MATERIAL SAFETY DATA SHEET

1 IDENTIFICATION

Product name	:TH-101
Name of company	:Hitachi Industrial Equipment Systems Co., Ltd
Address	:1-1,Higashitaga-cho 1-chome, Hitachi-shi, Ibaraki-ken, Japan
Tel	:+81-294-36-8682
Fax	:+81-294-36-8975
Recommended use of the chemical and restrictions on use	:Printing Ink for industrial Marking

2 HAZARDS IDENTIFICATION

Physico-chemical endpoints	:Flammable liquid Category 2
Acute toxicity - oral	:Category 5
Acute toxicity - dermal	:Not available
Acute toxicity - inhalation (air)	:Not identified
Acute toxicity - inhalation (vapors)	:Category 5
Acute toxicity - inhalation (dust, mist)	:Not identified
Skin corrosion/irritation	:Not available
Eye damage/irritation	: Category 2
Sensitization - respiratory	: Not identified
Sensitization - skin	: Not identified
Germ cell mutagenicity	: Category 1
Carcinogenicity	: Category 2
Toxic to reproduction	: Category 1
Effects on or via lactation	: Not identified
Specific target organ systemic toxicity	: (Single exposure) Category 1 Sensory system Category 1 Systemic toxicity Category 1 Central nervous system Category 2 Kidney Category 3 airway irritant :(Repeated exposure) Category 1 Liver Category 1 Sensory system Category 1 Central nervous system Category 1 Peripheral nervous system Category 2 Nervous system
Aspiration toxicity	: Category 2
Hazardous to the aquatic environment	
-Acute hazard	: Not available
-Chronic hazard	: Not available

GHS label elements

Hazard symbols:

Signal word: Danger

Hazard statement and precautionary statement:

- Highly flammable liquid and vapour
- May be harmful if swallowed
- May be harmful if inhaled
- Causes skin irritation
- Causes damage to Sensory system,systemic toxicity and central nervous system-single exposure
- May cause damage to kidney-single exposure
- May cause damage to airway irritant-single exposure
- Causes damage to liver, sensory system, central nervous system and peripheral nervous system through prolonged or repeated exposure
- May cause damage to nervous system through prolonged or repeated exposure

Precautionary statements:

- Keep out of reach of children. Read label before use. If medical advice is needed: Have product container or label at hand.

Prevention

- Keep away from ignition sources such as heat/sparks/open flame– No smoking.
- Take precautionary measures against static discharge.
- Wear protective gloves and eye/face protection as specified by the competent authority.
- Do not breathe dust/mist/vapors.
- Use only in a well-ventilated area. Call a doctor/physician if you feel unwell.
- Do not eat, drink or smoke when using this product.
- Avoid contact during pregnancy/while nursing.
- Wash hands thoroughly after handling.

Response

- In case of fire, use dry chemical, CO_2, water splay (fog) or form for extinction.
- IF SWALLOWED: Call a doctor/physician if you feel unwell. Rinse mouth.
- IF ON SKIN: Gently wash with plenty of soap and water.
- Wash/Decontaminate removed clothing before reuse.
- If skin irritation occurs, seek medical advice/attention.
- IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a doctor/physician.
- Collect spillage.

Storage

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

- Call a doctor/physician if exposed or you feel unwell.

Disposal
- Waste must be disposed of according to applicable regulations.

3 Composition/information on ingredients

Substance or mixture; mixture
Composition;

Chemical name	concentration (%)	CAS number
2-butanone	40-49	78-93-3
Methanol	10-20	67-56-1
Acetone	<1	67-64-1
Cyclohexanone	<1	108-94-1

4 First-aid measures

Inhalation;
Remove the victim from the contamination immediately to fresh air. Keep the victim warm and quiet and arrange for transport to the neatest medial facility for examination and treatment by a physician as soon as possible.

Skin contact;
Remove all contaminated clothing, shoes and socks from the affected areas as quickly as possible. Wash the affected area under running water using a mild soap. If irritation persists, arrange for transport to the nearest medical facility for examination and treatment by a physician as son as possible.

Eye contact;
Gently rinse the affected eyes with clean water for at least 15 minutes. Remove contact lenses if easily possible. and refer for medical attention.

Ingestion;
Never give anything by mouth to someone who is unconscious or convulsing. If the victim is responsive, give him one or two glasses of water. And refer for medial attention.

5 Fire-fighting measures

Suitable extinguishing media;
Use dry chemical, CO_2, water splay (fog) or form.

Fire fighting procedures;
Use water spray to cool fire-exposed surfaces and to protect personnel. Shut off "fuel" to fire. If a leak or spill has not ignited, use water spray to disperse the vapors.
Avoid spraying water directly into storage containers due to danger of boil over.

Unusual fire/explosion hazard;
Flammable liquid, can release vapors that form flammable mixtures at temperatures at or above the flashpoint.

Special protective equipment and precautions for fire fighters;
Fire fighters should wear boots, overalls, gloves, eye and face protection and breathing apparatus.

