Safety Data Sheets

1. Identification

Product Name	: LUS-200 Yellow
Order No.	: LUS20-Y-BA
Ink Ver.	:1
General Use	: Ink jet printing ink
Product Description	: UV curable ink
SDS Number	: 037-U104785
Manufacture	
Company Name	: Mimaki Engineering Co., Ltd.
Address	: 2182-3 Shigeno-otsu, Tomi-shi, Nagano 389-0512 JAPAN
Telephone No.	: +81-268-64-2413
Importer / Distributor	
Company Name	: MIMAKI AUSTRALIA PTY LTD.
Address	: Unit 14, 38-46 South Street, Rydalmere, NSW 2116, Australia
Telephone No.	: + 61-2-8036-4500
Emergency Telephone No.	+61 2 8014 4558 (within Australia only) 18000 74234 (within Australia only) +65 3158 1074

2. Hazards Identification

[GHS Classification]

Physical Hazards

Flammable Liquids	: Not classified

Health Hazards

Skin Corrosion / Irritation	: Category 2
Eye Damage / Irritation	: Category 1
Sensitization – Skin	: Category 1A
Carcinogenicity	: Category 1A
Toxic to Reproduction	: Category 1B
Specific Target Organ Toxicity (Repeated Exposure)	: Category 1 (respiratory system)

Environmental Hazards

Hazardous to the Aquatic Environment - Acute Hazard	: Category 1

Hazardous to the Aquatic Environment - Long Term Hazard : Category 1

The above list does not include category being non-classifiable or not-applicable.

[GHS Label Elements]

Symbol

Signal Word

Danger

Hazard Statements

H315 Causes skin irritation

H317 May cause an allergic skin reaction

H318 Causes serious eye damage

H350 May cause cancer

H360 May damage fertility or the unborn child.

H372 Causes damage to organs through prolonged or repeated exposure (respiratory system)

H410 Very toxic to aquatic life with long lasting effects

Precautionary Statements

[Prevention]

P201 Obtain SDS (Safety Data Sheet) and printer's Operation Manual before use.

P202 Do not handle until all safety precautions have been read and understood.

P260 Do not breathe gas/mist.

P264 Wash hands and eyes thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P272 Contaminated work clothing should not be allowed out of the workplace.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

[Response]

P302+P352 IF ON SKIN: Wash with plenty of soap and water.

P305+P351+P338 IF IN EYES: Rinse cautiously 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.

P314 Get medical advice/attention if you feel unwell.

P333+P313 If skin irritation or rash occurs: Get medical advice/attention.

P337+P313 If eye irritation persists: Get medical advice/attention.

P362+P364 Take off contaminated clothing and wash it before reuse.

P391 Collect spillage.

[Storage]

P403+P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

[Disposal]

P501 Dispose of contents/container in accordance with local/regional/national/international regulation (to be specified).

Hazards not otherwise classified

May cause chemical gastrointestinal burns.

9% of the mixture consists of ingredients of unknown acute oral toxicity.

3. Composition / Information on Ingredients

No	Chemical Name	Wt%	CAS No.
1	ISOBORNYL ACRYLATE	15-40	5888-33-5
2	PHENOXY ETHYL ACRYLATE	10-30	48145-04-6
3	TETRAHYDROFURFURYL ACRYLATE	7-13	2399-48-6
4	VINYL MONOMER	7-13	Trade Secret
5	2,4,6-TRIMETHYLBENZOYLDIPHENYLPHOSPHINE OXIDE	5-10	75980-60-8
6	ALIPHATIC URETHANEACRYLATE	5-10	Trade Secret
7	ACRYLATE MONOMER	3-7	Trade Secret
8	9H-THIOXANTHEN-9-ONE, 2,4-DIETHYL-	1-5	82799-44-8
9	NICKEL, 5,5'-AZOBIS-2,4,6(1H,3H,5H)-PYRIMIDINETRIONE COMPLEXES	1-5	68511-62-6
10	SUBSTITUTED AMINE OLIGOMER	1-5	Trade Secret
11	DISPERSANT	0.1-3	Trade Secret
12	STABILIZER	0.5-1.5	Trade Secret

4. First Aid Measures

Description of first aid measures

Inhalation : Remove person to fresh air. If you feel unwell, get medical attention.

