

MATERIAL SAFETY DATA SHEET

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MANUFACTURER'S NAME:

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SECTION 1 -- CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

CODE: NDI900

TRADE NAME...: NDI900 PIEZO INKJET INK

- H M I S C O D E S -  
HEALTH - 2\*  
FLAMMABILITY - 2  
REACTIVITY - 0  
PPE - X

PRODUCT CLASS: DIGITAL INKS

INK SERIES...:

| Item Description | WT lb/gal | VOC g/L | VOC lb/gal | % VOC volume | Item Description | WT lb/gal | VOC g/L | VOC lb/gal | % VOC volume |
|------------------|-----------|---------|------------|--------------|------------------|-----------|---------|------------|--------------|
| NDI901           | 8.0       | 897     | 7.5        | 95           | NDI902           | 8.1       | 883     | 7.4        | 93           |
| NDI911           | 8.0       | 894     | 7.5        | 94           | NDI912           | 8.1       | 883     | 7.4        | 93           |
| NDI921           | 8.1       | 882     | 7.4        | 93           | NDI922           | 8.0       | 898     | 7.5        | 95           |
| NDI933           | 8.0       | 899     | 7.5        | 95           | NDI934           | 8.1       | 884     | 7.4        | 93           |

SECTION 2 -- COMPOSITION, INFORMATION ON INGREDIENTS

| CHEMICAL NAME;<br>COMMON NAME;<br>CAS NUMBER  | PERCENT BY WEIGHT | OCCUPATIONAL EXPOSURE LIMITS  |                          | VAPOR PRESSURE IN mmHg | NOTES |
|---|-------------------|-------------------------------|--------------------------|------------------------|-------|
|   |                   | ACGIH TLV                     | OSHA PEL                 |                        |       |
| ETHYL 3-ETHOXYPROPIONATE;<br>ESTER SOLVENT EEP;<br>CAS #: 763-69-9                    | 40-60             | NOT ESTABLISHED               | NOT ESTABLISHED          | 1.11 @ 25C             | ( 1)  |
| * 2-BUTOXYETHANOL ACETATE;<br>ETHYLENE GLYCOL BUTYL ETHER ACETATE;<br>CAS #: 112-07-2 | 30-40             | 20 ppm                        | NOT ESTABLISHED          | 1.0 @ 20C              | ( 2)  |
| PIGMENTS;<br>MIXTURE;<br>CAS #: NOT AVAILABLE   | < 10              | 10 mg/m3<br>Total dust        | 15 mg/m3<br>Total dust   | N/A                    | ( 3)  |
| RESIN MIXTURES;<br>CAS #: NOT AVAILABLE   | < 10              | NOT ESTABLISHED               | NOT ESTABLISHED          | <1 @ 20C               |       |
| CARBON BLACK;<br>PIGMENT BLACK;<br>CAS #: 1333-86-4                                   | 0-5               | 3.500 mg/m3                   | 3.500 mg/m3              | N/A                    |       |
| CYCLOHEXANONE;<br>PIMELIC KETONE;<br>CAS #: 108-94-1                                  | 0-2               | 20 ppm<br>Skin<br>STEL: 50ppm | 25 ppm<br>Skin           | 2.0 @ 20C              |       |
| * ETHYL BENZENE;<br>CAS #: 100-41-4   | 0-.50             | 100 ppm<br>STEL: 125 ppm      | 100 ppm<br>STEL: 125 ppm | 7.1 @ 20C              | ( 4)  |

\* SUBJECT TO REPORTING REQUIREMENT OF SECTION 313 OF TITLE III OF SARA (40 CFR PART 372).

- Supplier recommended exposure limit of 50 ppm.
- NIOSH has set a Recommended Exposure Limit (REL) of 5 ppm. This chemical is included on the list of Hazardous Air Pollutants (HAPs) from Title III of the Clean Air Act Amendments of 1990 (Glycol Ethers Category).
- See Section 8 Exposure Controls, Personal Protection - Exposure Guidelines for more information on exposure limits.
- This chemical is included on the list of Hazardous Air Pollutants (HAPs) from Title III of the Clean Air Act Amendments of 1990.

The recommended permissible exposure limits (PEL) indicated above reflect the levels adopted by OSHA in 1989. Although, some of the 1989 levels have since been vacated, the Nazdar Company recommends that the lower exposure levels be observed as reasonable worker protection.

SECTION 3 -- HAZARDS IDENTIFICATION

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**GENERAL HEALTH EFFECTS**

THE FOLLOWING INFORMATION HAS BEEN DEVELOPED BASED UPON USING THE PRODUCT AS INTENDED BY THE MANUFACTURER. The potential health effects of this product are based on the hazards of its components. The use of this product in combination with other products may produce synergistic (additive) health effects. Cautionary labeling and material safety data sheets of all materials used with this product should be reviewed before use.

