SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

Product Name: **02-SERIES**
Product Use: Ultra-violet Curable Screen Printing Ink

000 Clear for Powders (4.13) [*1.093*]
002 Mixing White (5.10) [*1.350*]
005 Mixing Black (4.40) [*1.164*]
007 Brown (4.41) [*1.167*]
012 Radiant Yellow (4.19) [*1.108*]
014 Radiant Yellow (4.26) [*1.127*]
016 Brilliant Yellow (4.17) [*1.101*]
017 Medium Yellow (4.32) [*1.144*]
019 Permanent Orange (4.26) [*1.126*]
022 Red (4.19) [*1.108*]
023 Rhodamine Red (4.23) [*1.120*]
024 Rose (4.39) [*1.161*]
025 Graphic Red (4.19) [*1.108*]
026 Magenta (4.62) [*1.221*]
030 Emerald Green (4.31) [*1.140*]
031 Spruce Green (4.33) [*1.144*]
034 Permanent Blue (4.29) [*1.135*]
035 Violet (4.14) [*1.096*]
037 Reflex Blue (4.30) [*1.137*]
038 Peacock Blue (4.88) [*1.290*]
049 Overprint Clear (4.14) [*1.096*]
050 Process Blue (4.14) [*1.095*]
060 Halftone Base (4.39) [*1.162*]
080 Halftone Process Cyan (4.30) [*1.137*]
081 Halftone Process Magenta (4.29) [*1.135*]
082 Halftone Process Yellow (4.32) [*1.145*]
083 Halftone Process Black (4.34) [*1.148*]
092 Transparent Red (4.18) [*1.105*]
093 Transparent Green (4.20) [*1.110*]
094 Transparent Blue (4.15) [*1.097*]
095 Transparent Yellow (4.17) [*1.102*]
1019 Opaque Black (4.42) [*1.168*]
1022 Deadfront Black (4.19) [*1.108*]
1046 Opaque White (5.92) [*1.566*]
1054 Non-Chalking White (5.08) [*1.344*]
1056 Non-Chalking Opaque White (6.02) [*1.592*]
1085 Lens Clear (4.09) [*1.083*]
1234 White (5.11) [*1.351*]
1240 Opaque White (6.13) [*1.622*]
1400 Blue Shade White (6.03) [*1.596*]
2021 Opaque Blue Process (4.46) [*1.181*]
2233 Opaque Yellow (4.64) [*1.228*]
2286 Light LED Red (4.20) [*1.111*]
2287 Dark LED Red (4.19) [*1.109*]
2313 Lightfast Yellow (4.20) [*1.111*]
2872 Lightfast Orange (4.23) [*1.118*]
4000 Jet Black (4.32) [*1.142*]

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MSDS Issuer: EHS Department
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703-527-3887 CHEMTREC

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#05-08 Techplace 1,
Singapore 569628
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Emergency Phone (Outside U.S.):
703-527-3887 CHEMTREC

SECTION 2 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Product is a liquid with mild acrylic odor that may be harmful if inhaled or swallowed. Product may cause serious damage to eyes, allergic skin reactions and irritation to respiratory system. Avoid breathing vapors. Avoid spillage to sewers or waterways.

ROUTES OF ENTRY: Dermal, Inhalation, Ingestion

ACUTE HEALTH EFFECTS: Irritant to skin, eyes and respiratory tract. Effects may be delayed for several hours.
- **Skin Contact:** Potential irritant and can cause allergic skin reaction. Repeated or prolonged contact may cause sensitization.
- **Eye Contact:** Liquid, vapors, or mists may cause eye irritation. Protect eyes from repeated or prolonged contact.
- **Inhalation:** May be harmful if inhaled. May cause irritation to upper respiratory tract upon prolonged or repeated inhalation.
- **Ingestion:** May be harmful if swallowed. Gastrointestinal tract irritation may result.

CHRONIC HEALTH EFFECTS: No data available for mixture. Animal studies for N-Vinyl-2-Pyrrolidone indicate that inhalation can cause liver and nasal damage. Possible cancer hazard associated with NVP, based on animal studies. See Section 11 for Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Repeated and prolonged overexposure may increase the potential for adverse health effects.

