

MATERIAL SAFETY DATA SHEET

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Issued : April 12, 2012

Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name :	NIKKALITE® PROCESS COLOR N3501 WHITE	<u>HMIS Codes</u>	
Manufacture :	NIPPON CARBIDE INDUSTRIES CO., INC.	HEALTH :	0
Address :	2-11-19, Konan, Minato-ku, Tokyo 108-8466, Japan	FLAMMABILITY :	0
Telephone No. :	+81-3-5462-8225, Fax No.+81-3-5462-8271	REACTIVITY :	0
Emergency Tel. No. :	+81-3-5462-8206 (Retroreflective Materials Business Unit)		
Recommended use of the product and restrictions on use :	For Retroreflective Materials		

Section 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable Liquid Category 3
Skin Corrosion / Irritation Category 3
Serious Eye Damage / Eye Irritation Category 2
Carcinogenicity Category 2
Hazardous to the Aquatic Environment (Acute) Category 2
Hazardous to the Aquatic Environment (Chronic) Category 3

GHS Label Elements

Symbols / Pictograms :



Signal word : Warning

Hazard statement :

Flammable liquid and vapour.
Causes mild skin irritation.
Causes serious eye irritation.
Suspected of causing cancer.
Toxic to aquatic life.
Harmful to aquatic life with long lasting effects.

Prevention :

Keep container tightly closed.
Keep away from ignition sources such as heat/sparks/open flame - No smoking.
Use only outdoors or in a well-ventilated area.
Do not breathe dust/fume/gas/mist/vapors/spray.
Wash thoroughly after handling.
Wear protective gloves and eye/face protection.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Take precautionary measures against static discharge.
Use only non-sparking tools.
Avoid release to the environment.

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Collect spillage.

Response :

IN CASE OF FIRE use as specified for extinction.
IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation or rash occurs, seek medical advice/attention.
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists, get medical advice/attention.
If exposed or concerned: Get medical attention/advice.
Get medical attention/advice if you feel unwell.

Storage :

Store in cool/well-ventilated place.
Store locked up.

Disposal :

Dispose of contents/container in accordance with local/regional/national/international regulation.

Section 3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Ingredient name</u>	<u>Percentage</u>	<u>CAS number</u>	<u>EINECS number</u>
3-Methyl-3-methoxy-1-butanol	23 ~ 27	56539-66-3	260-252-4
C.I.Pigment White 6	22 ~ 26	13463-67-7	215-168-2
Acrylic resin	17 ~ 21	Confidential	—
3-Methoxybutyl acetate	16 ~ 20	4435-53-4	224-644-9
2-{2-[2-Methoxy(methyl)ethoxy](methyl)ethoxy}(methyl)ethanol	6 ~ 8	25498-49-1	247-045-4
Kerosene	4 ~ 6	8008-20-6	232-366-4
Silica	1 ~ 3	7631-86-9	231-545-4

Section 4. FIRST AID MEASURES

Ingestion : Do not induce vomiting. Get medical attention immediately.
Skin : Wash material off the skin with copious amount of soap and water. If irritation exists, get medical attention.
Wash contaminated clothing and decontaminated footwear before reuse.
Eyes : Immediately flush with copious amount of water for at least 15 minutes.
If redness, itching or a burning sensation develops, have eyes examined and treated by medical personnel.
Inhalation : Remove victim to fresh air.
If cough or other respiratory symptoms develops, consult medical personnel.
If not breathing, give artificial respiration, preferably mouth-to-mouth.
If breathing is difficult, give oxygen. Consult medical personnel.

Section 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable extinguishing media: Water fog, foam, dry powder, carbon dioxide
 Unsuitable extinguishing media: Drainage by hose.

Protection against fire and explosion

Keep sources of ignition at a distance. Take measures against the built-up of electrostatic charge.
 Have fire extinguishers standing ready before opening drum.

Special fire fighting protective equipment

During emergency conditions, overexposure to thermal decomposition products may cause health hazard.
 Self-contained breathing apparatus should be worn.

Unusual fire and explosion hazards

When exposed to flame, emits toxic fumes.

Section 6. ACCIDENTAL RELEASE MEASURES

After spillage / leakage / gas leakage

Persons not wearing protective equipment and clothing should be restricted to entering into area of spillage or leakage until cleanup has been completed.

If this material is split or leaked remove all sources of ignition and ventilated area of spill or leak.

Absorb small quantities on paper towels. Evaporate in safe place such as a fume hood. Allow sufficient time for evaporating vapors to completely-clear the hood ductwork. Burn the paper in a suitable location away from combustible materials.

Large quantities can be collected and atomized in suitable combustion chamber.

Section 7. HANDLING AND STORAGE

Storage : Store container in a cool, dry and dark place.

Handling : Use local exhaust ventilations to keep exposures to a minimum.
 Avoid skin and eye contact, and avoid breathing vapor.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure control limits

<u>Ingredient name</u>	<u>ACGIH 2011</u>		
	<u>TLV-TWA</u>	<u>TLV-STEL</u>	<u>OSHA PEL TWA</u>
3-Methyl-3-methoxy-1-butanol	Not established	Not established	Not established
3-Methoxybutyl acetate	Not established	Not established	Not established
2-{2-[2-Methoxy(methyl)ethoxy](methyl)ethoxy}(methyl)ethanol	Not established	Not established	Not established
Kerosene	200 mg/m ³	No data	300 ppm (max.) No data

Technical protective measures

Respiratory protection	: NIOSH-approved respiratory protection for organic gases if needed.
Eye protection	: Protecting glasses or full-face shield.
Protective clothing	: Wear impervious protective clothing including gloves, boots, and coveralls to prevent skin contact.
Industrial hygiene	: Take off contaminated, saturated clothing immediately. Wash hands before work breaks and at the end of working.
Others	: Safety shower and eyewash station near work area.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	: White liquid and ester odor
pH	: Not available
Flash point	: 53°C
Specific gravity	: 1.21 (20°C)
Solubility in water	: Negligible

Section 10. STABILITY AND REACTIVITY

Stability :	: Stable under the normal conditions.
Thermal decomposition	: Not available
Incompatibility	: Strong oxidizer, peroxide.
Hazardous decomposition products	: Hazardous gases and vapors may be released in a fire (such as CO _x , NO _x , and Phosphoric compounds).
Hazardous polymerization	: Will not occur.

Section 11. TOXICOLOGICAL INFORMATION

<u>Ingredient name</u>	<u>Ingestion (RTECS)</u> <u>Oral LD₅₀ (rat)</u>	<u>Inhalation (RTECS)</u>
3-Methyl-3-methoxy-1-butanol	4,300 mg/kg	Not available
3-Methoxybutyl acetate	4,210 mg/kg	Not available
Kerosene	5 g/kg	Not available

Ingestion	: Ingestion of this material can cause symptom of headache, dizziness, nausea, tinnitus, dyspnea, etc.
Skin contact	: This material is to be a primary irritant on human skin, repeated contact can cause irreversible damage to human skin.
Eye contact	: This material can probably cause irritant after contact is made with human eyes.
Inhalation	: Inhalation of this material at high concentrations can cause symptoms similar to those which may be experienced upon ingestion.
Carcinogenicity	
NTP	: Not available
IRAC	: Titanium dioxide 2B.
OSHA	: Not available

Section 12. ECOLOGICAL INFORMATION

Mobility : Not available
 Persistence and degradability : Not available
 Bioaccumulative potential : Not available
 Behavior in savage works : Not available

Section 13. DISPOSAL CONSIDERATIONS

Recover solvents by the proper equipment and dispose the residue in accordance with the local regulations.
 If not regulated, dispose those atomized in a proper combustion chamber.

Section 14. TRANSPORTATION INFORMATION

UN Hazard Class : 3 (Flammable liquid)
 UN No. : 1210
 UN Pack Group : III

Section 15. REGULATORY INFORMATION

<u>Ingredient name</u>	<u>CAS number</u>	<u>TSCA</u>	<u>EINECS number</u>	<u>MITI</u>
3-Methyl-3-methoxy-1-butanol	56539-66-3	listed	260-252-4	2-3079
C.I.Pigment White 6	13463-67-7	listed	215-168-2	1-357
Acrylic resin	Confidential	Confidential	Not applicable	6-589
3-Methoxybutyl acetate	4435-53-4	listed	224-644-9	2-739
2-{2-[2-Methoxy(methyl)ethoxy](methyl)ethoxy}(methyl)ethanol	25498-49-1	listed	247-045-4	2-438
Kerosene	8008-20-6	listed	232-366-4	9-1702
Silica	7631-86-9	listed	231-545-4	1-548

Section 16. OTHER INFORMATION

To the best of our knowledge, the information contained herein is accurate. However, we cannot assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist.

END

MATERIAL SAFETY DATA SHEET

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Issued : April 11, 2012

Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name :	NIKKALITE® PROCESS COLOR N3503 BLACK	<u>HMIS Codes</u>	
Manufacture :	NIPPON CARBIDE INDUSTRIES CO., INC.	HEALTH :	0
Address :	2-11-19, Konan, Minato-ku, Tokyo 108-8466, Japan	FLAMMABILITY :	0
Telephone No. :	+81-3-5462-8225, Fax No.+81-3-5462-8271	REACTIVITY :	0
Emergency Tel. No. :	+81-3-5462-8206 (Retroreflective Materials Business Unit)		
Recommended use of the product and restrictions on use :	For Retroreflective Materials		

Section 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable Liquid Category 3
Acute Toxicity (Inhalation; Vapors) Category 4
Skin Corrosion / Irritation Category 3
Carcinogenicity Category 2
Reproductive Toxicity Category 1A
Specific Target Organ Systemic Toxicity Single Exposure Category 1
Specific Target Organ Systemic Toxicity Repeated Exposure Category 1
Hazardous to the Aquatic Environment (Acute) Category 2

GHS Label Elements

Symbols / Pictograms :



Signal word : Danger

Hazard statement :

Flammable liquid and vapour.
Harmful if inhaled.
Causes mild skin irritation.
Suspected of causing cancer.
May damage fertility or the unborn child.
Causes damage to organs (central nervous system and nervous system)
Causes damage to organs (central nervous system, kidney, nervous system, liver and lung) through prolonged or repeated exposure.
Toxic to aquatic life.

Prevention :

Keep container tightly closed.
 Keep away from ignition sources such as heat/sparks/open flame - No smoking.
 Use only outdoors or in a well-ventilated area.
 Do not breathe dust/fume/gas/mist/vapors/spray.
 Wash thoroughly after handling.
 Wear protective gloves and eye/face protection.
 Ground/bond container and receiving equipment.
 Use explosion-proof electrical/ventilating/lighting equipment.
 Take precautionary measures against static discharge.
 Use only non-sparking tools.
 Avoid release to the environment.
 Obtain special instructions before use.
 Do not handle until all safety precautions have been read and understood.
 Collect spillage.

Response :

IN CASE OF FIRE use as specified for extinction.
 IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
 If skin irritation or rash occurs, seek medical advice/attention.
 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
 Call a POISON CENTER or doctor/physician if you feel unwell.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 If eye irritation persists, get medical advice/attention.
 If exposed or concerned: Get medical attention/advice.
 Get medical attention/advice if you feel unwell.

Storage :

Store in cool/well-ventilated place.
 Store locked up.

Disposal :

Dispose of contents/container in accordance with local/regional/national/international regulation.

Section 3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Ingredient name</u>	<u>Percentage</u>	<u>CAS number</u>	<u>EINECS number</u>
3-Methoxybutyl acetate	29 ~ 33	4435-53-4	224-644-9
3-Methyl-3-methoxy-1-butanol	25 ~ 29	56539-66-3	260-252-4
Acrylic resin	24 ~ 28	Confidential	—
Kerosene	6 ~ 8	8008-20-6	232-366-4
Carbon Black	2 ~ 4	1333-86-4	215-609-9
Toluene	2 ~ 4	108-88-3	203-625-9
Methyl isobutyl ketone	2 ~ 4	108-10-1	203-550-1
Acetic acid ethenyl ester, polymer with chloroethene and ethenol	1 ~ 3	25086-48-0	—
1,2,4- Trimethylbenzene (in the Kerosene)	< 1	95-63-6	202-436-9

Section 4. FIRST AID MEASURES

- Ingestion : Do not induce vomiting. Get medical attention immediately.
- Skin : Wash material off the skin with copious amount of soap and water. If irritation exists, get medical attention.
Wash contaminated clothing and decontaminated footwear before reuse.
- Eyes : Immediately flush with copious amount of water for at least 15 minutes.
If redness, itching or a burning sensation develops, have eyes examined and treated by medical personnel.
- Inhalation : Remove victim to fresh air.
If cough or other respiratory symptoms develops, consult medical personnel.
If not breathing, give artificial respiration, preferably mouth-to-mouth.
If breathing is difficult, give oxygen. Consult medical personnel.

