Safety Data Sheet

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

1.1 Product Identifier

Product Name: LIQUID STEEL Product Code: LQS-PC76598

1.2 Relevant identified uses of the substance or mixture

Trade Name: ULTRA VIOLET SCREEN PRINTING INK

1.3 Details of the Supplier of the safety data sheet

North America:
NOR-COTE INTERNATIONAL, INC.
506 Lafayette Avenue
Crawfordsville, Indiana 47933 USA
Phone: 765-362-9180 (day phone)
MSDS Issuer: EHS Department
jasong@norcote.com

Europe:
NOR-COTE INTERNATIONAL LTD.
Unit 8 Warrior Park, Eagle Close
Chandlers Ford Industrial Estate
Eastleigh, Hampshire
SO53 4NF England
Tel: +44 (0) 23 80270542 (day phone)

Asia:
NOR-COTE INTERNATIONAL PTE. LTD.
Blk 4012 Ang Mo Kio Ave 10,
#05-08 Techplace 1,
Singapore 569628
Tel +65 6291-0898 (day phone)

1.4 Emergency Telephone Number

CHEMTREC (United States)
800-424-9300

CHEMTREC (Outside U.S.)
703-527-3887

CHEMTREC (Outside U.S.)
703-527-3887

SECTION 2 - HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to the Globally Harmonized System (GHS).

GHS Ratings:

Skin Corrosive	2	Reversible adverse effects in dermal tissue, Draize score: >= 2.3 < 4.0 or persistent inflammation
Eye Corrosive	2A	Eye irritant: Subcategory 2A, Reversible in 21 days
Skin sensitizer	1	Skin sensitizer
Carcinogen	2	Limited evidence of human or animal carcinogenicity
Reproductive Toxin	2	Human or animal evidence possibly with other information
Organ Toxin Single Exposure	1	Significant toxicity in humans- Reliable, good quality human case studies or epidemiological studies, Presumed significant toxicity in humans- Animal studies with significant and/or severe toxic effects relevant to humans at generally low exposure (guidan
Organ Toxin Repeated Exposure	1	Significant toxicity in humans- Reliable, good quality human case studies or epidemiological studies Presumed significant toxicity in humans- Animal studies with significant and/or severe toxic effects relevant to humans at generally low exposure (guidanc
Aquatic Toxicity	A3	Acute toxicity <= 10.0 but < 100 mg/l

2.2 Label Elements

GHS Hazards

H315	Causes skin irritation
H317	May cause an allergic skin reaction
H319	Causes serious eye irritation
H351	Suspected of causing cancer
H361	Suspected of damaging fertility or the unborn child
H370	Causes damage to organs
H372	Causes damage to organs through prolonged or repeated exposure
H402	Harmful to aquatic life

GHS Precautions

P202	Do not handle until all safety precautions have been read and understood
P260	Do not breathe dust/fume/gas/mist/vapours/spray
P273	Avoid release to the environment
P280	Wear protective gloves/protective clothing/eye protection/face protection
P362	Take off contaminated clothing and wash before reuse
P302+P352	IF ON SKIN: Wash with soap and water
P305+P351+P338	IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing
P308+P313	IF exposed or concerned: Get medical advice/attention
P333+P313	If skin irritation or a rash occurs: Get medical advice/attention

Danger

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.
None Known

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.
Ingestion: May be harmful if swallowed. Gastrointestinal tract irritation may result.
Inhalation: May be harmful if inhaled. May cause irritation to upper respiratory tract upon prolonged or repeated inhalation.

Effects of Overexposure

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Repeated and prolonged overexposure may increase the potential for adverse health effects.
CHRONIC HEALTH EFFECTS: No data available for mixture. Animal studies for N-Vinyl Pyrrolidone indicate that inhalation can cause liver and nasal damage. Possible cancer hazard associated with NVP, based on animal studies.

SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

3.2 Mixtures

*Note: The exact concentrations of the below listed chemicals are being withheld as a trade secret

Chemical Name	Percent Weight	CAS #	EC No.	Classification (GHS)
Iron	60.00 - 70.00 %	7439-89-6		H302, H315
N-Vinyl-2-pyrrolidone	5.00 - 10.00 %	88-12-0	201-800-4	H331, H311, H318, H370, H372
Phosphine oxide, phenylbis(2,4,6-trimethylbenzoyl)-	1.00 - 5.00 %	162881-26-7	423-340-5	H317
1-Propanone, 2-methyl-1-[4-(methylthio)phenyl]-2-(4-morpholinyl)-	1.00 - 5.00 %	71868-10-5	400-600-6	H302, H411
Methanone, (1-hydroxycyclohexyl) phenyl-	1.00 - 5.00 %	947-19-3		H303
(NVC) 2H-Azepin-2-one, 1-ethenylhexahydro-	0.10 - 1.00 %	2235-00-9		H302, H332, H312

SECTION 4 - FIRST AID MEASURES

4.1 Description of first aid measures

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 .