Skin Contact : Immediately wash with soap and water. Remove contaminated

	clothing and wash before reuse. If signs/symptoms develop, get medical attention.
Eye Contact	: Immediately flush with large amounts of water for at least 15 minutes. Remove contact lenses if easy to do. Continue rinsing. Immediately get medical attention.
If Swallowed	: Rinse mouth. If you feel unwell, get medical attention.
Most important symptoms and effects, both acute and delayed	: See Section 11 Information on toxicological effects.
Indication of any immediate medical attention and special treatment required	: Not applicable.

5. Fire Fighting Measures

Suitable extinguishing media	: In case of fire: Use a fire fighting agent suitable for ordinary combustible material such as water or foam to extinguish.
Special hazards arising from the substance or mixture	: Closed containers exposed to heat from fire may build pressure and explode.
Hazardous Decomposition or By-Products	: Carbon monoxide / During Combustion Carbon dioxide / During Combustion
Special protective actions for fire-fighters	: Wear full protective clothing, including helmet, self-contained, positive pressure or pressure demand breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask, and protective covering for exposed areas of the head.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures	: Evacuate area. Ventilate the area with fresh air. For large spill, or spills in confined spaces, provide mechanical ventilation to disperse or exhaust vapors, in accordance with good industrial hygiene practice. Refer to other sections of this SDS for information regarding physical and health hazards, respiratory protection, ventilation, and

	personal protective equipment.
Environmental precautions	: Avoid release to the environment. For larger spills, cover drains and build dikes to prevent entry into sewer systems or bodies of water.
Methods and material for containment and cleaning up	: Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Mix in sufficient absorbent until it appears dry. Remember, adding an absorbent material does not remove a physical, health, or environmental hazard. Collect as much of the spilled material as possible. Place in a closed container approved for transportation by appropriate authorities. Clean up residue with an appropriate solvent selected by a qualified and authorized person. Ventilate the area with fresh air. Read and follow safety precautions on the solvent label and SDS. Seal the container. Dispose of collected material as soon as possible.

7. Handling and Storage

Precautions for safe handling	: For industrial or professional use only. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. Do not eat, drink or smoke when using this product. Wash thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Avoid release to the environment. Wash contaminated clothing before reuse. Avoid contact with oxidizing agents (eg. chlorine, chromic acid etc.) Use personal protective equipment (gloves, respirators, etc.) as required.
Conditions for safe storage including any incompatibilities	: Store in a well-ventilated place. Keep container tightly closed to prevent loss of stabilizing materials. Keep cool. Protect from sunlight. Store away from heat. Store away from acids. Store away from oxidizing agents.

8. Exposure Controls / Personal Protection

Control parameters

Occupational exposure limits : If a component is disclosed in section 3 but does not appear in the table below, an occupational exposure limit is not available for the component.

Ingredient	CAS No.	Agency	Limit type	Additional Comments
VINYL MONOMER	Trade Secret	Manufacturer determined	TWA:0.1 ppm(0.57 mg/m3)	
TETRAHYDROFURFURYL ACRYLATE	2399-48-6	Manufacturer determined	TWA:0.1 ppm(0.64mg/m3) STEL:0.3 ppm(1.91mg/m3)	
NICKEL, INSOLUBLE COMPOUNDS	68511-62-6	OSHA	TWA(as Ni):1 mg/m3	

ACGIH: American Conference of Governmental Industrial Hygienists
OSHA : United States Department of Labor - Occupational Safety and Health Administration
TWA: Time-Weighted-Average
STEL: Short Term Exposure Limit

Exposure Controls

Occupational Exposure Controls

Engineering Controls : Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below relevant Exposure Limits and/or control dust/fume/gas/mist/vapors/spray. If ventilation is not adequate, use respiratory protection equipment.