Section 5. FIRE-FIGHTING MEASURES

Extinguishing Media

- Suitable extinguishing media: Water fog, foam, dry powder, carbon dioxide
- Unsuitable extinguishing media: Drainage by hose.

Protection against fire and explosion

- Keep sources of ignition at a distance. Take measures against the built-up of electrostatic charge.
Have fire extinguishers standing ready before opening drum.

Special fire fighting protective equipment

- During emergency conditions, overexposure to thermal decomposition products may cause health hazard.
Self-contained breathing apparatus should be worn.

Unusual fire and explosion hazards

- When exposed to flame, emits toxic fumes.

Section 6. ACCIDENTAL RELEASE MEASURES

After spillage / leakage / gas leakage

- Persons not wearing protective equipment and clothing should be restricted to entering into area of spillage or leakage until cleanup has been completed.
If this material is split or leaked remove all sources of ignition and ventilated area of spill or leak.
Absorb small quantities on paper towels. Evaporate in safe place such as a fume hood. Allow sufficient time for evaporating vapors to completely-clear the hood ductwork. Burn the paper in a suitable location away from combustible materials.
Large quantities can be collected and atomized in suitable combustion chamber.

Section 7. HANDLING AND STORAGE

- Storage : Store container in a cool, dry and dark place.
- Handling : Use local exhaust ventilations to keep exposures to a minimum.
Avoid skin and eye contact, and avoid breathing vapor.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure control limits

<u>Ingredient name</u>	<u>ACGIH 2011</u>		
	<u>TLV-TWA</u>	<u>TLV-STEL</u>	<u>OSHA PEL TWA</u>
3-Methoxybutyl acetate	Not established	Not established	Not established
3-Methyl-3-methoxy-1-butanol	Not established	Not established	Not established
Kerosene	200 mg/m ³	No data	No data
Toluene	20 ppm	No data	200 ppm 300 ppm (max.)
Methyl isobutyl ketone	50 ppm	75 ppm	100 ppm
4-Ethane-1-yl-1,2-dimethylbenzene	No data	No data	No data
1,2,4- Trimethylbenzene	No data	No data	No data

Technical protective measures

Respiratory protection	: NIOSH-approved respiratory protection for organic gases if needed.
Eye protection	: Protecting glasses or full-face shield.
Protective clothing	: Wear impervious protective clothing including gloves, boots, and coveralls to prevent skin contact.
Industrial hygiene	: Take off contaminated, saturated clothing immediately. Wash hands before work breaks and at the end of working.
Others	: Safety shower and eyewash station near work area.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	: Black liquid and ester odor
pH	: Not available
Flash point	: 45°C
Specific gravity	: 0.98 (20°C)
Solubility in water	: Negligible

Section 10. STABILITY AND REACTIVITY

Stability :	: Stable under the normal conditions.
Thermal decomposition	: Not available
Incompatibility	: Strong oxidizer, peroxide.
Hazardous decomposition products	: Hazardous gases and vapors may be released in a fire (such as COx, NOx, and Phosphoric compounds).
Hazardous polymerization	: Will not occur.

Section 11. TOXICOLOGICAL INFORMATION

<u>Ingredient name</u>	<u>Ingestion (RTECS)</u> <u>Oral LD₅₀ (rat)</u>	<u>Inhalation (RTECS)</u>
3-Methoxybutyl acetate	4,210 mg/kg	Not available
3-Methyl-3-methoxy-1-butanol	4,300 mg/kg	Not available
Kerosene	5 g/kg	Not available
Toluene	636 mg/kg	TCLo 200 ppm (human)
Methyl isobutyl ketone	2,080 mg/kg	LC ₅₀ 100 mg/m ³ (rat)
1,2,4- Trimethylbenzene	5 g/kg	Not available

Ingestion	: Ingestion of this material can cause symptom of headache, dizziness, nausea, tinnitus, dyspnea, etc.
Skin contact	: This material is to be a primary irritant on human skin, repeated contact can cause irreversible damage to human skin.
Eye contact	: This material can probably cause irritant after contact is made with human eyes.
Inhalation	: Inhalation of this material at high concentrations can cause symptoms similar to those which may be experienced upon ingestion.
Carcinogenicity	
NTP	: Not available
IRAC	: Methyl isobutyl ketone 2B, Toluene 3, Carbon black 2B.
OSHA	: Not available

Section 12. ECOLOGICAL INFORMATION

Mobility	: Not available
Persistence and degradability	: Not available
Bioaccumulative potential	: Not available
Behavior in savage works	: Not available

Section 13. DISPOSAL CONSIDERATIONS

Recover solvents by the proper equipment and dispose the residue in accordance with the local regulations. If not regulated, dispose those atomized in a proper combustion chamber.

Section 14. TRANSPORTATION INFORMATION

UN Hazard Class	: 3 (Flammable liquid)
UN No.	: 1210
UN Pack Group	: III

Section 15. REGULATORY INFORMATION

<u>Ingredient name</u>	<u>CAS number</u>	<u>TSCA</u>	<u>EINECS number</u>	<u>MITI</u>
3-Methoxybutyl acetate	4435-53-4	listed	224-644-9	2-739
3-Methyl-3-methoxy-1-butanol	56539-66-3	listed	260-252-4	2-3079
Acrylic resin	Confidential	Confidential	Not applicable	6-589
Kerosene	8008-20-6	listed	232-366-4	9-1702
Carbon Black	1333-86-4	listed	215-609-9	Not available
Toluene	108-88-3	listed	203-625-9	3-2
Methyl isobutyl ketene	108-10-1	listed	203-550-1	2-542
Acetic acid ethenyl ester, polymer with chloroethene and ethenol	25086-48-0	listed	Not applicable	6-92
1,2,4- Trimethylbenzene	95-63-6	listed	202-436-9	3-7

Section 16. OTHER INFORMATION

To the best of our knowledge, the information contained herein is accurate. However, we cannot assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist.

END

MATERIAL SAFETY DATA SHEET

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Issued : March 19, 2012

Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name :	NIKKALITE® PROCESS COLOR N3504 YELLOW	<u>HMIS Codes</u>	
Manufacture :	NIPPON CARBIDE INDUSTRIES CO., INC.	HEALTH :	0
Address :	2-11-19, Konan, Minato-ku, Tokyo 108-8466, Japan	FLAMMABILITY :	0
Telephone No. :	+81-3-5462-8225, Fax No.+81-3-5462-8271	REACTIVITY :	0
Emergency Tel. No. :	+81-3-5462-8206 (Retroreflective Materials Business Unit)		
Recommended use of the product and restrictions on use :	For Retroreflective Materials		

Section 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable Liquid Category 3
Acute Toxicity (Inhalation; Vapors) Category 4
Skin Corrosion / Irritation Category 3
Skin Sensitization Category 1
Carcinogenicity Category 2
Reproductive Toxicity Category 1A
Specific Target Organ Systemic Toxicity Single Exposure Category 1
Specific Target Organ Systemic Toxicity Repeated Exposure Category 1
Hazardous to the Aquatic Environment (Acute) Category 2
Hazardous to the Aquatic Environment (Chronic) Category 3

GHS Label Elements

Symbols / Pictograms :



Signal word : Danger

Hazard statement :

Flammable liquid and vapour.
Harmful if inhaled.
Causes mild skin irritation.
May cause an allergy skin reaction.
Suspected of causing cancer.
May damage fertility or the unborn child.
Causes damage to organs (blood, respiratory tract, eye, central nervous system and nervous system).
Causes damage to organs (respiratory organ, blood, eye, central nervous system, kidney, nervous system and liver) through prolonged or repeated exposure.
May cause damage to organs (skin, central nervous system, nervous system, respiratory organ and blood) through prolonged or repeated exposure.
Toxic to aquatic life.
Harmful to aquatic life with long lasting effects.

Prevention :

Keep container tightly closed.
 Keep away from ignition sources such as heat/sparks/open flame - No smoking.
 Use only outdoors or in a well-ventilated area.
 Do not breathe dust/fume/gas/mist/vapors/spray.
 Wash thoroughly after handling.
 Wear protective gloves and eye/face protection.
 Ground/bond container and receiving equipment.
 Use explosion-proof electrical/ventilating/lighting equipment.
 Take precautionary measures against static discharge.
 Use only non-sparking tools.
 Avoid release to the environment.
 Obtain special instructions before use.
 Do not handle until all safety precautions have been read and understood.
 Collect spillage.

Response :

IN CASE OF FIRE use as specified for extinction.
 IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
 If skin irritation or rash occurs, seek medical advice/attention.
 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
 Call a POISON CENTER or doctor/physician if you feel unwell.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 If eye irritation persists, get medical advice/attention.
 If exposed or concerned: Get medical attention/advice.
 Get medical attention/advice if you feel unwell.

Storage :

Store in cool/well-ventilated place.
 Store locked up.

Disposal :

Dispose of contents/container in accordance with local/regional/national/international regulation.

Section 3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Ingredient name</u>	<u>Percentage</u>	<u>CAS number</u>	<u>EINECS number</u>
3-Methoxybutyl acetate	29 ~ 33	4435-53-4	224-644-9
3-Methyl-3-methoxy-1-butanol	19 ~ 23	56539-66-3	260-252-4
Acrylic resin	19 ~ 23	Confidential	—
Solvent naphtha (petroleum), heavy aromatic	10 ~ 14	64742-94-5	265-198-5
4-Ethane-1-yl-1,2-dimethylbenzene (in the Solvent naphtha (petroleum), heavy aromatic)	4 ~ 6	934-80-5	213-293-7
Methyl isobutyl ketone	4 ~ 6	108-10-1	203-550-1
Acetic acid ethenyl ester, polymer with chloroethene and ethenol	3 ~ 5	25086-48-0	—
C. I. Pigment Yellow 110 ※	2 ~ 4	5590-18-1	226-999-5
Toluene	2 ~ 4	108-88-3	203-625-9

Naphthalene (in the Solvent naphtha (petroleum), heavy aromatic)	1 ~ 3	91-20-3	202-049-5
Trimethylbenzene (in the Solvent naphtha (petroleum), heavy aromatic)	1 ~ 3	25551-13-7	247-099-9

※Hexachlorobenzene included(<10ppm;CAS:118-74-1)
(The chemicals in Annex III to the Rotterdam Convention.)

Section 4. FIRST AID MEASURES

- Ingestion** : Do not induce vomiting. Get medical attention immediately.
- Skin** : Wash material off the skin with copious amount of soap and water. If irritation exists, get medical attention.
Wash contaminated clothing and decontaminated footwear before reuse.
- Eyes** : Immediately flush with copious amount of water for at least 15 minutes.
If redness, itching or a burning sensation develops, have eyes examined and treated by medical personnel.
- Inhalation** : Remove victim to fresh air.
If cough or other respiratory symptoms develops, consult medical personnel.
If not breathing, give artificial respiration, preferably mouth-to-mouth.
If breathing is difficult, give oxygen. Consult medical personnel.

Section 5. FIRE-FIGHTING MEASURES

Extinguishing Media

- Suitable extinguishing media: Water fog, foam, dry powder, carbon dioxide
Unsuitable extinguishing media: Drainage by hose.

Protection against fire and explosion

- Keep sources of ignition at a distance. Take measures against the built-up of electrostatic charge.
Have fire extinguishers standing ready before opening drum.

Special fire fighting protective equipment

- During emergency conditions, overexposure to thermal decomposition products may cause health hazard.
Self-contained breathing apparatus should be worn.

Unusual fire and explosion hazards

- When exposed to flame, emits toxic fumes.

