



# MATERIAL SAFETY DATA SHEET

## SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT:** Denex 2000

November 28, 2005

Vishay Micro-Measurements  
Post Office Box 27777  
Raleigh, NC 27611

**MSDS # MGM067A**

919-365-3800

CHEMTREC 1-800-424-9300 (U.S.)  
703-527-3887 (Outside U.S.)

NOTE: CHEMTREC numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

## SECTION 2: HAZARDOUS INGREDIENTS / IDENTITY INFORMATION

CAS NUMBER	CHEMICAL IDENTITY	%
67-64-1	Acetone	76.0
28064-14-4	Polymer of Epichlorohydrin, Phenol-Formaldehyde Novolac	14.3-16.2
78-93-3	Methyl Ethyl Ketone	2.9-4.8
80-08-0	Benzenamine, 4,4'-Sulfonylbis-Diaminodiphenyl Sufone	3.8
25085-99-8	Reaction Product of Epichlorohydrin & Bisphenol A	1.0
75-23-0	Boron Trifluoride Ethylamine Complex	0.2

## SECTION 3: HEALTH HAZARD DATA

### Routes of Entry:

**Inhalation:** Yes      **Skin:** Yes      **Ingestion:** Accidental

**Health Hazards (Acute and Chronic):** Harmful if swallowed or inhaled. Causes irritation to skin, eyes, and respiratory tract. Affects central nervous system.

**Carcinogenicity:** NTP: Not listed  
IARC Monographs: Not listed  
OSHA Regulated: Not listed

### Signs and Symptoms of Exposure:

**INHALATION:** Inhalation of vapors irritates the respiratory tract. May cause coughing, dizziness, dullness, and headache. Higher concentrations can produce central nervous system depression, narcosis, and unconsciousness.

**EYE CONTACT:** Vapors are irritating to the eyes. Splashes may cause severe irritation, with stinging, tearing, redness and pain.

**SKIN CONTACT:** Irritating due to defatting action on skin. Causes redness, pain, drying and cracking of the skin. Prolonged or repeated skin contact may produce severe irritation or dermatitis.

**INGESTION:** Swallowing small amounts is not likely to produce harmful effects. Ingestion of larger amounts may produce abdominal pain, nausea and vomiting. Aspiration into lungs can produce severe lung damage and is a medical emergency. Other symptoms are expected to be similar to those expected from inhalation.

**Conditions Generally Aggravated by Exposure:** Use of alcoholic beverages enhances toxic effects. Exposure may increase the toxic potential of chlorinated hydrocarbons, such as chloroform, trichloroethane.

## SECTION 4: EMERGENCY AND FIRST AID PROCEDURES

**INHALATION:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**EYE CONTACT:** Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention.

**SKIN CONTACT:** Immediately flush skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

**INGESTION:** Aspiration hazard. If swallowed, vomiting may occur spontaneously, but do not induce vomiting. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.

## SECTION 5: FIRE AND EXPLOSION HAZARD DATA

**Flash Point (Method Used):** -4°F (20°C) Closed Cup (for Acetone)

**Flammable limits:** LEL: 2.5 UEL: 12.8 (for Acetone)

**Extinguishing Media:** Dry chemical, alcohol foam or carbon dioxide. Water may be ineffective. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.

**Special Firefighting Procedures:** In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

**Unusual Fire and Explosion Hazards:** Above flash point, vapor-air mixtures are explosive within flammable limits noted above for Acetone. Vapors can flow along surfaces to distant ignition source and flash back. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. This material may produce a floating fire hazard. Sensitive to static discharge.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

**Steps to be taken if material is released or spilled:** Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tool and equipment. Collect liquid in an appropriate container or absorb with an inert material and place in a chemical waste container. Do not use combustible materials such as saw dust. Do not flush to sewer. If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures.

## SECTION 7: EXPOSURE CONTROLS -- PERSONAL PROTECTION

**Respiratory Protection:** If the exposure limit is exceeded, a half-face organic vapor respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

**Ventilation:** A system of local and/or general exhaust is recommended to keep employee exposures below the airborne exposure limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminate at its source, preventing dispersion of it into the general work area.

**Protective Gloves:** Wear impervious gloves.

**Eye Protection:** Use chemical safety goggles and/or a full faceshield where splashing is possible.

**Other Protective Clothing or Equipment:** Wear impervious protective clothing, including boots, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Work / Hygienic Practices:** Maintain eyewash station and safety shower in work area. Use good industrial hygiene practices. Wash hands after using and before eating, drinking, or smoking.

**SECTION 8: HANDLING AND STORAGE**

**Precautions to be taken in handling and storing:** Protect against physical damage. Store in a cool, dry, well-ventilated location, away from any area where the fire hazard may be acute. Separate from incompatibles.