Personal protective equipment (PPE)

Eye/face protection : Select and use eye/face protection to prevent contact based on the results of an exposure assessment. The following eye/face protection(s) are recommended: Indirect Vented Goggles

Skin/hand protection : Select and use gloves and/or protective clothing approved to relevant local standards to prevent skin contact based on the results of an exposure assessment. Selection should be based on use factors such as exposure levels, concentration of the substance or mixture, frequency and duration, physical challenges such as temperature extremes, and

other use conditions.
Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible gloves/protective clothing. Note: Nitrile gloves may be worn over polymer laminate gloves to improve dexterity. Gloves made from the following material(s) are recommended: Polymer laminate

If this product is used in a manner that presents a higher potential for exposure (eg. spraying, high splash potential etc.), then use of protective coveralls may be necessary. Select and use body protection to prevent contact based on the results of an exposure assessment. The following protective clothing material(s) are recommended: Apron - polymer laminate

Respiratory protection : An exposure assessment may be needed to decide if a respirator is required. If a respirator is needed, use respirators as part of a full respiratory protection program. Based on the results of the exposure assessment, select from the following respirator type(s) to reduce inhalation exposure: Half facepiece or full facepiece air-purifying respirator suitable for organic vapors and particulates

For questions about suitability for a specific application, consult with your respirator manufacturer.

9. Physical and Chemical Properties

Appearance	- Physical State	: liquid
	- Color	: Yellow color
Odor		: Acrylate odor
Odor threshold;		: No Data Available
pH		: No Data Available
Melting Point		: Not Applicable
Boiling Point		: > 95 °C
Flash Point		: 95 °C [Test Method: Closed Cup]
Evaporation Rate		: No Data Available
Flammability (Solid, Gas)		: Not Applicable
Flammable Limits(LEL)		: No Data Available
Flammable Limits(UEL)		: No Data Available
Vapor Pressure		: No Data Available

Vapor Density	: No Data Available
Density	: No Data Available
Specific Gravity	: 1.08 [Ref Std: WATER=1]
Solubility In Water	: No Data Available
Solubility- non-water	: No Data Available
Partition Coefficient (n-octanol / Water)	: No Data Available
Auto ignition temperature	: No Data Available
Decomposition Temperature	: No Data Available
Viscosity	: 20 centipoise [@ 25 °C]
Percent volatile	: No Data Available

10. Stability and Reactivity

Reactivity	: This material may be reactive with certain agents under certain conditions - see the remaining headings in this section.
Chemical stability	: Stable.
Possibility of hazardous reactions	: Hazardous polymerization may occur.
Conditions to avoid	: Heat
Incompatible materials	: Strong oxidizing agents
Hazardous decomposition products	: None known.

11. Toxicological Information

Signs and Symptoms of Exposure

Based on test data and/or information on the components, this material may produce the following health effects:

Inhalation	: Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.
Skin Contact	: Skin Irritation: Signs/symptoms may include localized redness, swelling, itching, dryness, cracking, blistering, and pain. Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.

Eye Contact	: Corrosive (Eye Burns): Signs/symptoms may include cloudy appearance of the cornea, chemical burns, severe pain, tearing, ulcerations, significantly impaired vision or complete loss of vision.
Ingestion	: May be harmful if swallowed. Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.
Prolonged or repeated exposure may cause target organ effects	: Respiratory Effects: Signs/symptoms may include cough, shortness of breath, chest tightness, wheezing, increased heart rate, bluish colored skin (cyanosis), sputum production, changes in lung function tests, and/or respiratory failure.
Reproductive/Developmental Toxicity	: Contains a chemical or chemicals which can cause birth defects or other reproductive harm.
Carcinogenicity	: Contains a chemical or chemicals which can cause cancer.