Section 6. ACCIDENTAL RELEASE MEASURES

After spillage / leakage / gas leakage

- Persons not wearing protective equipment and clothing should be restricted to entering into area of spillage or leakage until cleanup has been completed.
If this material is split or leaked remove all sources of ignition and ventilated area of spill or leak.
Absorb small quantities on paper towels. Evaporate in safe place such as a fume hood. Allow sufficient time for evaporating vapors to completely-clear the hood ductwork. Burn the paper in a suitable location away from combustible materials.
Large quantities can be collected and atomized in suitable combustion chamber.

Section 7. HANDLING AND STORAGE

- Storage : Store container in a cool, dry and dark place.
 Handling : Use local exhaust ventilations to keep exposures to a minimum.
 Avoid skin and eye contact, and avoid breathing vapor.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure control limits

Ingredient name	ACGIH 2011		
	TLV-TWA	TLV-STEL	OSHA PEL TWA
3-Methoxybutyl acetate	Not established	Not established	Not established
3-Methyl-3-methoxy-1-butanol	Not established	Not established	Not established
Solvent naphtha (petroleum), heavy aromatic	No data	No data	No data
4-Ethane-1-yl-1,2-dimethylbenzene	No data	No data	No data
Methyl isobutyl ketone	50 ppm	75 ppm	100 ppm
Toluene	20 ppm	No data	200 ppm 300 ppm (max.)
Naphthalene	10 ppm	15 ppm	10 ppm
Trimethylbenzene	25 ppm	No data	No data

Technical protective measures

- Respiratory protection : NIOSH-approved respiratory protection for organic gases if needed.
 Eye protection : Protecting glasses or full-face shield.
 Protective clothing : Wear impervious protective clothing including gloves, boots, and coveralls to prevent skin contact.
 Industrial hygiene : Take off contaminated, saturated clothing immediately. Wash hands before work breaks and at the end of working.
 Others : Safety shower and eyewash station near work area.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance and Odor : Yellow liquid and ester odor
 pH : Not available
 Flash point : 52°C
 Specific gravity : 1.00 (20°C)
 Solubility in water : Negligible

Section 10. STABILITY AND REACTIVITY

- Stability : Stable under the normal conditions.
 Thermal decomposition : Not available
 Incompatibility : Strong oxidizer, peroxide.
 Hazardous decomposition products : Hazardous gases and vapors may be released in a fire (such as COx, NOx, and Phosphoric compounds).
 Hazardous polymerization : Will not occur.

Section 11. TOXICOLOGICAL INFORMATION

Ingredient name	Ingestion (RTECS)	Inhalation (RTECS)
	Oral LD ₅₀ (rat)	
3-Methoxybutyl acetate	4,210 mg/kg	Not available
3-Methyl-3-methoxy-1-butanol	4,300 mg/kg	Not available
4-Ethane-1-yl-1,2-dimethylbenzene	5,000 mg/kg	Not available
Methyl isobutyl ketone	2,080 mg/kg	LC ₅₀ 100 mg/m ³ (rat)
Toluene	636 mg/kg	TCLo 200 ppm (human)
Naphthalene	490 mg/kg	LD ₅₀ > 20 μg
Trimethylbenzene	8,970 mg/kg	Not available

Ingestion	: Ingestion of this material can cause symptom of headache, dizziness, nausea, tinnitus, dyspnea, etc.
Skin contact	: This material is to be a primary irritant on human skin, repeated contact can cause irreversible damage to human skin.
Eye contact	: This material can probably cause irritant after contact is made with human eyes.
Inhalation	: Inhalation of this material at high concentrations can cause symptoms similar to those which may be experienced upon ingestion.
Carcinogenicity	
NTP	: Not available
IRAC	: Methyl isobutyl ketone 2B, Toluene 3, Naphthalene 2B.
OSHA	: Not available

Section 12. ECOLOGICAL INFORMATION

Mobility	: Not available
Persistence and degradability	: Not available
Bioaccumulative potential	: Not available
Behavior in savage works	: Not available

Section 13. DISPOSAL CONSIDERATIONS

Recover solvents by the proper equipment and dispose the residue in accordance with the local regulations. If not regulated, dispose those atomized in a proper combustion chamber.

Section 14. TRANSPORTATION INFORMATION

UN Hazard Class	: 3 (Flammable liquid)
UN No.	: 1210
UN Pack Group	: III

Section 15. REGULATORY INFORMATION

<u>Ingredient name</u>	<u>CAS number</u>	<u>TSCA</u>	<u>EINECS number</u>	<u>MITI</u>
3-Methoxybutyl acetate	4435-53-4	listed	224-644-9	2-739
3-Methyl-3-methoxy-1-butanol	56539-66-3	listed	260-252-4	2-3079
Acrylic resin	Confidential	Confidential	Not applicable	6-589
Solvent naphtha (petroleum), heavy aromatic	64742-94-5	listed	265-198-5	9-2578
4-Ethane-1-yl-1,2-dimethylbenzene	934-80-5	listed	213-293-7	3-3427
Methyl isobutyl ketene	108-10-1	listed	203-550-1	2-542
Acetic acid ethenyl ester, polymer with chloroethene and ethenol	25086-48-0	listed	Not applicable	6-92
C. I. Pigment Yellow 110	5590-18-1	listed	226-999-5	5-3185
Toluene	108-88-3	listed	203-625-9	3-2
Naphthalene	91-20-3	listed	202-049-5	4-311
Trimethylbenzene	25551-13-7	listed	247-099-9	3-7

Section 16. OTHER INFORMATION

To the best of our knowledge, the information contained herein is accurate. However, we cannot assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist.

END

MATERIAL SAFETY DATA SHEET

Page 1 of 6

Issued : March 27, 2012

Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name :	NIKKALITE® PROCESS COLOR N3506 BLUE	<u>HMIS Codes</u>	
Manufacture :	NIPPON CARBIDE INDUSTRIES CO., INC.	HEALTH :	0
Address :	2-11-19, Konan, Minato-ku, Tokyo 108-8466, Japan	FLAMMABILITY :	0
Telephone No. :	+81-3-5462-8225, Fax No.+81-3-5462-8271	REACTIVITY :	0
Emergency Tel. No. :	+81-3-5462-8206 (Retroreflective Materials Business Unit)		
Recommended use of the product and restrictions on use :	For Retroreflective Materials		

Section 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable Liquid Category 3
Acute Toxicity (Inhalation; Vapors) Category 4
Skin Corrosion / Irritation Category 2
Skin Sensitization Category 1
Carcinogenicity Category 2
Reproductive Toxicity Category 1A
Specific Target Organ Systemic Toxicity Single Exposure Category 1
Specific Target Organ Systemic Toxicity Repeated Exposure Category 1
Hazardous to the Aquatic Environment (Acute) Category 2
Hazardous to the Aquatic Environment (Chronic) Category 3

GHS Label Elements

Symbols / Pictograms :



Signal word : Danger

Hazard statement :

Flammable liquid and vapour.
Harmful if inhaled.
Causes skin irritation.
May cause an allergy skin reaction.
Suspected of causing cancer.
May damage fertility or the unborn child.
Causes damage to organs (central nervous system and nervous system)
Cause damage to organs (central nervous system, kidney, nervous system and liver) through prolonged or repeated exposure.
Toxic to aquatic life.
Harmful to aquatic life with long lasting effects.

Prevention :

- Keep container tightly closed.
- Keep away from ignition sources such as heat/sparks/open flame - No smoking.
- Use only outdoors or in a well-ventilated area.
- Do not breathe dust/fume/gas/mist/vapors/spray.
- Wash thoroughly after handling.
- Wear protective gloves and eye/face protection.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting equipment.
- Take precautionary measures against static discharge.
- Use only non-sparking tools.
- Avoid release to the environment.
- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Collect spillage.

Response :

- IN CASE OF FIRE use as specified for extinction.
- IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- If skin irritation or rash occurs, seek medical advice/attention.
- IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- If eye irritation persists, get medical advice/attention.
- If exposed or concerned: Get medical attention/advice.
- Get medical attention/advice if you feel unwell.

Storage :

- Store in cool/well-ventilated place.
- Store locked up.

Disposal :

- Dispose of contents/container in accordance with local/regional/national/international regulation.

Section 3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Ingredient name</u>	<u>Percentage</u>	<u>CAS number</u>	<u>EINECS number</u>
3-Methoxybutyl acetate	24 ~ 28	4435-53-4	224-644-9
3-Methyl-3-methoxy-1-butanol	19 ~ 23	56539-66-3	260-252-4
Acrylic resin	19 ~ 23	Confidential	—
Solvent naphtha (petroleum), heavy aromatic	8 ~ 10	64742-94-5	265-198-5
Kerosene	6 ~ 8	8008-20-6	232-366-4
C. I. Pigment Blue 15	4 ~ 6	147-14-8	205-685-1
4-Ethane-1-yl-1,2-dimethylbenzene (in the Solvent naphtha (petroleum), heavy aromatic)	3 ~ 5	934-80-5	213-293-7
Acetic acid ethenyl ester, polymer with chloroethene and ethenol	3 ~ 5	25086-48-0	—
Methyl isobutyl ketone	3 ~ 5	108-10-1	203-550-1
Toluene	2 ~ 4	108-88-3	203-625-9
Naphthalene (in the Solvent naphtha (petroleum), heavy aromatic)	< 1	91-20-3	202-049-5

1,2,4- Trimethylbenzene (in the Kerosene)	< 1	95-63-6	202-436-9
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Section 4. FIRST AID MEASURES

- Ingestion : Do not induce vomiting. Get medical attention immediately.
- Skin : Wash material off the skin with copious amount of soap and water. If irritation exists, get medical attention.
Wash contaminated clothing and decontaminated footwear before reuse.
- Eyes : Immediately flush with copious amount of water for at least 15 minutes.
If redness, itching or a burning sensation develops, have eyes examined and treated by medical personnel.
- Inhalation : Remove victim to fresh air.
If cough or other respiratory symptoms develops, consult medical personnel.
If not breathing, give artificial respiration, preferably mouth-to-mouth.
If breathing is difficult, give oxygen. Consult medical personnel.

Section 5. FIRE-FIGHTING MEASURES

Extinguishing Media

- Suitable extinguishing media: Water fog, foam, dry powder, carbon dioxide
- Unsuitable extinguishing media: Drainage by hose.

Protection against fire and explosion

- Keep sources of ignition at a distance. Take measures against the built-up of electrostatic charge.
Have fire extinguishers standing ready before opening drum.

Special fire fighting protective equipment

- During emergency conditions, overexposure to thermal decomposition products may cause health hazard.
Self-contained breathing apparatus should be worn.

Unusual fire and explosion hazards

- When exposed to flame, emits toxic fumes.

Section 6. ACCIDENTAL RELEASE MEASURES

After spillage / leakage / gas leakage

- Persons not wearing protective equipment and clothing should be restricted to entering into area of spillage or leakage until cleanup has been completed.
If this material is split or leaked remove all sources of ignition and ventilated area of spill or leak.
Absorb small quantities on paper towels. Evaporate in safe place such as a fume hood. Allow sufficient time for evaporating vapors to completely-clear the hood ductwork. Burn the paper in a suitable location away from combustible materials.
Large quantities can be collected and atomized in suitable combustion chamber.

Section 7. HANDLING AND STORAGE

- Storage : Store container in a cool, dry and dark place.
- Handling : Use local exhaust ventilations to keep exposures to a minimum.
Avoid skin and eye contact, and avoid breathing vapor.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure control limits

<u>Ingredient name</u>	<u>ACGIH 2011</u>		
	<u>TLV-TWA</u>	<u>TLV-STEL</u>	<u>OSHA PEL TWA</u>
3-Methoxybutyl acetate	Not established	Not established	Not established
3-Methyl-3-methoxy-1-butanol	Not established	Not established	Not established
Solvent naphtha (petroleum), heavy aromatic	No data	No data	No data
Kerosene	200 mg/m ³	No data	No data
4-Ethane-1-yl-1,2-dimethylbenzene	No data	No data	No data
Methyl isobutyl ketone	50 ppm	75 ppm	100 ppm
Toluene	20 ppm	No data	200 ppm 300 ppm (max.)
Naphthalene	10 ppm	15 ppm	10 ppm
1,2,4- Trimethylbenzene	No data	No data	No data

Technical protective measures

Respiratory protection	: NIOSH-approved respiratory protection for organic gases if needed.
Eye protection	: Protecting glasses or full-face shield.
Protective clothing	: Wear impervious protective clothing including gloves, boots, and coveralls to prevent skin contact.
Industrial hygiene	: Take off contaminated, saturated clothing immediately. Wash hands before work breaks and at the end of working.
Others	: Safety shower and eyewash station near work area.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	: Blue liquid and ester odor
pH	: Not available
Flash point	: 51°C
Specific gravity	: 0.98 (20°C)
Solubility in water	: Negligible

Section 10. STABILITY AND REACTIVITY

Stability :	: Stable under the normal conditions.
Thermal decomposition	: Not available
Incompatibility	: Strong oxidizer, peroxide.
Hazardous decomposition products	: Hazardous gases and vapors may be released in a fire (such as CO _x , NO _x , and Phosphoric compounds).
Hazardous polymerization	: Will not occur.