HMIS ® RATING: Health – 2* Flammability -1 Physical Hazard – 1 PPE – C

GHS CLASSIFICATION:
Physical Hazards: Classification not possible for mixture
Health Hazards: Classification not possible for mixture
Environmental Hazards: Classification not possible for mixture

SECTION 3 COMPOSITION

CHEMICAL NAME	PERCENT BY WEIGHT	CAS#	EINECS#	Symbol	R Phrase
Acrylated Oligomer Mixture	27-65%	Proprietary	Proprietary	Not available	Not available
N-Vinyl-2-Pyrrolidone (NVP)	10-28%	88-12-0	201-800-4	Xn	R20/21/22, R37, R40, R41, R48/20

Acrylated Monomer Mixture	5-25%	Proprietary	Proprietary	Xi, N	R36/37/38,43,51/53
1,6-Hexanediol Diacrylate (1085, 2021 only)	2-4%	13048-33-4	235-921-9	Xi	R36/38, 43
Photoinitiators	2-8%	Proprietary	Proprietary	Xn, N	R22, 36/37/38, 43, 51, 50/53, 52/53
Copper Compound (026, 034, 037, 038, 050, 080, 094, 2021, and 2287)	0.1-3.5%	147-14-8	205-685-1	Not available	Not available
Carbon Black (005, 007, 035, 083, 1019, and 4000)	0.8-4.5%	1333-86-4	215-609-9	Not available	Not available
Zinc Compound (017, 023, 026, 030, 031, and 2233)	0.3-2.5%	1314-98-3	215-251-3	Not available	Not available
Rosin (092, 095, 1022, 2286, and 2287)	0.3-3%	8050-09-7	232-475-7	Not available	Not available

SECTION 4 FIRST AID MEASURES

SKIN CONTACT: Remove and isolate contaminated clothing and shoes. Remove excess material from skin with clean cloth. Flush skin with running lukewarm water. Wash affected areas using mild soap.

EYE CONTACT: Flush the eye and under lids with warm water for 15 minutes. Remove any contact lenses during the flushing. Get immediate medical attention if symptoms persist.

INHALATION: Move subject to fresh air and keep warm. If subject is not breathing, administer artificial respiration. If breathing is difficult, have qualified personnel administer oxygen and get medical attention.

INGESTION: If appreciable quantities are swallowed, seek immediate medical attention. Do NOT induce vomiting. Never give anything by mouth to an unconscious person.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING METHOD: Water fog, carbon dioxide (CO2) or dry chemical
OSHA CLASSIFICATION: Class IIIB Combustible

Evacuate area of all non-emergency personnel. Fire fighters must wear full emergency equipment with self-contained breathing apparatus. At elevated temperatures hazardous polymerization may occur causing container rupture and in extreme cases, explosion. Fight fires from upwind and cool intact containers with water spray or stream at maximum range.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Remove all sources of ignition and ventilate area. Avoid skin and eye contact. Use respiratory protection. Absorb with inert materials such as dry clay or sand and place in closed container for disposal as solid waste in accordance with all applicable regulations.

SECTION 7 HANDLING AND STORAGE

HANDLING: Avoid any unnecessary contact. Use protective clothing specified in Section 8.

STORAGE: Store away from heat and sunlight to prevent spontaneous polymerization. Store below 90° F (32° C). Protect containers from physical damage. Storage of containers should conform to flammable and combustible liquid regulations.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS: Not established for mixture.

Component	Exposure Limit
N-Vinyl-2-Pyrrolidone (NVP)	ACGIH TLV: 0.05 ppm
1,6-Hexanediol Diacrylate	AIHA WEEL: 1mg/m3 skin DSEN
Acrylate Monomer Mixture	None known
Acrylated Oligomer Mixture	None known
Photoinitiator Mixture	None known
Pigments	Not applicable in product

HAND PROTECTION: Use nitrile, butyl or other gloves that are resistant to chemicals in Section 2. Replace immediately if punctured or torn or when a change of appearance (color, elasticity, shape) occurs. A minimum of 0.45mm thick gloves for long

duration exposure (up to 4 hours) or mechanical handling activities; single use, disposable gloves for short duration exposures not exceeding 30 minutes or where splashes are likely, are recommended.