Ingredient	CAS No.	Class Description	Regulation
NI CMPDS NOT ALLOYS	68511-62-6	Known human carcinogen	National Toxicology Program Carcinogens
NICKEL COMPOUNDS	68511-62-6	Grp. 1: Carcinogenic to humans	International Agency for Research on Cancer

Acute Toxicity

Name	Route	Species	Value
Overall product	Ingestion		No data available; calculated ATE 2,000 - 5,000mg/kg
ISOBORNYL ACRYLATE	Dermal	Rabbit	LD50 > 5,000 mg/kg
ISOBORNYL ACRYLATE	Ingestion	Rat	LD50 > 4,350 mg/kg
PHENOXY ETHYL ACRYLATE	Dermal	Rat	LD50 > 2,000 mg/kg
PHENOXY ETHYL ACRYLATE	Ingestion	Rat	LD50 > 5,000 mg/kg
TETRAHYDROFURFURYL ACRYLATE	Ingestion	Rat	LD50 > 551 mg/kg
VINYL MONOMERr	Dermal	Rabbit	LD50 1,700 mg/kg
VINYL MONOMERr	Ingestion	Rat	LD50 1,049mg/kg
2,4,6-TRIMETHYLBENZOYLDIPHENYLPHOSPHINE OXIDE	Dermal	Professional judgement	LD50 estimated to be > 5,000 mg/kg
2,4,6-TRIMETHYLBENZOYLDIPHENYLPHOSPHINE OXIDE	Ingestion	Rat	LD50 > 5,000 mg/kg
ACRYLATE MONOMER	Dermal	Professional	LD50 estimated to be > 5,000 mg/kg

		judgement	
ACRYLATE MONOMER	Ingestion	Rat	LD50 > 15,400 mg/kg
NICKEL, 5,5'-AZOBIS-2,4,6(1H,3H,5H)-PYRIMIDINETRIONE COMPLEXES	Dermal		LD50 estimated to be 2,000 - 5,000 mg/kg
NICKEL, 5,5'-AZOBIS-2,4,6(1H,3H,5H)-PYRIMIDINETRIONE COMPLEXES	Ingestion	Rat	LD50 5,000 mg/kg

ATE = acute toxicity estimate

Skin Corrosion/Irritation

Name	Species	Value
Overall product	Professional judgement	Irritant
ISOBORNYL ACRYLATE	Rabbit	Minimal irritation
PHENOXY ETHYL ACRYLATE	Rabbit	No significant irritation
TETRAHYDROFURFURYL ACRYLATE	Rabbit	Corrosive
VINYL MONOMER	Rabbit	Minimal irritation
2,4,6-TRIMETHYLBENZOYLDIPHENYLPHOSPHINE OXIDE	Rabbit	No significant irritation
ACRYLATE MONOMER	Rabbit	No significant irritation
NICKEL, 5,5'-AZOBIS-2,4,6(1H,3H,5H)-PYRIMIDINETRIONE COMPLEXES	Rabbit	No significant irritation

Serious Eye Damage/Irritation

Name	Species	Value
ISOBORNYL ACRYLATE	Rabbit	Mild irritant
PHENOXY ETHYL ACRYLATE	Rabbit	No significant irritation
TETRAHYDROFURFURYL ACRYLATE	Rabbit	Corrosive
VINYL MONOMER	Rabbit	Severe irritant
2,4,6-TRIMETHYLBENZOYLDIPHENYLPHOSPHINE OXIDE	Rabbit	No significant irritation
ACRYLATE MONOMER	Rabbit	Mild irritant
NICKEL, 5,5'-AZOBIS-2,4,6(1H,3H,5H)-PYRIMIDINETRIONE COMPLEXES	Rabbit	No significant irritation

Skin Sensitization

Name	Species	Value
ISOBORNYL ACRYLATE	Mouse	Sensitizing
PHENOXY ETHYL ACRYLATE	Guinea pig	Sensitizing
TETRAHYDROFURFURYL ACRYLATE	Professional judgement	Sensitizing
VINYL MONOMER	Mouse	Sensitizing
2,4,6-Trimethylbenzoyldiphenylphosphine oxide	Mouse	Sensitizing
ACRYLATE MONOMER	Guinea pig	Sensitizing
NICKEL, 5,5'-AZOBIS-2,4,6(1H,3H,5H)-PYRIMIDINETRIONE COMPLEXES	Similar compounds	Sensitizing

Respiratory Sensitization

For the component/components, either no data are currently available or the data are not sufficient for classification.