Section 11. TOXICOLOGICAL INFORMATION

<u>Ingredient name</u>	<u>Ingestion (RTECS) Oral LD₅₀ (rat)</u>	<u>Inhalation (RTECS)</u>
3-Methoxybutyl acetate	4,210 mg/kg	Not available
3-Methyl-3-methoxy-1-butanol	4,300 mg/kg	Not available
4-Ethane-1-yl-1,2-dimethylbenzene	5,000 mg/kg	Not available
Methyl isobutyl ketone	2,080 mg/kg	LC ₅₀ 100 mg/m ³ (rat)
Toluene	636 mg/kg	TCLo 200 ppm (human)
Naphthalene	490 mg/kg	LD ₅₀ > 20 μg
1,2,4- Trimethylbenzene	5 g/kg	Not available

Ingestion	: Ingestion of this material can cause symptom of headache, dizziness, nausea, tinnitus, dyspnea, etc.
Skin contact	: This material is to be a primary irritant on human skin, repeated contact can cause irreversible damage to human skin.
Eye contact	: This material can probably cause irritant after contact is made with human eyes.
Inhalation	: Inhalation of this material at high concentrations can cause symptoms similar to those which may be experienced upon ingestion.
Carcinogenicity	
NTP	: Not available
IRAC	: Methyl isobutyl ketone 2B, Toluene 3, Naphthalene 2B.
OSHA	: Not available

Section 12. ECOLOGICAL INFORMATION

Mobility	: Not available
Persistence and degradability	: Not available
Bioaccumulative potential	: Not available
Behavior in savage works	: Not available

Section 13. DISPOSAL CONSIDERATIONS

Recover solvents by the proper equipment and dispose the residue in accordance with the local regulations. If not regulated, dispose those atomized in a proper combustion chamber.

Section 14. TRANSPORTATION INFORMATION

UN Hazard Class	: 3 (Flammable liquid)
UN No.	: 1210
UN Pack Group	: III

Section 15. REGULATORY INFORMATION

<u>Ingredient name</u>	<u>CAS number</u>	<u>TSCA</u>	<u>EINECS number</u>	<u>MITI</u>
3-Methoxybutyl acetate	4435-53-4	listed	224-644-9	2-739
3-Methyl-3-methoxy-1-butanol	56539-66-3	listed	260-252-4	2-3079
Acrylic resin	Confidential	Confidential	Not applicable	6-589
Solvent naphtha (petroleum), heavy aromatic	64742-94-5	listed	265-198-5	9-2578
Kerosene	8008-20-6	listed	232-366-4	9-1702
4-Ethane-1-yl-1,2-dimethylbenzene	934-80-5	listed	213-293-7	3-3427
Methyl isobutyl ketene	108-10-1	listed	203-550-1	2-542
Acetic acid ethenyl ester, polymer with chloroethene and ethenol	25086-48-0	listed	Not applicable	6-92
C. I. Pigment Blue 15	147-14-8	listed	2005-685-1	5-3299
Toluene	108-88-3	listed	203-625-9	3-2
Naphthalene	91-20-3	listed	202-049-5	4-311
1,2,4- Trimethylbenzene	95-63-6	listed	202-436-9	3-7

Section 16. OTHER INFORMATION

To the best of our knowledge, the information contained herein is accurate. However, we cannot assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist.

END

MATERIAL SAFETY DATA SHEET

Page 1 of 5

Issued : April 12, 2012

Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name :	NIKKALITE® PROCESS COLOR N3512 TONER	<u>HMIS Codes</u>
Manufacture :	NIPPON CARBIDE INDUSTRIES CO., INC.	HEALTH : 0
Address :	2-11-19, Konan, Minato-ku, Tokyo 108-8466, Japan	FLAMMABILITY : 0
Telephone No. :	+81-3-5462-8225, Fax No.+81-3-5462-8271	REACTIVITY : 0
Emergency Tel. No. :	+81-3-5462-8206 (Retroreflective Materials Business Unit)	
Recommended use of the product and restrictions on use :	For Retroreflective Materials	

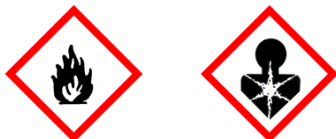
Section 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable Liquid Category 3
Skin Corrosion / Irritation Category 3
Carcinogenicity Category 2
Hazardous to the Aquatic Environment (Acute) Category 2

GHS Label Elements

Symbols / Pictograms :



Signal word : Warning

Hazard statement :

Flammable liquid and vapour.
Causes mild skin irritation.
Suspected of causing cancer.
Toxic to aquatic life.

Prevention :

Keep container tightly closed.
Keep away from ignition sources such as heat/sparks/open flame - No smoking.
Use only outdoors or in a well-ventilated area.
Do not breathe dust/fume/gas/mist/vapors/spray.
Wash thoroughly after handling.
Wear protective gloves and eye/face protection.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Take precautionary measures against static discharge.
Use only non-sparking tools.
Avoid release to the environment.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Collect spillage.

Response :

IN CASE OF FIRE use as specified for extinction.

IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.

If skin irritation or rash occurs, seek medical advice/attention.

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

Call a POISON CENTER or doctor/physician if you feel unwell.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists, get medical advice/attention.

If exposed or concerned: Get medical attention/advice.

Get medical attention/advice if you feel unwell.

Storage :

Store in cool/well-ventilated place.

Store locked up.

Disposal :

Dispose of contents/container in accordance with local/regional/national/international regulation.

Section 3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Ingredient name</u>	<u>Percentage</u>	<u>CAS number</u>	<u>EINECS number</u>
3-Methoxybutyl acetate	36 ~ 40	4435-53-4	224-644-9
Acrylic resin	27 ~ 31	Confidential	—
3-Methyl-3-methoxy-1-butanol	24 ~ 28	56539-66-3	260-252-4
Kerosene	6 ~ 8	8008-20-6	232-366-4
Carbon TONER	2 ~ 4	1333-86-4	215-609-9
1,2,4- Trimethylbenzene (in the Kerosene)	< 1	95-63-6	202-436-9

Section 4. FIRST AID MEASURES

Ingestion : Do not induce vomiting. Get medical attention immediately.

Skin : Wash material off the skin with copious amount of soap and water. If irritation exists, get medical attention.

Wash contaminated clothing and decontaminated footwear before reuse.

Eyes : Immediately flush with copious amount of water for at least 15 minutes.

If redness, itching or a burning sensation develops, have eyes examined and treated by medical personnel.

Inhalation : Remove victim to fresh air.

If cough or other respiratory symptoms develops, consult medical personnel.

If not breathing, give artificial respiration, preferably mouth-to-mouth.

If breathing is difficult, give oxygen. Consult medical personnel.

Section 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable extinguishing media:

Water fog, foam, dry powder, carbon dioxide

Unsuitable extinguishing media:

Drainage by hose.

Protection against fire and explosion

Keep sources of ignition at a distance. Take measures against the built-up of electrostatic charge.

Have fire extinguishers standing ready before opening drum.

Special fire fighting protective equipment

During emergency conditions, overexposure to thermal decomposition products may cause health hazard. Self-contained breathing apparatus should be worn.

Unusual fire and explosion hazards

When exposed to flame, emits toxic fumes.

Section 6. ACCIDENTAL RELEASE MEASURESAfter spillage / leakage / gas leakage

Persons not wearing protective equipment and clothing should be restricted to entering into area of spillage or leakage until cleanup has been completed.

If this material is split or leaked remove all sources of ignition and ventilated area of spill or leak.

Absorb small quantities on paper towels. Evaporate in safe place such as a fume hood. Allow sufficient time for evaporating vapors to completely-clear the hood ductwork. Burn the paper in a suitable location away from combustible materials.

Large quantities can be collected and atomized in suitable combustion chamber.

Section 7. HANDLING AND STORAGE

Storage : Store container in a cool, dry and dark place.

Handling : Use local exhaust ventilations to keep exposures to a minimum.
Avoid skin and eye contact, and avoid breathing vapor.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTIONExposure control limits

<u>Ingredient name</u>	<u>ACGIH 2011</u>		
	<u>TLV-TWA</u>	<u>TLV-STEL</u>	<u>OSHA PEL TWA</u>
3-Methoxybutyl acetate	Not established	Not established	Not established
3-Methyl-3-methoxy-1-butanol	Not established	Not established	Not established
Kerosene	200 mg/m ³	No data	No data
1,2,4- Trimethylbenzene	No data	No data	No data

Technical protective measures

Respiratory protection : NIOSH-approved respiratory protection for organic gases if needed.

Eye protection : Protecting glasses or full-face shield.

Protective clothing : Wear impervious protective clothing including gloves, boots, and coveralls to prevent skin contact.

Industrial hygiene : Take off contaminated, saturated clothing immediately. Wash hands before work breaks and at the end of working.

Others : Safety shower and eyewash station near work area.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor : Slightly cloudy liquid and ester odor
pH : Not available
Flash point : 53°C
Specific gravity : 0.90 (20°C)
Solubility in water : Negligible

Section 10. STABILITY AND REACTIVITY

Stability :	: Stable under the normal conditions.
Thermal decomposition	: Not available
Incompatibility	: Strong oxidizer, peroxide.
Hazardous decomposition products	: Hazardous gases and vapors may be released in a fire (such as COx, NOx, and Phosphoric compounds).
Hazardous polymerization	: Will not occur.

Section 11. TOXICOLOGICAL INFORMATION

<u>Ingredient name</u>	<u>Ingestion (RTECS) Oral LD₅₀ (rat)</u>	<u>Inhalation (RTECS)</u>
3-Methoxybutyl acetate	4,210 mg/kg	Not available
3-Methyl-3-methoxy-1-butanol	4,300 mg/kg	Not available
Kerosene	5 g/kg	Not available
1,2,4- Trimethylbenzene	5 g/kg	Not available

Ingestion	: Ingestion of this material can cause symptom of headache, dizziness, nausea, tinnitus, dyspnea, etc.
Skin contact	: This material is to be a primary irritant on human skin, repeated contact can cause irreversible damage to human skin.
Eye contact	: This material can probably cause irritant after contact is made with human eyes.
Inhalation	: Inhalation of this material at high concentrations can cause symptoms similar to those which may be experienced upon ingestion.
Carcinogenicity	
NTP	: Not available
IRAC	: Not available
OSHA	: Not available

Section 12. ECOLOGICAL INFORMATION

Mobility	: Not available
Persistence and degradability	: Not available
Bioaccumulative potential	: Not available
Behavior in savage works	: Not available

Section 13. DISPOSAL CONSIDERATIONS

Recover solvents by the proper equipment and dispose the residue in accordance with the local regulations. If not regulated, dispose those atomized in a proper combustion chamber.

Section 14. TRANSPORTATION INFORMATION

UN Hazard Class	: 3 (Flammable liquid)
UN No.	: 1210
UN Pack Group	: III

Section 15. REGULATORY INFORMATION

<u>Ingredient name</u>	<u>CAS number</u>	<u>TSCA</u>	<u>EINECS number</u>	<u>MITI</u>
3-Methoxybutyl acetate	4435-53-4	listed	224-644-9	2-739
Acrylic resin	Confidential	Confidential	Not applicable	6-589
3-Methyl-3-methoxy-1-butanol	56539-66-3	listed	260-252-4	2-3079
Kerosene	8008-20-6	listed	232-366-4	9-1702
1,2,4- Trimethylbenzene	95-63-6	listed	202-436-9	3-7

Section 16. OTHER INFORMATION

To the best of our knowledge, the information contained herein is accurate. However, we cannot assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist.