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.

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.

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

5.1 Extinguising Media

Evacuate area of all non-emergency personell. Firefighters 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.

Flash Point: 100 C (212 F)

FLAMMABLE/EXPLOSIVE LIMITS (Volume % in air): Not established

EXTINGUISHING METHOD: Water fog, carbon dioxide (CO2) or dry chemical

5.2 Special Hazards arising from the substance or mixture:

Thermal decomposition can lead to release of irritating gases and vapors

5.3 Advice for firefighters

Protective Equipment:

Wear full emergency equipment with selfcontained breathing apparatus .

Refer to Section 8

5.4 Additional Information

Heating causes a rise in pressue, risk of bursting and combustion
Shut off sources of ignition
Carbon monoxide and carbon dioxide may form upon combustion

OSHA CLASSIFICATION: Class IIIB Combustible

SECTION 6 - ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Remove all sources of ignition and ventilate area. Avoid skin and eye contact. Use respiratory protection.

6.2 Environmental precautions

Avoid release to the environment. Local authorities should be advised if significant spillages cannot be contained

6.3 Methods and materials for containment and cleaning up

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

7.1 Precautions for safe handling

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

7.2 Conditions for safe storage, including and incompatibilities

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

8.1 Control parameters

Exposure Limits: Not established for mixture

Chemical Name / CAS No.	OSHA Exposure Limits	ACGIH Exposure Limits	Other Exposure Limits
Iron 7439-89-6			
N-Vinyl-2-pyrrolidone 88-12-0		0.05 ppm TWA	
Phosphine oxide, phenylbis (2,4,6-trimethylbenzoyl)- 162881-26-7			
1-Propanone, 2-methyl-1-[4-(methylthio)phenyl]-2-(4-morpholinyl)- 71868-10-5			
Methanone, (1-hydroxycyclohexyl)phenyl- 947-19-3			

(NVC) 2H-Azepin-2-one, 1-ethenylhexahydro- 2235-00-9			Long term exposure: Local effects inhalation (LTLI): 0.17 mg/m3 Systemic Effects, inhalation (LTSI): 4.9 mg/m3 Systemic effects, dermal (LTSD): 0.7 mg/kg

8.2 Exposure Controls

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

EYE PROTECTION: Use splash-proof safety goggles or safety glasses that are ANSI approved to prevent eye contact. Eyewash availability is also recommended.
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.
RESPIRATORY PROTECTION: Use of NIOSH/MSHA approved respirators is recommended where exposure limits may be exceeded. Consult the respirator manufacturer for appropriate type and application.
SKIN PROTECTION: Protective or disposable outer clothing is recommended.

Environmental Exposure Controls: Avoid release to the environment. The product should not be allowed to enter drains, water courses or the soil.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance:	Liquid with moderate viscosity	**Odor:**	Mild Acrylic odor
Vapor Pressure:	Not Established	**Vapor Density:**	Heavier than Air
pH:	Not Established	**Formula KG / Gal**	8.00
Melting Point:	Not Available	**Freezing Point:**	Not Available
Solubility:	Not Soluble in Water	**Boiling Range:**	Not Available
Flash Point:	See Section 5.1	**Evaporation Rate:**	<1
Flammability:	See Section 5.4	**Explosive Limits:**	See Section 5.4
Viscosity:	See Certificate of Analysis	**Specific Gravity (SG)**	2.113
Grams VOC less water:	<1%	**Partition Coefficient**	Not Available
Auto-Ignition Temperature	Not Available	**Decomposition Temperature**	Not Available

SECTION 10 - REACTIVITY / STABILITY HAZARD DATA

10.1 Reactivity

None known

10.2 Chemical Stability

This material is stable under recommended storage and handling conditions.

10.3 Possibility of hazardous reaction

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

10.4 CONDITIONS TO AVOID:

Excessive heat, ignition sources and contamination with dirt and other foreign materials.

10.5 Incompatible Materials:

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.

10.6 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 will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

Component Toxicity:

Component Description Oral, Dermal, Inhalation Toxicity	Ecotoxocity:
Iron Oral:984.00 mg/kg (Rat)	96 Hr LC50 Morone saxatilis: 13.6 mg/L [static]; 96 Hr LC50 Cyprinus carpio: 0.56 mg/L [semi-static]
N-Vinyl-2-pyrrolidone Oral:830.00 mg/kg (Rat) Dermal: 560.00 mg/kg (Rabbit) Inhalation: Rat mg/L (Rat)	48 Hr EC50 Daphnia species: 45 mg/L 72 Hr EC50 Desmodesmus subspicatus: 780 mg/L
Phosphine oxide, phenylbis(2,4,6-trimethylbenzoyl)-	N/A
1-Propanone, 2-methyl-1-[4-(methylthio)phenyl]-2-(4-morpholinyl)-	N/A
Methanone, (1-hydroxycyclohexyl)phenyl-	N/A
(NVC) 2H-Azepin-2-one, 1-ethenylhexahydro-	N/A