EYE PROTECTION: Use splash-proof safety goggles or safety glasses that are ANSI approved to prevent eye contact. Eyewash availability is also recommended.

SKIN PROTECTION: Protective or disposable outer clothing is recommended.

VENTILATION: Provide natural or mechanical ventilation to minimize exposure. If practical, use local mechanical exhaust ventilation at sources of air contamination.

RESPIRATORY PROTECTION: Use of NIOSH approved respirators for organic vapors is recommended where exposure limits are exceeded.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE, ODOR & PHYSICAL STATE: Liquid with moderate viscosity and mild acrylic odor.
AUTO-IGNITION TEMPERATURE: Not available
BOILING POINT (°F): Not available
DENSITY: See section 1
EVAPORATION RATE: <1
FLAMMABLE/EXPLOSIVE LIMITS (Volume % in air): Not established
FLASH POINT: Not determined, but expected to be >200° F (> 93.3°C) based on raw material data.
MELTING / FREEZING POINT: Not available
ODOR THRESHOLD: Not applicable
PARTITION COEFFICIENT: Not available
pH: Not available
RELATIVE DENSITY: Not available
SOLUBILITY IN WATER: Not soluble
SPECIFIC GRAVITY: See section 1
VAPOR DENSITY: Heavier than air
VAPOR PRESSURE (mm Hg): Not available
VISCOSITY: Not available
VOC: Not established
VOLATILE CHARACTERISTICS: Negligible

SECTION 10 REACTIVITY / STABILITY HAZARD DATA

STABILITY: This material is stable under recommended storage and handling conditions.

CONDITIONS TO AVOID: Excessive heat, ignition sources and contamination with dirt and other foreign materials.

INCOMPATIBILITY: Avoid contamination or inappropriate mixing with strong oxidizing agents, peroxides, strongly caustic materials and metal corrosion products including rust. Do not expose to UV light during storage.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal oxidation or pyrolysis (as in fire) may yield carbon dioxide, carbon monoxide and volatile organic fragments which are flammable, irritating or toxic.

HAZARDOUS POLYMERIZATION: Under certain conditions (excess temperatures and contamination) hazardous polymerization may occur. Avoid high temperature and contamination with foreign materials.

SECTION 11 TOXICOLOGICAL INFORMATION

TOXICOLOGICAL DATA: No data for mixtures
LD50 – Not determined for mixtures
LC50 – Not determined for mixtures

CARCINOGENICITY: **IARC?** No **NTP?** No **OSHA?** No
NVP, one component of this product is a possible cancer hazard based upon animal studies. Acute Oral LD50 is 1500 mg/kg (rat). Acute Dermal LD50 is 560 mg/kg (rabbit). Acute Inhalation LC50 is 3.2 mg/l (rat). Negative results and no chromosome-damaging effects were found with mutagenicity studies. Carcinogenicity studies (Rat, 2-year inhalation) showed tumors observed in nasal mucosa of both sexes at 20 ppm and in males at 10pm. Liver and laryngeal tumors at 20ppm and liver damage at 5ppm in both sexes. NVP classified as ACGIH A3 – Confirmed animal carcinogen with unknown relevance to humans.

HDODA, one component of this product, showed no increased incidence of tumors in an 80 week carcinogenicity study in mice

MUTAGENICITY: NVP, one component of this product had no chromosome-damaging effects found and negative results with mutagenicity studies.

HDODA, one componenet of this product, was positive in a mouse lymphoma test indicating possible mutagenic potential. An Ames test for mutagenicity produced equivocal results.

REPRODUCTIVE EFFECTS: HDODA was not fetotoxic when administered orally to mice at a maternally toxic dose.

TERATOGENICITY: HDODA was not teratogenic when administered orally to mice at a maternally toxic dose.

SECTION 12 ECOLOGICAL INFORMATION

No determination has been made on ecological impact. However, it is highly recommended to prevent contamination of the environment with this product, i.e. soil, landfills, drains, sewers, surface waters, etc.

SECTION 13 DISPOSAL CONSIDERATIONS

Dispose of this product in accordance with all applicable laws and regulations. This product is not considered a hazardous waste under US EPA 40 CFR 261.