END

MATERIAL SAFETY DATA SHEET

Page 1 of 6

Issued : March 19, 2012

Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name :	NIKKALITE® PROCESS COLOR N3515 RED	<u>HMIS Codes</u>	
Manufacture :	NIPPON CARBIDE INDUSTRIES CO., INC.	HEALTH :	0
Address :	2-11-19, Konan, Minato-ku, Tokyo 108-8466, Japan	FLAMMABILITY :	0
Telephone No. :	+81-3-5462-8225, Fax No.+81-3-5462-8271	REACTIVITY :	0
Emergency Tel. No. :	+81-3-5462-8206 (Retroreflective Materials Business Unit)		
Recommended use of the product and restrictions on use :	For Retroreflective Materials		

Section 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable Liquid Category 3
Acute Toxicity (Inhalation; Vapors) Category 4
Skin Corrosion / Irritation Category 2
Skin Sensitization Category 1
Carcinogenicity Category 2
Reproductive Toxicity Category 1A
Specific Target Organ Systemic Toxicity Single Exposure Category 1
Specific Target Organ Systemic Toxicity Repeated Exposure Category 1
Hazardous to the Aquatic Environment (Acute) Category 2
Hazardous to the Aquatic Environment (Chronic) Category 3

GHS Label Elements

Symbols / Pictograms :



Signal word : Danger

Hazard statement :

Flammable liquid and vapour.
Harmful if inhaled.
Causes skin irritation.
May cause an allergy skin reaction.
Suspected of causing cancer.
May damage fertility or the unborn child.
Causes damage to organs (central nervous system and nervous system)
Causes damage to organs (central nervous system, kidney, nervous system and liver) through prolonged or repeated exposure.
Toxic to aquatic life.
Harmful to aquatic life with long lasting effects.

Prevention :

- Keep container tightly closed.
- Keep away from ignition sources such as heat/sparks/open flame - No smoking.
- Use only outdoors or in a well-ventilated area.
- Do not breathe dust/fume/gas/mist/vapors/spray.
- Wash thoroughly after handling.
- Wear protective gloves and eye/face protection.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting equipment.
- Take precautionary measures against static discharge.
- Use only non-sparking tools.
- Avoid release to the environment.
- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Collect spillage.

Response :

- IN CASE OF FIRE use as specified for extinction.
- IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- If skin irritation or rash occurs, seek medical advice/attention.
- IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- If eye irritation persists, get medical advice/attention.
- If exposed or concerned: Get medical attention/advice.
- Get medical attention/advice if you feel unwell.

Storage :

- Store in cool/well-ventilated place.
- Store locked up.

Disposal :

- Dispose of contents/container in accordance with local/regional/national/international regulation.

Section 3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Ingredient name</u>	<u>Percentage</u>	<u>CAS number</u>	<u>EINECS number</u>
3-Methoxybutyl acetate	27 ~ 31	4435-53-4	224-644-9
3-Methyl-3-methoxy-1-butanol	22 ~ 26	56539-66-3	260-252-4
Acrylic resin	21 ~ 25	Confidential	—
Kerosene	6 ~ 8	8008-20-6	232-366-4
Solvent naphtha (petroleum), heavy aromatic	5 ~ 7	64742-94-5	265-198-5
4-Ethane-1-yl-1,2-dimethylbenzene (in the Solvent naphtha (petroleum), heavy aromatic)	2 ~ 4	934-80-5	213-293-7
Acetic acid ethenyl ester, polymer with chloroethene and ethenol	2 ~ 4	25086-48-0	—
Methyl isobutyl ketone	1 ~ 3	108-10-1	203-550-1
Toluene	1 ~ 3	108-88-3	203-625-9
C. I. Pigment Red 224	1 ~ 3	128-69-8	204-905-3
C. I. Pigment Red 179	1 ~ 3	5521-31-3	226-866-1

Naphthalene (in the Solvent naphtha (petroleum), heavy aromatic)	< 1	91-20-3	202-049-5
1,2,4- Trimethylbenzene (in the Kerosene)	< 1	95-63-6	202-436-9

Section 4. FIRST AID MEASURES

- Ingestion** : Do not induce vomiting. Get medical attention immediately.
- Skin** : Wash material off the skin with copious amount of soap and water. If irritation exists, get medical attention.
Wash contaminated clothing and decontaminated footwear before reuse.
- Eyes** : Immediately flush with copious amount of water for at least 15 minutes.
If redness, itching or a burning sensation develops, have eyes examined and treated by medical personnel.
- Inhalation** : Remove victim to fresh air.
If cough or other respiratory symptoms develops, consult medical personnel.
If not breathing, give artificial respiration, preferably mouth-to-mouth.
If breathing is difficult, give oxygen. Consult medical personnel.

Section 5. FIRE-FIGHTING MEASURES

Extinguishing Media

- Suitable extinguishing media: Water fog, foam, dry powder, carbon dioxide
 Unsuitable extinguishing media: Drainage by hose.

Protection against fire and explosion

- Keep sources of ignition at a distance. Take measures against the built-up of electrostatic charge.
 Have fire extinguishers standing ready before opening drum.

Special fire fighting protective equipment

- During emergency conditions, overexposure to thermal decomposition products may cause health hazard.
 Self-contained breathing apparatus should be worn.

Unusual fire and explosion hazards

- When exposed to flame, emits toxic fumes.

Section 6. ACCIDENTAL RELEASE MEASURES

After spillage / leakage / gas leakage

- Persons not wearing protective equipment and clothing should be restricted to entering into area of spillage or leakage until cleanup has been completed.
 If this material is split or leaked remove all sources of ignition and ventilated area of spill or leak.
 Absorb small quantities on paper towels. Evaporate in safe place such as a fume hood. Allow sufficient time for evaporating vapors to completely-clear the hood ductwork. Burn the paper in a suitable location away from combustible materials.
 Large quantities can be collected and atomized in suitable combustion chamber.

Section 7. HANDLING AND STORAGE

- Storage** : Store container in a cool, dry and dark place.
Handling : Use local exhaust ventilations to keep exposures to a minimum.
 Avoid skin and eye contact, and avoid breathing vapor.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure control limits

Ingredient name	ACGIH 2011		
	TLV-TWA	TLV-STEL	OSHA PEL TWA
3-Methoxybutyl acetate	Not established	Not established	Not established
3-Methyl-3-methoxy-1-butanol	Not established	Not established	Not established
Kerosene	200 mg/m ³	No data	No data
Solvent naphtha (petroleum), heavy aromatic	No data	No data	No data
4-Ethane-1-yl-1,2-dimethylbenzene	No data	No data	No data
Methyl isobutyl ketone	50 ppm	75 ppm	100 ppm
Toluene	20 ppm	No data	200 ppm 300 ppm (max.)
Naphthalene	10 ppm	15 ppm	10 ppm
1,2,4- Trimethylbenzene	No data	No data	No data

Technical protective measures

Respiratory protection	: NIOSH-approved respiratory protection for organic gases if needed.
Eye protection	: Protecting glasses or full-face shield.
Protective clothing	: Wear impervious protective clothing including gloves, boots, and coveralls to prevent skin contact.
Industrial hygiene	: Take off contaminated, saturated clothing immediately. Wash hands before work breaks and at the end of working.
Others	: Safety shower and eyewash station near work area.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	: Red liquid and ester odor
pH	: Not available
Flash point	: 53°C
Specific gravity	: 0.98 (20°C)
Solubility in water	: Negligible

Section 10. STABILITY AND REACTIVITY

Stability :	: Stable under the normal conditions.
Thermal decomposition	: Not available
Incompatibility	: Strong oxidizer, peroxide.
Hazardous decomposition products	: Hazardous gases and vapors may be released in a fire (such as CO _x , NO _x , and Phosphoric compounds).
Hazardous polymerization	: Will not occur.

Section 11. TOXICOLOGICAL INFORMATION

Ingredient name	Ingestion (RTECS)	Inhalation (RTECS)
	Oral LD ₅₀ (rat)	
3-Methoxybutyl acetate	4,210 mg/kg	Not available
3-Methyl-3-methoxy-1-butanol	4,300 mg/kg	Not available
Kerosene	5 g/kg	Not available
4-Ethane-1-yl-1,2-dimethylbenzene	5,000 mg/kg	Not available
Methyl isobutyl ketone	2,080 mg/kg	LC ₅₀ 100 mg/m ³ (rat)
Toluene	636 mg/kg	TCLo 200 ppm (human)
Naphthalene	490 mg/kg	LD ₅₀ > 20 μg

1,2,4- Trimethylbenzene

5 g/kg

Not available

Ingestion	: Ingestion of this material can cause symptom of headache, dizziness, nausea, tinnitus, dyspnea, etc.
Skin contact	: This material is to be a primary irritant on human skin, repeated contact can cause irreversible damage to human skin.
Eye contact	: This material can probably cause irritant after contact is made with human eyes.
Inhalation	: Inhalation of this material at high concentrations can cause symptoms similar to those which may be experienced upon ingestion.
Carcinogenicity	
NTP	: Not available
IRAC	: Methyl isobutyl ketone 2B, Toluene 3, Naphthalene 2B.
OSHA	: Not available

Section 12. ECOLOGICAL INFORMATION

Mobility	: Not available
Persistence and degradability	: Not available
Bioaccumulative potential	: Not available
Behavior in savage works	: Not available

Section 13. DISPOSAL CONSIDERATIONS

Recover solvents by the proper equipment and dispose the residue in accordance with the local regulations. If not regulated, dispose those atomized in a proper combustion chamber.

Section 14. TRANSPORTATION INFORMATION

UN Hazard Class	: 3 (Flammable liquid)
UN No.	: 1210
UN Pack Group	: III

Section 15. REGULATORY INFORMATION

<u>Ingredient name</u>	<u>CAS number</u>	<u>TSCA</u>	<u>EINECS number</u>	<u>MITI</u>
3-Methoxybutyl acetate	4435-53-4	listed	224-644-9	2-739
3-Methyl-3-methoxy-1-butanol	56539-66-3	listed	260-252-4	2-3079
Acrylic resin	Confidential	Confidential	Not applicable	6-589
Kerosene	8008-20-6	listed	232-366-4	9-1702
Solvent naphtha (petroleum), heavy aromatic	64742-94-5	listed	265-198-5	9-2578
4-Ethane-1-yl-1,2-dimethylbenzene	934-80-5	listed	213-293-7	3-3427
Acetic acid ethenyl ester, polymer with chloroethene and ethenol	25086-48-0	listed	Not applicable	6-92
Methyl isobutyl ketene	108-10-1	listed	203-550-1	2-542
Toluene	108-88-3	listed	203-625-9	3-2
C. I. Pigment Red 224	128-69-8	listed	204-905-3	9-2398
C. I. Pigment Red 179	5521-31-3	listed	226-866-1	5-3278
Naphthalene	91-20-3	listed	202-049-5	4-311
1,2,4- Trimethylbenzene	95-63-6	listed	202-436-9	3-7

Section 16. OTHER INFORMATION

To the best of our knowledge, the information contained herein is accurate. However, we cannot assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist.

END

MATERIAL SAFETY DATA SHEET

Page 1 of 6

Issued : March 16, 2012

Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name :	NIKKALITE® PROCESS COLOR N3525 RED	<u>HMIS Codes</u>	
Manufacture :	NIPPON CARBIDE INDUSTRIES CO., INC.	HEALTH :	0
Address :	2-11-19, Konan, Minato-ku, Tokyo 108-8466, Japan	FLAMMABILITY :	0
Telephone No. :	+81-3-5462-8225, Fax No.+81-3-5462-8271	REACTIVITY :	0
Emergency Tel. No. :	+81-3-5462-8206 (Retroreflective Materials Business Unit)		
Recommended use of the product and restrictions on use :	For Retroreflective Materials		

Section 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable Liquid Category 3
Acute Toxicity (Inhalation; Vapors) Category 4
Skin Corrosion / Irritation Category 2
Skin Sensitization Category 1
Carcinogenicity Category 2
Reproductive Toxicity Category 1A
Specific Target Organ Systemic Toxicity Single Exposure Category 1
Specific Target Organ Systemic Toxicity Repeated Exposure Category 1
Hazardous to the Aquatic Environment (Acute) Category 2
Hazardous to the Aquatic Environment (Chronic) Category 3

GHS Label Elements

Symbols / Pictograms :



Signal word : Danger

Hazard statement :

Flammable liquid and vapour.
Harmful if inhaled.
Causes skin irritation.
May cause an allergy skin reaction.
Suspected of causing cancer.
May damage fertility or the unborn child.
Causes damage to organs (central nervous system and nervous system)
Causes damage to organs (central nervous system, kidney, nervous system and liver) through prolonged or repeated exposure.
Toxic to aquatic life.
Harmful to aquatic life with long lasting effects.