**Other Precautions:** Containers should be bonded and grounded for transfers to avoid static spark. Storage and use areas should be "No Smoking" areas. Containers of this material may be hazardous when empty since they retain product residue.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

<b>Boiling Point:</b>	133°F (56.5°C)
<b>Vapor Pressure (mmHg):</b>	400 @ 104°F (39.5°C)
<b>Vapor Density (Air = 1):</b>	2.0
<b>Specific Gravity (H<sub>2</sub>O = 1):</b>	0.79
<b>Melting Point:</b>	-139°F (95°C)
<b>Evaporation Rate (BuAc = 1):</b>	7.7
<b>Volatile Organic Compounds:</b>	76.8
<b>Solubility in Water:</b>	Miscible in all proportions in water

**Appearance and Odor:** Clear, to yellow colorless, volatile liquid.

**SECTION 10: STABILITY AND REACTIVITY DATA**

**Stability:** Stable under ordinary conditions of use and storage.

**Conditions to Avoid:** Heat, flames, ignition sources and incompatibles.

**Incompatibility (Materials to Avoid):** Concentrated nitric and sulfuric acid mixtures, oxidizing materials, chloroform, alkalis, chlorine compounds, acids, potassium t-butoxide.

**Hazardous Decomposition or By-products:** Carbon dioxide and carbon monoxide may form when heated to decomposition.

**Hazardous Polymerization:** Will not occur.

**SECTION 11: TOXICOLOGICAL INFORMATION**

Acetone

OSHA PEL:	1000 ppm
ACGIH TLV:	500 ppm: 750 ppm STEL
OTHER:	ORAL (Rat) LD <sub>50</sub> : 5800 mg/kg INHALATION (Rat) LC <sub>50</sub> : 50,100 mg/m <sup>3</sup>

## Polymer of Epichlorohydrin, Phenol-Formaldehyde Novolac

OSHA PEL: Not Known  
 ACGIH TLV: Not Known  
 OTHER: Not Known

## Methyl Ethyl Ketone

OSHA PEL: 200 ppm  
 ACGIH TLV: 200 ppm: 300 ppm STEL  
 OTHER: SKIN ABSORPTION (Rabbits) >2000 mg/kg  
 ORAL (Rat) >4000 mg/kg

## Benzenamine, 4,4'-Sulfonylbis-Diaminodiphenyl Sufone

OSHA PEL: Not Established  
 ACGIH TLV: Not Established  
 OTHER: ORAL (Rat) 640 mg/kg  
 SKIN (Rabbit) >4000 mg/kg

## Boron Trifluoride Ethylamine Complex

OSHA PEL: Not Known  
 ACGIH TLV: Not Known  
 OTHER: Not Known

## Reaction Product of Epichlorohydrin &amp; Bisphenol A

OSHA PEL: Not Established  
 ACGIH TLV: Not Established  
 OTHER: SKIN Absorption ((Rabbit) LD<sub>50</sub> 20,000 mg/kg  
 ORAL (Rats) LD<sub>50</sub> >5000 mg/kg

<b>SECTION 12: DISPOSAL CONSIDERATIONS</b>
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**Waste Disposal Method:** Dispose of in accordance with local, state, and federal environmental regulations.

<b>SECTION 13: TRANSPORTATION INFORMATION</b>
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SHIPPING NAME	CLASS	PACKING GROUP	UN NUMBER
Flammable Liquid, N.O.S. (Acetone, Methyl Ethyl Ketone)	3	II	1993

**SECTION 14: REGULATORY INFORMATION****SECTION 313 SUPPLIER NOTIFICATION:**

This product contains a toxic chemical or chemicals (as listed below) subject to the reporting requirements of Section 313 Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR Part 372.

<b>CAS NUMBER</b>	<b>CHEMICAL NAME</b>	<b>% BY WEIGHT</b>
67-64-1	Acetone	76.0
78-93-3	Methyl Ethyl Ketone	2.9-4.8

**TSCA NOTIFICATION:**

All components of this product are listed in the Toxic Substance Control Act Chemical Substance Inventory (TSCA).

**SECTION 15: OTHER INFORMATION**

To the best of our knowledge, the information provided above meets the requirements of the United States Occupational Safety and Health Act and regulations established under 29 CFR 1910.1200 (g)(2)(c)(1)-(4) for a mixture of hazardous chemicals which has not been tested as a whole. The data provided on this Material Safety Data Sheet is from manufacturers of the original components. Vishay Micro-Measurements specifically disclaims any and all form of liability and/or responsibility for the application of this product.