Germ Cell Mutagenicity

Name	Route	Value
ISOBORNYL ACRYLATE	In Vitro	Some positive data exist, but the data are not sufficient for classification
TETRAHYDROFURFURYL ACRYLATE	In Vitro	Not mutagenic
VINYL MONOMER	In Vitro	Not mutagenic
2,4,6-TRIMETHYLBENZOYLDIPHENYLPHOSPHINE OXIDE	In Vitro	Not mutagenic
ACRYLATE MONOMER	In Vitro	Not mutagenic

Carcinogenicity

Name	Route	Species	Value
NICKEL, 5,5'-AZOBIS-2,4,6(1H,3H,5H)-PYRIMIDINETRIONE COMPLEXES	Not Specified	Similar compound ds	Carcinogenic

Reproductive Toxicity

Reproductive and/or Developmental Effects

Name	Route	Value	Species	Test Result	Exposure Duration

PHENOXY ETHYL ACRYLATE	Ingestion	Not classified for male reproduction	Rat	NOAEL 800 mg/kg/day	43 days
PHENOXY ETHYL ACRYLATE	Ingestion	Toxic to female reproduction	Rat	NOAEL 300 mg/kg/day	premating into lactation
PHENOXY ETHYL ACRYLATE	Ingestion	Toxic to development	Rat	NOAEL 300 mg/kg/day	premating into lactation
TETRAHYDROFURFURYL ACRYLATE	Ingestion	Toxic to female reproduction	Rat	NOAEL 50 mg/kg/day	premating into lactation
TETRAHYDROFURFURYL ACRYLATE	Dermal	Toxic to female reproduction	Rat	NOAEL 100 mg/kg/day	90 days
TETRAHYDROFURFURYL ACRYLATE	Ingestion	Toxic to male reproduction	Rat	NOAEL 35 mg/kg/day	90 days
TETRAHYDROFURFURYL ACRYLATE	Inhalation	Toxic to male reproduction	Rat	NOAEL 0.6 mg/l	90 days
TETRAHYDROFURFURYL ACRYLATE	Ingestion	Toxic to development	Rat	NOAEL 50 mg/kg/day	premating into lactation
2,4,6-TRIMETHYLBENZOYLDIPH ENYLPHO SPHINE OXIDE	Ingestion	Toxic to male reproduction	Rat	NOAEL 100 mg/kg/day	90 days

Target Organ(s)

Specific Target Organ Toxicity - single exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
ISOBORNYL ACRYLATE	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Official classification	NOAEL Not available	
TETRAHYDROFUR FURYL ACRYLATE	Inhalation	respiratory irritation	May cause respiratory irritation	Human and animal	NOAEL Not available	
VINYL MONOMER	Inhalation	respiratory irritation	Some positive data exist, but the data are not sufficient for classification	Rat	NOAEL Not available	

Specific Target Organ Toxicity - repeated exposure

Name	Route	Target Organ(s)	Value	Species	Test Result	Exposure Duration
VINYL MONOMER	Inhalation	respiratory system	Causes damage to organs through prolonged or repeated exposure	Rat	NOAEL 0.001 mg/l	28 days
VINYL MONOMER	Inhalation	Blood, liver, kidney, and/or bladder, eyes	Not classified	Rat	NOAEL 0.18 mg/l	90 days
VINYL MONOMER	Ingestion	liver	Not classified	Rat	NOAEL 260 mg/kg/day	3 months
2,4,6-TRIMETHYLBENZOYLDIPHENYLPHO SPHINE OXIDE	Ingestion	Skin, blood, liver, kidney and/or, bladder, nervous system	Not classified	Rat	NOAEL 1,000 mg/mg/kg/day	90 days

Aspiration Hazard

For the component/components, either no data are currently available or the data are not sufficient for classification.