Prevention :

Keep container tightly closed.
 Keep away from ignition sources such as heat/sparks/open flame - No smoking.
 Use only outdoors or in a well-ventilated area.
 Do not breathe dust/fume/gas/mist/vapors/spray.
 Wash thoroughly after handling.
 Wear protective gloves and eye/face protection.
 Ground/bond container and receiving equipment.
 Use explosion-proof electrical/ventilating/lighting equipment.
 Take precautionary measures against static discharge.
 Use only non-sparking tools.
 Avoid release to the environment.
 Obtain special instructions before use.
 Do not handle until all safety precautions have been read and understood.
 Collect spillage.

Response :

IN CASE OF FIRE use as specified for extinction.
 IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
 If skin irritation or rash occurs, seek medical advice/attention.
 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
 Call a POISON CENTER or doctor/physician if you feel unwell.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 If eye irritation persists, get medical advice/attention.
 If exposed or concerned: Get medical attention/advice.
 Get medical attention/advice if you feel unwell.

Storage :

Store in cool/well-ventilated place.
 Store locked up.

Disposal :

Dispose of contents/container in accordance with local/regional/national/international regulation.

Section 3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Ingredient name</u>	<u>Percentage</u>	<u>CAS number</u>	<u>EINECS number</u>
3-Methoxybutyl acetate	24 ~ 28	4435-53-4	224-644-9
3-Methyl-3-methoxy-1-butanol	21 ~ 25	56539-66-3	260-252-4
Acrylic resin	19 ~ 23	Confidential	—
Solvent naphtha (petroleum), heavy aromatic	8 ~ 10	64742-94-5	265-198-5
Kerosene	6 ~ 8	8008-20-6	232-366-4
4-Ethane-1-yl-1,2-dimethylbenzene (in the Solvent naphtha (petroleum), heavy aromatic)	3 ~ 5	934-80-5	213-293-7
Acetic acid ethenyl ester, polymer with chloroethene and ethenol	3 ~ 5	25086-48-0	—
Methyl isobutyl ketone	2 ~ 4	108-10-1	203-550-1
Toluene	2 ~ 4	108-88-3	203-625-9
C. I. Pigment Red 224	1 ~ 3	128-69-8	204-905-3
C. I. Pigment Red 179	1 ~ 3	5521-31-3	226-866-1

Naphthalene (in the Solvent naphtha (petroleum), heavy aromatic)	< 1	91-20-3	202-049-5
1,2,4- Trimethylbenzene (in the Kerosene)	< 1	95-63-6	202-436-9

Section 4. FIRST AID MEASURES

- Ingestion** : Do not induce vomiting. Get medical attention immediately.
- Skin** : Wash material off the skin with copious amount of soap and water. If irritation exists, get medical attention.
Wash contaminated clothing and decontaminated footwear before reuse.
- Eyes** : Immediately flush with copious amount of water for at least 15 minutes.
If redness, itching or a burning sensation develops, have eyes examined and treated by medical personnel.
- Inhalation** : Remove victim to fresh air.
If cough or other respiratory symptoms develops, consult medical personnel.
If not breathing, give artificial respiration, preferably mouth-to-mouth.
If breathing is difficult, give oxygen. Consult medical personnel.

Section 5. FIRE-FIGHTING MEASURES

Extinguishing Media

- Suitable extinguishing media: Water fog, foam, dry powder, carbon dioxide
 Unsuitable extinguishing media: Drainage by hose.

Protection against fire and explosion

- Keep sources of ignition at a distance. Take measures against the built-up of electrostatic charge.
 Have fire extinguishers standing ready before opening drum.

Special fire fighting protective equipment

- During emergency conditions, overexposure to thermal decomposition products may cause health hazard.
 Self-contained breathing apparatus should be worn.

Unusual fire and explosion hazards

- When exposed to flame, emits toxic fumes.

Section 6. ACCIDENTAL RELEASE MEASURES

After spillage / leakage / gas leakage

- Persons not wearing protective equipment and clothing should be restricted to entering into area of spillage or leakage until cleanup has been completed.
 If this material is split or leaked remove all sources of ignition and ventilated area of spill or leak.
 Absorb small quantities on paper towels. Evaporate in safe place such as a fume hood. Allow sufficient time for evaporating vapors to completely-clear the hood ductwork. Burn the paper in a suitable location away from combustible materials.
 Large quantities can be collected and atomized in suitable combustion chamber.

Section 7. HANDLING AND STORAGE

- Storage** : Store container in a cool, dry and dark place.
- Handling** : Use local exhaust ventilations to keep exposures to a minimum.
 Avoid skin and eye contact, and avoid breathing vapor.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure control limits

<u>Ingredient name</u>	<u>ACGIH 2011</u>		
	<u>TLV-TWA</u>	<u>TLV-STEL</u>	<u>OSHA PEL TWA</u>
3-Methoxybutyl acetate	Not established	Not established	Not established
3-Methyl-3-methoxy-1-butanol	Not established	Not established	Not established
Solvent naphtha (petroleum), heavy aromatic	No data	No data	No data
Kerosene	200 mg/m ³	No data	No data
4-Ethane-1-yl-1,2-dimethylbenzene	No data	No data	No data
Methyl isobutyl ketone	50 ppm	75 ppm	100 ppm
Toluene	20 ppm	No data	200 ppm 300 ppm (max.)
Naphthalene	10 ppm	15 ppm	10 ppm
1,2,4- Trimethylbenzene	No data	No data	No data

Technical protective measures

Respiratory protection	: NIOSH-approved respiratory protection for organic gases if needed.
Eye protection	: Protecting glasses or full-face shield.
Protective clothing	: Wear impervious protective clothing including gloves, boots, and coveralls to prevent skin contact.
Industrial hygiene	: Take off contaminated, saturated clothing immediately. Wash hands before work breaks and at the end of working.
Others	: Safety shower and eyewash station near work area.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	: Red liquid and ester odor
pH	: Not available
Flash point	: 53°C
Specific gravity	: 0.98 (20°C)
Solubility in water	: Negligible

Section 10. STABILITY AND REACTIVITY

Stability :	: Stable under the normal conditions.
Thermal decomposition	: Not available
Incompatibility	: Strong oxidizer, peroxide.
Hazardous decomposition products	: Hazardous gases and vapors may be released in a fire (such as CO _x , NO _x , and Phosphoric compounds).
Hazardous polymerization	: Will not occur.

Section 11. TOXICOLOGICAL INFORMATION

<u>Ingredient name</u>	<u>Ingestion (RTECS)</u> <u>Oral LD₅₀ (rat)</u>	<u>Inhalation (RTECS)</u>
3-Methoxybutyl acetate	4,210 mg/kg	Not available
3-Methyl-3-methoxy-1-butanol	4,300 mg/kg	Not available
Kerosene	5 g/kg	Not available
4-Ethane-1-yl-1,2-dimethylbenzene	5,000 mg/kg	Not available
Methyl isobutyl ketone	2,080 mg/kg	LC ₅₀ 100 mg/m ³ (rat)
Toluene	636 mg/kg	TCLo 200 ppm (human)
Naphthalene	490 mg/kg	LD ₅₀ > 20 μg

1,2,4- Trimethylbenzene	5 g/kg	Not available
Ingestion	: Ingestion of this material can cause symptom of headache, dizziness, nausea, tinnitus, dyspnea, etc.	
Skin contact	: This material is to be a primary irritant on human skin, repeated contact can cause irreversible damage to human skin.	
Eye contact	: This material can probably cause irritant after contact is made with human eyes.	
Inhalation	: Inhalation of this material at high concentrations can cause symptoms similar to those which may be experienced upon ingestion.	
Carcinogenicity		
NTP	: Not available	
IRAC	: Methyl isobutyl ketone 2B, Toluene 3, Naphthalene 2B.	
OSHA	: Not available	

Section 12. ECOLOGICAL INFORMATION

Mobility	: Not available
Persistence and degradability	: Not available
Bioaccumulative potential	: Not available
Behavior in savage works	: Not available

Section 13. DISPOSAL CONSIDERATIONS

Recover solvents by the proper equipment and dispose the residue in accordance with the local regulations. If not regulated, dispose those atomized in a proper combustion chamber.

Section 14. TRANSPORTATION INFORMATION

UN Hazard Class	: 3 (Flammable liquid)
UN No.	: 1210
UN Pack Group	: III

Section 15. REGULATORY INFORMATION

<u>Ingredient name</u>	<u>CAS number</u>	<u>TSCA</u>	<u>EINECS number</u>	<u>MITI</u>
3-Methoxybutyl acetate	4435-53-4	listed	224-644-9	2-739
3-Methyl-3-methoxy-1-butanol	56539-66-3	listed	260-252-4	2-3079
Acrylic resin	Confidential	Confidential	Not applicable	6-589
Solvent naphtha (petroleum), heavy aromatic	64742-94-5	listed	265-198-5	9-2578
Kerosene	8008-20-6	listed	232-366-4	9-1702
4-Ethane-1-yl-1,2-dimethylbenzene	934-80-5	listed	213-293-7	3-3427
Acetic acid ethenyl ester, polymer with chloroethene and ethenol	25086-48-0	listed	Not applicable	6-92
Methyl isobutyl ketene	108-10-1	listed	203-550-1	2-542
Toluene	108-88-3	listed	203-625-9	3-2
C. I. Pigment Red 224	128-69-8	listed	204-905-3	9-2398
C. I. Pigment Red 179	5521-31-3	listed	226-866-1	5-3278
Naphthalene	91-20-3	listed	202-049-5	4-311
1,2,4- Trimethylbenzene	95-63-6	listed	202-436-9	3-7

Section 16. OTHER INFORMATION

To the best of our knowledge, the information contained herein is accurate. However, we cannot assume any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards which exist.

END

Rennicks (UK) Ltd.

Stuart Road
Manor Park
Runcorn
Cheshire
WA7 1TS

Material Safety Data Sheet

ARCOSOLV® PM SOLVENT

For use as thinner with Nikkalite N3500 and N3600
screen printing inks.



REMA Nikkalite

T: 01928 579 966 F: 01928 579 965 E: uksales@rennicks.com

www.rennicksuk.com

Registered in the United Kingdom No. 2101567 VAT No. GB 464 633633



Rennicks U.K.
CLEARLY BETTER

ARCOSOLV® PM SOLVENT**SECTION 1: IDENTIFICATION**

Product Name: ARCOSOLV® PM SOLVENT

Product Number: 000000000000509290

Chemical Family: Propylene Glycol Ethers

CAS Number: 107-98-2

Chemical Name: 1-Methoxy-2-propanol

Synonyms: Propylene glycol monomethyl ether

Type of Use: Solvent.

Company

Lyondell Chemie Nederland, B.V.
Weena 737
3013 AM Rotterdam The Netherlands

Business Contact

European Headquarters 31 (0) 10 275 55 00
product.safety@lyondell.com

24 Hour Emergency Contact

European Headquarters 31 (0) 10 275 57 77

SECTION 2: HAZARD IDENTIFICATION

Emergency Overview

This safety data sheet has been prepared in accordance with EU Directives 67/548/EEC; on dangerous substances, and 1999/45/EC; on dangerous preparations.

Hazards

Flammable liquid. Complementary Information: 2-Methoxy-1-propanol at <0.5% is not present in sufficient quantity to give rise to classification of this material as toxic to reproduction. May form reactive peroxides. However, there is no known evidence that it has nearly the peroxide forming potential as, for example, diethyl ether, etc.

R-Phrases

R10 - Flammable.

Physical State

Liquid.

Color

Clear, colorless.

ARCOSOLV® PM SOLVENT**Odor**

Ether-like odor.

Odor Threshold

10 ppm / Odor is not an adequate warning of potentially hazardous ambient air concentrations.