SECTION 14 TRANSPORTATION INFORMATION

Transport this product in accordance with all applicable laws and regulations. This product, as supplied, is not regulated nor classified as a hazardous material/dangerous good by 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).

DEPARTMENT OF TRANSPORTATION:
Export Shipping Class: Not applicable
DOT (49 CFR)/IATA/IMDG Hazard Class: Not applicable
UN Number: Not applicable
Export Shipping Name: Not applicable

SECTION 15 REGULATORY INFORMATION

This Material Safety Data Sheet has been formatted to the best of our ability in accordance with American National Standards Institute (ANSI), European Communities (EC), and contains hazard criteria and all information required by the Canadian Controlled Products Regulation (CPR).

California Proposition 65 RTK: This product may contain substances that are known to the state of California to cause cancer or reproductive toxicity: None Known

Clean Air Act – Ozone Depleting Substances (ODS): This product and its components do not contain Ozone Depleting Substances.

Coalition of Northeastern Governors (CONEG): This product meets the requirements of CONEG pertaining to heavy metals total content of no more than 100 PPM. No heavy metals are added as a part of the formulation, but raw materials may contain residual parts per million as naturally occurring elements.

European Union Directive 2002/95/EC Restriction of Hazardous Substances (RoHS): This product is in compliance with the requirements of the RoHS Directive.

Food and Drug Administration (FDA) Food Packaging Status: Components of this product have not been cleared by FDA for use in food packaging and/or other applications as an indirect food additive.

Global Inventories: All components of this product are listed or in compliance with the following chemical inventories:
Australian Inventory of Chemical Substances (AICS)
Canadian Domestic Substance List (DSL) or Non-Domestic Substance List (NDSL)
European Inventory of Existing Commercial Substances (EINECS), the European List of Notified Chemical Substances (ELINCS)
Korean Existing Chemicals List (ECL)
United States Toxic Substances Control Act (TSCA) listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III:

Section 302 – Extremely Hazardous Substances (EHS): This product is not regulated as an EHS.
Section 304 - CERCLA: This product is not regulated for emergency release notification.
Section 311/312 – Hazard Communication Standard (HCS): This product is classified as an acute hazard.
Section 313 – Toxic Chemical List (TCL): This product contains the following components that are regulated under the Toxic Chemical Release Reporting requirements 40 CFR 372: Zinc Compounds
Copper Compounds

SECTION 16 OTHER INFORMATION

HMIS® ratings are a registered trade and service mark of the National Paint and Coatings Association with the following scale:

* = Chronic health effect	PPE Index
4 = Severe Hazard	A = Safety Glasses
3 = Serious Hazard	B = Safety Glasses and Gloves
2 = Moderate Hazard	C = Safety Glasses, Gloves and Protective Apron
1 = Slight Hazard	D = Face Shield, Gloves and Protective Apron
0 = Minimal Hazard	E = Safety Glasses, Gloves and Respirator

EU Risk Phrases

R21/22: Harmful in contact with skin and if swallowed
R36/37/38: Irritating to eyes, respiratory system and skin.
R43: May cause sensitization by skin contact.
R48/20: Harmful: danger of serious damage to health by prolonged exposure through inhalation
R50: Very toxic to aquatic organisms
R51/53: Toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment
R62: Possible risk of impaired fertility

Definitions

TWA – Time Weighted Average
TLV – Threshold Limit Value
STEL – Short Term Exposure Limit
CAS# - Chemical Abstract Service Number
NTP – National Toxicology Program
PEL – Permissible Exposure Limit
IARC - International Agency for Research on Cancer
ANSI – American National Standards Institute
AIHA – American Industrial Hygiene Association
WEEL – Workplace Environmental Exposure Limit
DSEN – Agent may cause skin sensitization

Supersedes: April 28, 2006

Disclaimer: To the best of our knowledge, the product information contained herein is based upon data believed to be reliable, however Nor-Cote makes no warranty and disclaims any liability whatsoever for its accuracy or completeness. Since the actual use of the product is beyond our control, no guarantee expressed or implied, is made by Nor-Cote as to the effects of such uses nor does Nor-Cote assume liability arising out of the use of this product by others. It remains the responsibility of the user to ensure that the use of the product herein is in accordance with all applicable laws and regulations.