12. Ecological Information

Handling is noted because it might influence the environment when leaking and abandoning it. Especially, note that the product doesn't flow directly to ground, the river, and the drain ditch.

Ecotoxicity : Very toxic to aquatic life with long lasting effects.

Component Analysis - Aquatic Toxicity : **ISOBORNYL ACRYLATE(5888-33-5)**

LC50 for freshwater fish: 704µg/L (4days)

EC50 for freshwater algae: 1.98 mg/L (72h)

PHENOXY ETHYL ACRYLATE(48145-04-6)

LC50 for freshwater fish: 10 mg/L (4days)

EC50 for freshwater invertebrates 1.21 mg/L (48h)

EC50 for microorganisms: 177 mg/L (3h)

TETRAHYDROFURFURYL ACRYLATE (2399-48-6)

LC50 for freshwater fish: 7.32 mg/L (4days)
EC50 for freshwater invertebrates: 37.7 mg/L (48h)
EC50 for freshwater algae: 3.92 mg/L (72h)

Persistence and Degradability	: No information available for the product.
Bioaccumulative Potential	: No information available for the product.
Mobility in soil	: No information available for the product.
Other adverse effects	: No information available for the product.

13. Disposal Considerations

Disposal Method	: Dispose of contents/ container in accordance with the local/regional/national/international regulations. Dispose of waste product in a permitted industrial waste facility. As a disposal alternative, incinerate in a permitted waste incineration facility. Proper destruction may require the use of additional fuel during incineration processes. Empty drums/barrels/containers used for transporting and handling hazardous chemicals (chemical substances/mixtures/preparations classified as Hazardous as per applicable regulations) shall be considered, stored, treated & disposed of as hazardous wastes unless otherwise defined by applicable waste regulations. Consult with the respective regulating authorities to determine the available treatment and disposal facilities.

14. Transport Information

Check a thing without a leak in a container.
Perform prevention of collapse of cargo surely.

Sea Transport (IMDG)	
Class	: 9
Packing Group (PG)	: Ⅲ
UN Number	: UN 3082
Proper Shipping Name	: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (ISOBORNYL ACRYLATE AND NICKEL, 5,5'-AZOBIS-2,4,6(1H,3H,5H)-PYRIMIDINETRIONE COMPLEXES)

Marine Pollutant	: ISOBORNYL ACRYLATE AND NICKEL, 5,5'-AZOBIS-2,4,6(1H,3H,5H)-PYRIMIDINETRIONE COMPLEXES

Air Transport (ICAO/IATA)

Class	: 9
Packing Group(PG)	: Ⅲ
UN Number	: UN 3082
Proper Shipping Name	: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S., (ISOBORNYL ACRYLATE AND NICKEL, 5,5'-AZOBIS-2,4,6(1H,3H,5H)-PYRIMIDINETRIONE COMPLEXES)
Remarks	: Single or inner packaging less than 5 L (liquid) or 5 kg net (solids) is excepted from Dangerous Goods regulations. Refer to ICAO/IATA A197, IMDG 2.10.2.7, ADR SP 375.

15. Regulatory Information

CHEMICAL INVENTORIES

15.3. Chemical Inventories

The components of this material are in compliance with the provisions of Japan Industrial Safety and Health Law. Certain restrictions may apply. Contact the selling division for additional information.

The components of this material are in compliance with the provisions of Japan Chemical Substance Control Law. Certain restrictions may apply. Contact the selling division for additional information.

The components of this product are in compliance with the chemical notification requirements of TSCA.

16. Other Information

This information is furnished without warranty, express or implied, except that it is accurate to the best knowledge of Mimaki Engineering Corporation.

It relates only to the specific material designated herein, and does not relate to use in combination with any other material or process.

Mimaki Engineering Corporation assumes no legal responsibility for use or reliance upon this information.