Potential Health Effects**Routes of Exposure**

Eye. Inhalation. Skin.

Signs and Symptoms of Acute Exposure

See component summary.

- *1-Methoxy-2-propanol* 107-98-2

Slight inhalation hazard. Slight eye irritant. Slight skin irritant. Slight skin absorption hazard.

- *2-Methoxy-1-propanol* 1589-47-5

Respiratory tract irritant. Skin irritant. Moderate eye irritant.

Skin

May be absorbed through the skin and produce toxic effects such as CNS depression.

Inhalation

Vapors may cause irritation of the eyes, nose and throat as well as CNS depression (fatigue, dizziness, loss of concentration, with collapse, coma and death possible in cases of severe overexposure). High vapor concentrations may be irritating to the upper respiratory tract.

Eye

Mild eye irritation reported with vapor.

Ingestion

This material may be a slight health hazard if ingested in large quantities.

Chronic Health Effects

No adverse chronic health effects are expected from anticipated conditions of normal use of this material, based on animal test data.

- *1-Methoxy-2-propanol* 107-98-2

Prolonged or high exposures may cause CNS effects and liver and kidney changes. Mild skin irritation with repeated dermal exposure.

- *2-Methoxy-1-propanol* 1589-47-5

ARCOSOLV® PM SOLVENT

Damages developing fetus. See section 11.

SECTION 3 : COMPOSITION/INFORMATION ON INGREDIENTS

<u>Component Name</u>	<u>CAS #</u>	<u>EU Inventory</u>	<u>Concentration Wt. %</u>	
1-Methoxy-2-propanol	107-98-2	203-539-1	> 99.0	R10
2-Methoxy-1-propanol	1589-47-5	216-455-5	< 0.5	R10 R61 R37/38, R41

Xi

Compositions given are typical values not specifications.

See section 16 for full text of risk phrases.

SECTION 4: FIRST AID MEASURES**General**

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid. For specific information refer to the Emergency Overview in Section 2 of this MSDS.

Skin

Remove contaminated clothing as needed. Wash skin thoroughly with mild soap and water. Flush with lukewarm water for 15 minutes. If sticky, use waterless cleaner first. Seek medical attention if ill effect or irritation develops.

Inhalation

If overcome by exposure, remove victim to fresh air immediately. Give oxygen or artificial respiration as needed. Obtain medical attention if breathing difficulty persists.

Eye

Immediately flush the eyes with large amounts of clean low-pressure water for at least 15 minutes, occasionally lifting the upper and lower lids. If pain or irritation persists, promptly obtain medical attention.

Ingestion

ARCOSOLV® PM SOLVENT

If large quantity swallowed, give lukewarm water (pint/ 1/2 litre) if victim completely conscious/alert. Do not induce vomiting. Risk of damage to lungs exceeds poisoning risk. Obtain emergency medical attention.

Note to Physician

Treat symptomatically. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 5: FIRE FIGHTING MEASURES

Flammable Properties

Classification

Flammable liquid.

Flash Point

31.7 °C (89.06 °F) (TCC).

Auto-Ignition Temperature

277.8 °C (532.04 °F)

Lower Flammable Limit

3 vol%

Upper Flammable Limit

12 vol%

Extinguishing Media

Suitable: Dry chemical. CO₂. Water spray. Alcohol resistant foam.

Unsuitable: Do not use solid water stream.

Protection of Firefighters

Protective Equipment/Clothing: Wear an approved positive pressure self-contained breathing apparatus and firefighter turnout gear. Structural firefighters protective clothing will only provide limited protection.

Fire Fighting Guidance: Individuals should perform only those fire-fighting procedures for which they have been trained. Fire fighters should wear self-contained breathing apparatus in the positive pressure mode with a full facepiece when there is a possibility of exposure to smoke, fumes or hazardous decomposition products. Cool tanks and containers exposed to fire with water. Water may be ineffective in firefighting due to low flash point. Burning liquid may float on water. Even if material is water soluble, may not be practical to extinguish fire by water dilution. Notify authorities immediately if liquid enters sewer/public waters.

ARCOSOLV® PM SOLVENT

Hazardous Combustion Products: Incomplete combustion may produce carbon monoxide and other toxic gases.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Release Response

Flammable liquid. Release can cause fire or explosion. Vapors may ignite. Equip responders with proper protection extinguish all ignition sources. Blanket with firefighting foam. Contain spill with dike to prevent entry into sewers or waterways. For large spills, dike and pump into properly labeled containers for reclamation or disposal. For small spills, soak up with absorbent material and place in properly labeled containers for disposal. All recovered material should be packaged, labeled, transported and disposed of or reclaimed in conformance with applicable laws and regulations and in conformance with good engineering practices. Reclaim where possible.

SECTION 7: HANDLING AND STORAGE

Handling

For industrial use only. Keep container tightly closed when not in use. The potential for peroxide formation is enhanced when these solvents are used in processes such as distillation. Use only non-sparking tools. Properly ground containers before beginning transfer. When transferring propylene glycol ethers with flash points at or below 60 °C (140 °F) into fixed site vessels, the vessel should be purged and inerted prior to transfer. Propylene glycol ethers may be transferred into air atmospheres if the temperature of the product and the ambient temperature within the shipping container are both at least 16.7 °C (30 °F) less than the product's flash point. After loading, nitrogen blanketing is required if the contents of the transportation container could exceed a temperature of 16.7 °C (30 °F) less than the product flash point during any subsequent transportation activities. If the product flash point is less than 16.7 °C (30 °F) above either the ambient temperature of the transportation container or the storage temperature of the product, the container should be purged and inerted with nitrogen prior to loading and nitrogen blanketed after loading. Handle empty containers with care. Flammable/combustible residue remains after emptying. The purging of all empty shipping containers, regardless of the flashpoint, is recommended when received with air atmospheres. Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair. Use adequate personal protective equipment. Observe precautions pertaining to confined space entry.

Storage

Store only in tightly closed, properly vented containers away from heat, sparks, open flame and strong oxidizing agents. Storage under nitrogen atmosphere is recommended to minimize possible formation of highly reactive peroxides. Store in properly lined steel/stainless steel to avoid slight discoloration from mild steel/copper. Aluminum (5000 series alloys - U.S. Aluminum Association Standard) showed no corrosion after 30 days contact with ARCOSOLV® PM Acetate, ARCOSOLV® DPM, TPM, PTB, or PM at 71°C (160°F). Some plastics/rubbers are attacked by Glycol Ethers/Ether Esters. This product will absorb water if exposed to air.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

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Engineering Controls

General room or local exhaust ventilation is usually required to meet exposure limit(s).

Personal Protection

Inhalation If exposure can potentially exceed the exposure limit(s), respiratory protection recommended or approved by appropriate local, state or international agency must be used.

Skin Wear chemical resistant gloves such as: Neoprene. Depending on the conditions of use, protective gloves, apron, boots, head and face protection should be worn.

Eye Chemical splash goggles and/or face shield should be worn.

Additional Remarks

Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing/wash thoroughly before reuse.

Occupational Exposure Limits

Component Name	Source	Type	Value	Notation
1-Methoxy-2-propanol	US (ACGIH)	STEL	150 ppm	None.
	US (ACGIH)	TWA	100 ppm	None.
	OEL (AU)	CEILING	50 ppm 187 mg/m3	Skin.
	OEL (AU)	STEL	50 ppm 187 mg/m3	Skin.
	OEL (AU)	MAK	50 ppm 187 mg/m3	Skin.
	OEL (BE)	STEL	150 ppm 568 mg/m3	Skin.
	OEL (BE)	TWA	100 ppm 375 mg/m3	Skin.
	OEL (BG)	STEL		Skin.

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		568.0 mg/m3	
OEL (BG)	TWA	375.0 mg/m3	Skin.
SUVA (CH)	STEL	200 ppm 720 mg/m3	None.
SUVA (CH)	MAK	100 ppm 360 mg/m3	None.
OEL (CY)	STEL	150 ppm 568 mg/m3	None.
OEL (CY)	TWA	100 ppm 375 mg/m3	None.
OEL (CZ)	CEILING	550 mg/m3	Skin.
OEL (CZ)	TWA	270 mg/m3	Skin.
TRGS 900 (DE)	TWA	100 ppm 370 mg/m3	None.
OEL (DK)	TWA	50 ppm	None.
OEL (DK)	TWA	50 ppm 185 mg/m3	None.
OEL (EE)	STEL	150 ppm 568 mg/m3	None.
OEL (EE)	TWA	100 ppm 375 mg/m3	None.
OEL (ES)	VLA-ED	100 ppm 375 mg/m3	Skin.
OEL (ES)	VLA-EC	150 ppm 568 mg/m3	Skin.
	STEL	150 ppm 568 mg/m3	Skin.
	TWA	100 ppm 375 mg/m3	Skin.

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HTP (FI)	STEL	150 ppm 560 mg/m3	None.
HTP (FI)	TWA	100 ppm 370 mg/m3	None.
OEL (FR)	VLCT	150 ppm 568 mg/m3	Skin.
OEL (FR)	VME	100 ppm 375 mg/m3	Skin.
OEL (GR)	STEL	300 ppm 1,080 mg/m3	Skin.
OEL (GR)	TWA	100 ppm 360 mg/m3	Skin.
OEL (HR)	MAC	100 ppm 360 mg/m3	None.
OEL (HU)	STEL	568 mg/m3	Skin.
OEL (HU)	TWA	375 mg/m3	Skin.
OEL (IE)	STEL	100 ppm 368 mg/m3	Skin.
OEL (IE)	STEL	300 ppm 1,080 mg/m3	Skin.
OEL (IE)	TWA	50 ppm 184 mg/m3	Skin.
OEL (IE)	TWA	100 ppm 360 mg/m3	Skin.
OEL (IT)	STEL	150 ppm 568 mg/m3	Skin.
OEL (IT)	TWA	100 ppm 375 mg/m3	Skin.
OEL (LT)	TPRV	150 ppm 568 mg/m3	Skin.

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OEL (LT)	TPRV	75 ppm 300 mg/m3	Skin.
OEL (LT)	IPRV	100 ppm 375 mg/m3	Skin.
OEL (LT)	IPRV	50 ppm 190 mg/m3	Skin.
OEL (LV)	STEL	150 ppm 568 mg/m3	Skin.
OEL (LV)	TWA	100 ppm 375 mg/m3	Skin.
OEL (NL)	STEL	150 ppm 563 mg/m3	Skin.
OEL (NL)	MAC	100 ppm 375 mg/m3	Skin.
OEL (NO)	STEL	75 ppm 225 mg/m3	Skin.
OEL (NO)	TWA	50 ppm 180 mg/m3	Skin.
OEL (PL)	NDSCh	360 mg/m3	None.
OEL (PL)	NDS	180 mg/m3	None.
OEL (PT)	STEL	150 ppm	None.
OEL (PT)	TWA	100 ppm	None.
OEL (RO)	STEL	150 ppm 568 mg/m3	Skin.
OEL (RO)	TWA	100 ppm 375 mg/m3	Skin.
OEL (SE)	STV	75 ppm 300 mg/m3	Skin.
OEL (SE)	LLV	50 ppm	Skin.

ARCOSOLV® PM SOLVENT

190 mg/m³

2-Methoxy-1-propanol

OEL (SI)	STEL	150 ppm 562.5 mg/m ³	Skin.
OEL (SI)	TWA	100 ppm 375 mg/m ³	Skin.
OEL (SK)	CEILING	568 mg/m ³	Skin.
OEL (SK)	TWA	100 ppm 375 mg/m ³	Skin.
WEL (GB)	STEL	150 ppm 560 mg/m ³	None.
WEL (GB)	TWA	100 ppm 375 mg/m ³	None.
OEL (AU)	STEL	80 ppm 300 mg/m ³	Skin.
OEL (AU)	MAK	20 ppm 75 mg/m ³	Skin.
SUVA (CH)	STEL	40 ppm 152 mg/m ³	Skin.
SUVA (CH)	MAK	5 ppm 19 mg/m ³	Skin.
TRGS 900 (DE)	TWA	5 ppm 19 mg/m ³	Skin.
OEL (DK)	TWA	20 ppm	None.
OEL (DK)	TWA	20 ppm 75 mg/m ³	None.
OEL (ES)	VLA-ED	5 ppm 19 mg/m ³	None.
OEL (NL)	MAC	19 mg/m ³	None.
OEL (NO)	STEL	30 ppm 112.5 mg/m ³	Skin.

