rats]: >5,000 mg/kg.

CARCINOGENICITY LISTING:

No ingredients of this product are designated by IARC, NTP, OSHA, ACGIH or Dupont as potential carcinogens.

EXPOSURE LIMITS:

Workplace exposures should be kept below the following limits:

Name/Units	AIHA		ACGIH		OSHA	
	8hr	15min	8hr	15min	8hr	15min
Silver, Metallic as Ag Units: mg/m3			0.1		0.01	

Also, DuPont has established and observes the following limits:  
Name/Units                      12 hr      8hr      15min      Ceiling

ETHYLENE GLYCOL MONOBUTYL ETHER ACETATE  
Units: ppm                                      10                                      (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 immediately. 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: Because of the danger of aspiration, emesis or gastric lavage should not be employed unless the risk is justified by the presence of additional substances. Activated charcoal may induce vomiting, but may be given after emesis or lavage to absorb toxic additives. THIS MATERIAL MAY MAKE THE HEART MORE SUSCEPTIBLE TO ARRHYTHMIAS. Catecholamines such as adrenaline, epinephrine and other compounds having similar effects, should be reserved for emergencies and then used only with special caution.

\*\*\*\*\* 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;

Respirators with organic vapor cartridges provide adequate protection, within use limitations, for the following components in this product:  
Toluene;

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 refined to recover the precious metal content.

Waste Disposal:

Components of this product may be considered hazardous; Waste product may be refined to recover precious metal content.

\*\*\*\*\* 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)	10 - 30%
Silver, 7440-22-4	> 60%
Phthalic Anhydride, 85-44-9	1 - 5%

CALIFORNIA PROPOSITION 65: WARNING: This product contains chemicals known to the state of California to cause cancer, birth defects, or other reproductive harm:

INGREDIENT(S)	Weight %
Toluene, 108-88-3	< .1%

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:

Class B, Div 3.

Date of latest MSDS revision: 01/03/08

Person Responsible for MSDS:

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