**EYES**

Eye contact with liquid, vapors or mists may cause moderate to severe irritation, including burning, tearing, redness or swelling.

**SKIN**

Skin contact may cause irritation. Repeated or prolonged overexposure may cause skin irritation or dermatitis. Symptoms may include dryness, chapping, redness and skin damage. Toxic and may be harmful if absorbed through the skin. Penetrates the skin readily.

**INHALATION**

Inhalation may cause respiratory tract irritation. Repeated and prolonged overexposure by inhalation may cause respiratory tract irritation. Symptoms may include central nervous system disorders such as headaches, dizziness, weakness and fatigue.

**INGESTION**

Ingestion may cause gastrointestinal tract irritation. Symptoms may include abdominal pain, nausea, vomiting and diarrhea. Contains material that may be moderately toxic if ingested.

**CHRONIC EFFECTS/TARGET ORGANS**

Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling the contents may be harmful or fatal. Ethylbenzene is possibly carcinogenic to humans (IARC Group 2B).

**ANIMAL STUDIES**

Ethyl 3-ethoxypropionate (EEP) has been suggested, after overexposure, as a cause of the following effects in laboratory animals, and may aggravate pre-existing disorders of these organs in humans; mild, reversible liver effects. EEP has been shown to cause harm to the fetus in laboratory animal studies. Harm to the fetus occurs only at exposure levels that harm the pregnant animal. The relevance of these findings to humans is uncertain. 2-Butoxyethanol acetate has caused reproductive and blood disorders resulting in kidney, liver and lung damage in lab animals. Cyclohexanone has caused liver and kidney damage in animal tests. For animal studies, reference TSCA Section 4 Test Rule Results or contact the manufacturer for further details.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE**

Pregnant women and persons with pre-existing health disorders should consult their physician before using this product. Repeated and prolonged overexposure and/or individual sensitivity may increase the potential for and degree of adverse health effects. See Section 3 "Hazards Identification" for effects of certain hazardous ingredients.

**ROUTES OF EXPOSURE**

Primary exposure routes: Inhalation-Dermal (Contact/Absorption)-Ingestion

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**SECTION 4 -- FIRST AID MEASURES**

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**EYES**

After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. If irritation persists have eyes examined and tested by medical personnel.

**SKIN**

In case of contact, immediately wash skin with a mild soap and plenty of water for at least 15 minutes, while removing contaminated clothing and shoes. Cool water is initially suggested to prevent the pores of the skin from opening. This will minimize both the area and time of skin contact. Lukewarm water may then be used to ensure all contaminants are removed. Skin should be monitored for reddening or chemical burns. Mild soap is suggested to help prevent abrading the skin or rubbing the chemicals into pores during cleansing. Get medical attention if irritation persists or significant contact has occurred. Thoroughly wash (or discard) clothing and shoes before reuse.

**INHALATION**

Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention if breathing difficulty is experienced.

**INGESTION**

If swallowed, do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person.

**OTHER COMMENTS**

No Data Available

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**SECTION 5 -- FIRE FIGHTING MEASURES**

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FLASH POINT

143 Degrees Fahrenheit (PMCC)

## OSHA FLAMMABILITY CLASSIFICATION (NFPA)

Class IIIA Combustible Liquid

## LEL - LOWER EXPLOSIVE LIMIT / UEL - UPPER EXPLOSIVE LIMIT

0.9% volume in air / No Data Available

## EXTINGUISHING MEDIA

Foam-CO2-Dry Chemical-Water Spray

## FIRE AND EXPLOSION HAZARDS

Isolate from heat, electrical equipment, sparks, and open flame. Keep containers tightly closed. Vapors may be heavier than air and can travel to a source of ignition then flash back. Closed containers may explode when exposed to extreme heat.

## FIRE FIGHTING EQUIPMENT

Full protective equipment including self-contained breathing apparatus (SCBA) is recommended to protect firefighters.

## SPECIAL FIRE FIGHTING PROCEDURES

Water may be ineffective but may be used to cool containers. Fumes released on burning may be toxic and dangerous.

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SECTION 6 -- ACCIDENTAL RELEASE MEASURES  
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## RELEASE MANAGEMENT MEASURES

Remove all sources of ignition (flames, hot surfaces and electrical, static or frictional sparks). Avoid contact or breathing vapors. Ventilate area. Contain release and remove with inert absorbent. Use non-sparking tools to place material in appropriate container for disposal. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. The National Response Center (800-424-8802) and local authorities should be contacted for any reportable spill/release.