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OEL (NO)	TWA	20 ppm 75 mg/m3	Skin.
OEL (SI)	STEL	80 ppm 300 mg/m3	Skin.
OEL (SI)	TWA	20 ppm 75 mg/m3	Skin.
OEL (SK)	CEILING	152 mg/m3	Skin.
OEL (SK)	TWA	5 ppm 19 mg/m3	Skin.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Liquid. Clear, colorless.

Odor: Ether-like odor.

Odor Threshold: 10 ppm Odor is not an adequate warning of potentially hazardous ambient air concentrations.

pH: Not applicable.

Boiling Point/Boiling Range: ~ 120 °C (248 °F)

Freezing Point/Melting Point: ~ -95 °C (-139 °F)

Flash Point: 31.7 °C (89.06 °F) (TCC).

Auto-ignition: 277.8 °C (532.04 °F)

Flammability: Flammable liquid.

Lower Flammable Limit: 3 vol%

Upper Flammable Limit: 12 vol%

Explosive Properties: No Data Available.

Oxidizing Properties: No Data Available.

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Vapor Pressure: 10.9 mm Hg

Evaporation Rate: 0.7 (butyl acetate = 1)

Relative Density: ~ 0.92 @ 25 °C (77 °F)

Relative Vapor Density: > 3.0 @ 15.5 - 32.2 °C (59.9 - 89.96 °F)

Viscosity: ~ 2.0 mm²/s @ 77 °C (170.6 °F)

Solubility (Water): ~ 200 g/l @ 20 °C (68 °F) Complete

Partition Coefficient (Kow): Log Pow = - 0.437

Additional Physical and Chemical Properties: Volatile Characteristics: Moderate: 1.0 to 10.0% Additional properties may be listed in Sections 2 and 5.

SECTION 10: STABILITY AND REACTIVITY

Chemical Stability

This material is stable when properly handled and stored.

Conditions to Avoid

Extended contact with air or oxygen. The potential for peroxide formation is enhanced when these solvents are used in processes such as distillation. Heat, sparks, open flame, other ignition sources, and oxidizing conditions. Ignition may occur at temperatures below those published in the literature as autoignition or ignition temperatures.

Substances to Avoid

Strong oxidizing agents.

Decomposition Products

No Data Available.

Hazardous Polymerization

Not expected to occur.

Reactions with Air and Water

May react with oxygen to form peroxides. However, there is no known evidence that it has nearly the peroxide forming potential as, for example, diethyl ether, etc.

SECTION 11: TOXICOLOGICAL INFORMATION

ARCOSOLV® PM SOLVENT**PRODUCT INFORMATION**

Product Summary

Propylene glycol monomethyl ether (PGME) exhibits a low acute toxicity hazard after exposure via ingestion, skin contact, or inhalation exposure. Exposure to vapors of PGME may cause irritation of the eyes, nose, or throat. PGME is not a skin sensitizer. PGME is, at most, mildly irritating to the skin and only slightly irritating to the eye. Repeated exposure studies in animals indicate that PGME may cause sedation, enlarged liver, minor kidney changes, and decreased body weight gain during prolonged or high exposures. Reproductive effects observed in animal studies appear to be related to a decrease in maternal body weights and secondary to nutritional stress. PGME is not teratogenic. PGME is not genotoxic in standardized in vitro and in vivo tests. Studies in laboratory animals indicate that PGME is not carcinogenic.

COMPONENT INFORMATION

- *1-Methoxy-2-propanol 107-98-2*

Acute Toxicity - Lethal Doses

LC50 (Inhl) Rat > 7,559 PPM 6 HOURS

LD50 (Oral) Rat > 5,000 MG/KG BWT

LD50 (Skin) Rabbit 13,000 MG/KG BWT

Acute Toxicity - Effects

Inhalation This substance is considered nontoxic by the inhalation route. Exposure to vapor may cause irritation of the eyes, nose, or throat. Exposure to very high concentrations of aerosols may cause CNS depression.

Ingestion This substance is considered nontoxic by the oral route. High doses may cause CNS depression (fatigue, dizziness and possibly loss of concentration, with collapse, coma and death in cases of severe over-exposure).

Skin Contact May be absorbed through the skin and produce toxic effects such as CNS depression. This substance is considered nontoxic by the dermal route of exposure. However, very high exposures may cause skin injury or systemic toxicity. (death)

Irritation

Skin This substance is a mild skin irritant.

Eye Liquid is not irritating to the eye. Mild eye irritation reported with vapor.

Sensitization

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Does not induce skin sensitization.

Repeated Dose Toxicity

PGME is a low concern to health following prolonged oral, inhalation, or dermal exposures. Repeated exposure studies performed in multiple animal species indicate that PGME may cause transient, dose-related sedation with secondary effects of decreased body weight gain at oral doses of ≥ 460 mg/kg bwt/day, at dermal exposures of ≥ 1840 mg/kg bwt/day, and vapor concentrations of $\geq 3,000$ ppm. Liver and/or kidney changes were noted at oral doses of ≥ 920 mg/kg bwt/day, at dermal exposures of $\geq 6,440$ mg/kg bwt/day, and at vapor concentrations of $\geq 3,000$ ppm. Repeated dermal exposure of rabbits to undiluted PGME at concentrations up to 1,000 mg/kg bwt/day caused no systemic toxicity and failed to cause more than very mild dermal irritation.

Reproductive Effects

This substance is not expected to cause reproductive toxicity at dose levels that are not also toxic to the parents. Effects noted in animal reproductive toxicity studies appear to be related to a decrease in maternal body weights and secondary to general toxicity and/or nutritional stress. At vapor concentrations of 3,000 ppm, parental effects included sedation and decreased mean body weights. In female rats, toxicity was accompanied by lengthened estrous cycles, decreased fertility, decreased ovary weights, reduced pup survival and litter size, slight delays on the onset of puberty, and histological changes in the liver and thymus of the first and second generation offspring. Also, there was an increase in histological ovarian atrophy in the first and second generation parental females. No reproductive or neonatal effects were observed in rats at doses as high as 1000 ppm of PGME.

Developmental Effects

This substance is not a teratogen. No teratogenic effects but slight fetotoxicity (evidenced by delayed skeletal ossification) was observed in rats or rabbits exposed to concentrations of PGME up to 3000 ppm. Maternal general toxicity included mild transient CNS depression, decreased food consumption and body weight gain at the 3000 ppm dose groups for both rats and rabbits.

Genetic Toxicity

No evidence of genotoxicity in standard bacterial and mammalian test systems in vitro. No increase in micronuclei in mice after in vivo exposure.

Carcinogenicity

Studies in laboratory animals indicate that this substance is not carcinogenic. Long-term exposure (2 years) of PGME via inhalation at concentrations up to 3000 ppm caused no statistical significant increases in tumors in any tissue for either sex of rats or mice. This substance is not classified for carcinogenicity by IARC, OSHA, NTP, or the EPA.

- *2-Methoxy-1-propanol* 1589-47-5

Developmental Effects

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2-Methoxy-1-propanol has been shown to cause developmental effects in offspring of female rabbits exposed to 0, 145, 225, 350, and 545 ppm by inhalation during pregnancy. 145 ppm was the no observed effect level (NOEL) in this study. The acetate of 2-methoxy-1-propanol also has been tested for developmental effects. Information for the acetate is pertinent since the acetate portion of this molecule is quickly removed in a living organism to yield 2-methoxy-1-propanol. The offspring of rats exposed to concentrations of 0, 110, 550, or 2,700 ppm developed vertebral incisions at the highest exposure level, in the presence of maternal toxicity. Rabbits exposed to 0, 36, 145, or 550 ppm of 2-methoxy-1-propanol acetate bore offspring that showed malformations of sternum, paws, major blood vessels and the heart at the highest exposure level. A concentration of 145 ppm was the no observed effect level (NOEL) for adverse developmental effects from the acetate of 2-methoxy-1-propanol.

Carcinogenicity

Not listed by IARC, NTP, OSHA or EPA.

SECTION 12: ECOLOGICAL INFORMATION

PRODUCT INFORMATION

Ecotoxicity

See component summary.

WGK

1 (Slightly water-endangering)

Environmental Fate and Pathway

See component summary.

COMPONENT INFORMATION

- *1-Methoxy-2-propanol* 107-98-2

Ecotoxicity

ARCOSOLV® PM SOLVENTAcute toxicity to fish

LC50 / 96 HOURS Golden orfe. 6,812 mg/l(nominal)

LC50 / 96 HOURS fathead minnow 20,800 mg/l(nominal)

LC50 / 96 HOURS rainbow trout. > 1,000 mg/l(nominal)

Summary: Acute toxicity to fish is very low.

Acute toxicity to aquatic invertebrates

EC50 / 48 HOURS waterflea (daphnia magna). > 500 mg/l(nominal)

Summary: This material is not harmful or toxic to aquatic invertebrates.

Toxicity to aquatic plants

EC50 / 96 HOURS green algae (Selenastrum). > 1,000 mg/l(nominal)

Summary: Growth

Summary: Causes little or no inhibition of algal growth.

Toxicity to microorganisms

IC50 / 3 HOURS Sewage microbes > 1,000 mg/l(nominal)

Summary: Low toxicity to sewage microbes.

Chronic toxicity to fish

Summary: No measured data available. QSAR (Quantitative structure-activity relationship) based calculation predicts low chronic toxicity.

Chronic toxicity to aquatic invertebrates

Summary: No measured data available. QSAR (Quantitative structure-activity relationship) based calculation predicts low chronic toxicity.

Other Adverse Effects

No additional information available.

Environmental Fate and PathwayMobility

Transport between environmental compartments: Rapid dissipation in soil expected: *K_{oc}* value between 1 and 50, indicating very high soil mobility. If released to the environment, this substance is expected to partition mainly into the water compartment (open waters and perhaps soil groundwater/porewater).

ARCOSOLV® PM SOLVENTPersistence and Degradability

Biodegradation: In water, hydrolytic stability not determined but readily biodegradable (96% degraded in 28 days).
Atmospheric vapor rapidly photodegraded (half-life <1 day).

Bioaccumulation: Based on high water solubility, ready biodegradability and low *Kow* value, significant bioaccumulation is not expected. QSAR calculations based on chemical structure predict a BCF value of 3.2.

- *2-Methoxy-1-propanol* 1589-47-5

Ecotoxicity

No Data Available.

Environmental Fate and Pathway

No Data Available.

SECTION 13: DISPOSAL CONSIDERATIONS

Contaminated product, soil, water, container residues and spill cleanup materials may be hazardous wastes. Comply with applicable local, state or international regulations concerning solid or hazardous waste disposal and/or container disposal.

SECTION 14: TRANSPORT INFORMATION

Special Requirements

If you reformulate or further process this material, you should consider re-evaluation of the regulatory status of the components listed in the composition section of this sheet, based on final composition of your product.

Proper Shipping Name 1-METHOXY-2-PROPANOL

ID No. UN3092

Hazard Class 3

PG III

SECTION 15: REGULATORY INFORMATION

Regulatory Status

ARCOSOLV® PM SOLVENT

Country	Inventory		
Australia	AICS	X	X = All components are included or are otherwise exempt from inclusion on this inventory. C = Contact Lyondell/Equistar by e-mail at product.safety@lyondell.com or product.safety@equistarchem.com for additional information.
Canada	DSL	X	
Canada	NDSL		
China	IECS	X	
European Union	EINECS	X	
European Union	ELINCS		
European Union	NLP		
Japan	ENCS	X	
Korea	ECL	X	
Philippines	PICCS	X	
United States	TSCA	X	

Labeling Information**R-Phrases**

R10 - Flammable.

S-Phrases

S2 - Keep out of the reach of children.

S6 - Keep under nitrogen.

S24/25 - Avoid contact with skin and eyes.

S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.

Other

EU Labeling Information:

SECTION 16: OTHER INFORMATION

Latest Revision(s)

Revised Section(s): 1

All Relevant Risk Phrases

R10 - Flammable.

R37/38 - Irritating to respiratory system and skin.

R41 - Risk of serious damage to eyes.

R61 - May cause harm to the unborn child.

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