TOXICOLOGICAL DATA: Slightly Toxic by injestion. Prolonged or repeated exposure may result in sensitization.
LC50 - No additional information
LD50 - No additional information
MUTAGENICITY: No additional information
REPRODUCTIVE EFFECTS:
No additional information
CARCINOGENICITY:
NVP, cas # 88-12-0, one component of this product is a possible cancer hazard based upon animal studies. Acute Oral LD50 is 1470 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.

None Known

Carcinogenicity:

SECTION 12 - ECOLOGICAL INFORMATION

12.1 Toxicity

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

12.2 Persistence and degradability

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

12.3 Bioaccumulative potential

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.

12.4 mobility in soil

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

SECTION 13 - DISPOSAL CONSIDERATIONS

13.1 Waste Water methods

If material becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261 as supplied. Dispose of this material in accordance with all applicable federal, state, provincial, and local laws and regulations.

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), the Canadian Transportation of Dangerous Goods Act (TDG), or the International Air Transport Association (IATA).

14.1 UN Number: Not Applicable

14.2 UN Proper Shipping Name: Not Applicable

14.3 Transport Hazard Class: Not Applicable **DOT (49 CFR)/IATA/IMDG Hazard Class:** Not Applicable

14.4 Packing Group: Not Applicable

SECTION 15 - REGULATORY INFORMATION

15.1 Safety, Health and Environmental regulations / legislation specific for the substance or mixture

This safety data sheet has been formatted to the best of our ability in accordance to Directive 67/548/EEC or Directive 1999/45EC, American National Standards Institute (ANSI) and contains hazard criteria and all information required by the Canadian Controlled Products Regulation (CPR) in regard to this product.

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

Canadian Inventory Status: Components of this product are currently listed on the Canadian Domestic Substance List (DSL) or the Canadian Non-Domestic Substance List (NDSL).

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 Inventory Status: Components of this product are listed on the European Inventory of Existing Commercial Substances (EINECS), the European List of Notified Chemical Substances (ELINCS), or are exempt from being listed.

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 .

European Union Directive 2011/65/EC Restriction of Hazardous Substances (RoHS): This product is in compliance with the requirements of the RoHS2 Directive.

California Proposition 65 RTK:

The following components of this mixture are listed under California Proposition 65:

- None

If CAS numbers 13463-67-7 and/or 1333-86-4 are listed they are not supplied in respirable form.

The following substances from Section 3.2 are considered to be PBT, or vPvB

- None

REACH : This product is compliant with the registration of the REACH Regulation (EC) No. 1907/2006 as all its components are either excluded, exempt and/or preregistered.

The following Substances of Very High Concern are present (updated December 17, 2015 to review for the 168 SVHC)

- None

- None

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III: Section 302:

- None

Superfund Amendments and Reauthorization Act of 1986 (SARA) Title III: SARA 313:

This product contains the following components that are regulated under the Toxic Chemical Release Reporting requirements 40 CFR 372:

- None

Global Inventories: The components of these products are listed in the following or exempt from listing:

Europe (EINECS): Yes
USA (TSCA): Yes
Canada (DSL): Yes
Japan (ENCS): Yes
Philippines (PICCS): Yes
China (IECSC): Yes
Australia (AICS): Yes
Korea (KECI): Yes
New Zealand (NZIoC): Yes
Taiwan (ECSI): Yes

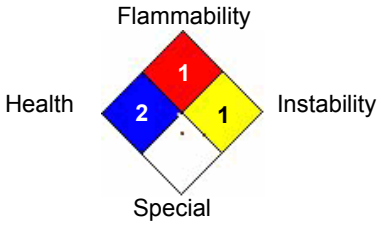
SECTION 16 - OTHER INFORMATION

Hazardous Material Information System (HMIS)

HEALTH	2
FLAMMABILITY	1
PHYSICAL HAZARD	1
PERSONAL PROTECTION	C

HMIS & NFPA Hazard Rating Legend
*** = Chronic Health Hazard**
0 = INSIGNIFICANT
1 = SLIGHT
2 = MODERATE
3 = HIGH

National Fire Protection Association (NFPA)



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

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

SKIN CORR. Skin corrosive
EYE Eye corrosive
RESP. SENS. Respiratory sensitizer
SKIN SENS. Skin sensitizer
MUTA. Mutagen
CARC. Carcinogen
REPR. Reproductive toxin
STOT SE Organ toxin single exposure

STOT RE Organ toxin repeated exposure
AH Aspiration hazard
HHNOC Health hazard not otherwise classified

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