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SECTION 7 -- HANDLING AND STORAGE  
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## HANDLING AND STORAGE METHODS

Use in a well ventilated area. Follow all MSDS/label precautions even after container is emptied; container may retain product residues. Store in closed containers in cool, dry, well ventilated area away from sources of ignition. Keep containers closed when not in use. Smoke in designated areas only. Avoid prolonged or repeated overexposure to this product. Keep out of reach of children. Follow label directions carefully. Do not take internally. Harmful or fatal if swallowed.

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SECTION 8 -- EXPOSURE CONTROLS, PERSONAL PROTECTION  
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## RESPIRATORY PROTECTION

If concentrations of hazardous ingredients exceed exposure limits listed in Section 2 an appropriate NIOSH (National Institute for Occupational Safety and Health) approved respirator with an organic vapor cartridge should be used. If material is handled under mist, spray or dust forming conditions, a P100 (99.97% efficiency) filter should be used in addition to the organic vapor cartridge. Protection provided by air-purifying respirators is limited. If no exposure limits are listed in Section 2, follow general safety guidelines in 29 CFR 1910.134 Respiratory Protection or other applicable respiratory standard.

## SKIN PROTECTION

Use neoprene, nitrile or other gloves resistant to chemicals listed in Section 2. Contact a reputable safety supply company for appropriate gloves. Solvent resistant aprons are recommended. Prevent prolonged skin contact with contaminated clothing.

## EYE PROTECTION

Use ANSI (American National Standards Institute) approved safety glasses, faceshield or splash proof goggles to prevent eye contact. Contact a reputable safety supply company for appropriate eye protection. The availability of an eye wash is highly recommended.

## EXPOSURE GUIDELINES

See Section 2 "Composition, Information on Ingredients" for occupational exposure limits. Excessive concentrations of nuisance dusts or particulates not otherwise classified (PNOC) or regulated (PNOR) may reduce visibility and cause unpleasant deposits in the eyes, ears, and nasal passages. The TLV and PEL has been established for all non-toxic "nuisance dusts" that are not otherwise classified and refers to both organic and inorganic dusts. Exposure or generation of these dusts is not anticipated during normal printing operations. The use of dry pigments and powders, grinding or sanding of printed products may generate quantities of these particulates. Refer to Section 2 Composition, Information on Ingredients for exposure limits.

## HYGIENIC PRACTICES

Wash with soap and water before eating, smoking or using toilet facilities. Separately wash or discard clothing and footwear before reuse. NEVER try to remove product from the skin by using solvent or thinner. Such action is likely to increase the possibility of undesirable effects. Remove contaminated clothing to prevent prolonged skin contact.

## ENGINEERING CONTROLS

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Use applicable engineering controls, work practices and personal protective equipment to ensure all concentrations are kept below the exposure limits listed in Section 2. Adequate controls should be implemented to ensure employee safety from fine mists which may be produced under some printing conditions.

OTHER PROTECTION  
No Data Available

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SECTION 9 -- PHYSICAL AND CHEMICAL PROPERTIES  
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APPEARANCE:  
Thin liquid

ODOR:  
Characteristic

PHYSICAL STATE:  
Liquid

pH  
Not applicable

VAPOR PRESSURE  
See Section 2 for individual ingredients.

VAPOR DENSITY  
Heavier than air

BOILING POINT  
Greater than 300 degrees Fahrenheit

FREEZING POINT  
Not available

SOLUBILITY IN WATER  
Not tested

EVAPORATION RATE  
Slower than ether

VISCOSITY  
Greater than water

PERCENT VOLATILE BY VOLUME: SEE SECTION ONE

WEIGHT PER GALLON: SEE SECTION ONE

VOC: SEE SECTION ONE

PHOTOCHEMICALLY REACTIVE  
No

Percent volatile = Percent VOC

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SECTION 10 -- STABILITY AND REACTIVITY  
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CHEMICAL STABILITY  
Stable

CONDITIONS TO AVOID  
Avoid excessive heat, ignition sources, sparks and open flame.

INCOMPATIBILITY WITH OTHER MATERIALS  
Strong acids/bases, oxidizing/reducing agents and reactive chemicals.

HAZARDOUS DECOMPOSITION PRODUCTS  
May produce hazardous fumes when heated to decomposition e.g. carbon monoxide, carbon dioxide and other noxious gases.

HAZARDOUS POLYMERIZATION  
Not anticipated during normal printing and storage conditions.

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SECTION 11 -- TOXICOLOGICAL INFORMATION  
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## EXPERIMENTAL TOXICITY DATA

Refer to Section 3 Hazards Identification for additional toxicological data. Experimental toxicity data on 2-butoxyethanol acetate has given the following results: Oral LD50 Rat; 2400 mg/kg; Dermal LD50 Rabbit; 1500 mg/kg. Experimental toxicity data on cyclohexanone has given the following results: Oral LD50 Rat; 1620 mg/kg; Dermal LD50 Rabbit; 1000 mg/kg; Inhalation TCLO Human; 75 ppm.

## SECTION 12 -- ECOLOGICAL INFORMATION

## ECOTOXICITY

Because this product may be a mixture of chemicals, some of which may be ecologically toxic, it is strongly suggested that it not be disposed of into the environment, i.e. soil, water courses, lakes, landfills, sewers, etc.

## ENVIRONMENTAL FATE

No Data Available

## SECTION 13 -- DISPOSAL CONSIDERATIONS

## DISPOSAL METHODS

This product, as supplied, is considered non-hazardous for disposal purposes by the U.S. Environmental Protection Agency Resource Conservation and Recovery Act (RCRA). If combined with other products, the user should determine if hazardous waste codes are required. It is the responsibility of the user to determine if local, county, state, or provincial regulations may also apply to the disposal of this product and/or the container.

## SECTION 14 -- TRANSPORT INFORMATION

## TRANSPORT INFORMATION

Not regulated. The product(s) described by this Material Safety Data Sheet do not meet the definition of nor are they classified as a hazardous material/dangerous good as defined by the United States Department of Transportation (DOT), the International Civil Aviation Organization (ICAO), the International Maritime Organization (IMO) or the Canadian Transportation of Dangerous Goods Act (TDG). Questions concerning transportation requirements should be directed to Nazdar's Regulatory Compliance Department 913-422-1735.

## SECTION 15 -- REGULATORY INFORMATION

## SARA TITLE III 313 INFORMATION

See Section 2 "Composition, Information on Ingredients" for applicable chemicals.

## TOXIC SUBSTANCES CONTROL ACT STATUS

All ingredients in Section 2 are listed on the U.S. Environmental Protection Agency's Toxic Substances Control Act (TSCA) Inventory and the Canadian Domestic Substance List.

## OTHER REGULATORY INFORMATION

OCCUPATIONAL SAFETY and HEALTH ADMINISTRATION (OSHA) - MSDS is compliant with Occupational Safety and Health Administration Hazard Communication Standard - 29 CFR 1910.1200. AMERICAN NATIONAL STANDARDS INSTITUTE - This MSDS follows the ANSI Z400.1-1998 format. WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS) - This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

## WHMIS CLASSIFICATION (CANADA):

B3 \_ Combustible Liquids; D1B \_ Material causing immediate and serious toxic effects, toxic material; D2A \_ Materials causing other toxic effects, very toxic material; D2B \_ Materials causing other toxic effects, toxic material;

## SECTION 16 -- OTHER INFORMATION

## DISCLOSURE

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind express or implied is made with respect to the information contained herein. The data in this MSDS relates only to the specific material designated herein and does not apply to use in combination with any other material or process.

## DEFINITIONS

ACGIH: American Conference of Governmental Industrial Hygienists

AIHA: American Industrial Hygiene Association

CEILING: (TLV-Ceiling and PEL Ceiling Limit) The ceiling exposure limit or concentration not to be exceeded for even brief times.

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DOT: Department of Transportation

HMIS: The Hazardous Materials Identification System (HMIS) developed by the National Paint and Coatings Association (NPCA) to provide information on the acute health hazards, reactivity and flammability of products encountered in the workplace at room temperatures.

HMIS codes assigned for this product are only suggested ratings based on anticipated normal screen printing applications. The employer has the ultimate responsibility for assigning these ratings and should fully evaluate the MSDS, work practices and environmental conditions prior to assigning the appropriate ratings.

HMIS rating involves data interpretations that may vary from company to company.

HMIS Personal Protection Index of "X-Ask your supervisor" is given on this MSDS due to varying work conditions which may dictate different levels of protection. Please review this MSDS before determining appropriate protective equipment and beginning work.

IARC: International Agency for Research on Cancer

NFPA: National Fire Protection Association

NTP: National Toxicology Program

STEL: Short-Term Exposure Limit: ACGIH terminology for the short-term exposure limit or maximum concentration for a continuous exposure period of 15 minutes.

TLV: Threshold Limit Value. A term ACGIH uses to express the airborne concentration of a material to which most workers can be exposed during a normal daily and weekly work schedule without adverse effects.

TWA: Time-Weighted Average

VOC: Volatile Organic Compound