6 Accidental release measures

Shut off all sources of ignition; No smoking or flames in area. Absorb spill with inert material (e.g., dry sand or earth), then place in closed containers using non-sparking tools. Flush residual spill (area) with copious amounts of water.

7 Handling and storage

Handling;

Use only in the well-ventilated areas.
Make available in the work area emergency shower and eyes wash.
Avoid contact with skin or eyes.

Storage;

Close up the container and keep it in dark cool(0~20℃) place.
Keep away from combustible materials and sources of ignition.

8 Exposure controls/personal protection

Exposure guidelines;

ACGIH TLV-TWA (ppm)

2-butanone	:200
Methanol	:200(skin)
Acetone	:500(skin)
Cyclohexanone	:25(skin)

ACGIH STEL(ppm)

2-butanone	:300
Methanol	:250(skin)
Acetone	:750(skin)
Cyclohexanone	:None known

9 Physical and chemical properties

Appearance	
Physical state	:Liquid
Color	:Clear
Odor	:Solvent odor
Boiling point	:78 to 80℃
Flash point	:-5.0℃ (closed cup)
Upper/lower flammability or explosive limits	:Lower 1.8 vol%、Upper 19 vol%
Vapor pressure	:8.9kPa (20℃)
Vapor density (Air＝1)	:None known
Relative density	:0.81(20℃)
Solubility (Water)	:None known
Partition coefficient: n-octanol/water	:None known
Auto-ignition temperature	:422 to 450℃
Decomposition temperature	:No data

10 Stability and reactivity

Stability: The product is stable.
Conditions and materials to avoid: Not available
Hazardous decomposition products: These products are carbon oxides

11 Toxicological information

Acute toxicity;
2-butanone
LD50(orl,rat): 2737mg/kg(TXAPA9 19, 699, 1971)
LCLo(ihl,rat): 23500mg/m3/8H(AIHAAP 20, 364, 1959)
LD50(skin,rabbit): 6480mg/kg(SHELL* MSDS-5390-4)
TCLo(ihl,human): 1000mg/m3(VCVGK* -, 417, 1994)
LDLo(orl,human): 714.3mg/kg(VCVGK* -, 417, 1994)
Methanol
LD50(orl,rat): 5628mg/kg(GTPZAB 19(11),27,1975)
LC50(ihl,rat): 64000ppm/4H(NPIRI* 1,74,1974)
TDLo(orl,man): 9450µL/kg(AJEMEN 16,538,1998)
TCLo(ihl,human): 300ppm(NPIRI* 1,74,1974)
Acetone
TDLo(orl,man): 2857mg/kg (RTECS)
LD50(orl,rat): 5800mg/kg (RTECS)
TCLo(ihl,man): 10mg/m3/6H (RTECS)
LC50(ihl,mouse): 44gm/m3/4H (RTECS)
Cyclohexanone
LD50(orl,rat): 1800mg/kg(VCVGK* -, 455, 1994)
LC50(ihl,rat): 19000mg/m3(VCVGK* -, 455, 1994)
LD50(skin,rabbit): 1mL/kg(AIHAAP 30, 470, 1969)
LDLo(orl,human): 714.3mg/kg(VCVGK* -, 455, 1994)
TCLo(ihl,human): 0.09mg/m3(VCVGK* -, 455, 1994)

Skin corrosion/irritation;
2-butanone
Skin; rabbit; 402mg/24H; Mild(TXAPA9 19, 276, 1971)
Methanol
Skin; rabbit; 20mg/24H; Moderate(85JCAE -,187,1986)
Acetone
Skin; rabbit; 500mg/24H; Mild(85JCAE -,280,1986)
Cyclohexanone
Skin; rabbit; 500mg; Mild; Open(UCDS**)
Skin; human; 50%/48H; Mild(ADVEA4 27, 189, 1992)

Serious eye damage/irritation;
2-butanone
Eye; rabbit; 80mg(TXAPA9 19, 276, 1971)
Methanol
Eye; rabbit; 100mg/24H; Moderate(85JCAE -,187,1986)
Acetone
Eye; rabbit; 20mg; Severe(AJOPAA 29,1363,1946) Eye; rabbit; 20mg/24H; Severe(85JCAE -,280,1986)
Cyclohexanone
Eye; rabbit; 250µg/24H; Severe(85JCAE -,289,1986)

Respiratory or skin sensitization;
2-butanone

Methanol
Allergic dermatitis; human, skin(PATTY 4th,1994)
No skin sensitization ;Magnusson-Kligman maximization test, guinea pig(EHC 196,1997: DFGOT vol. 16,2001)
Acetone
Not available
Cyclohexanone
Skin; rabbit; 500mg; Mild; Open(UCDS**)
Skin; human; 50%/48H; Mild(ADVEA4 27, 189, 1992)

Germ cell mutagenicity;
2-butanone
Reverse mutation assay in S.typhimuriun and E.coli; Negative
Sex chromosome loss and nondisjunction; S.cerevisiae; 33800ppm(MUREAV 149, 339, 1985)
Methanol
Mutation in microorganisms; mouse; lymphocyte; 7900mg/L(ENMUDM 7(Suppl 3),10,1985)
Acetone
Cytogenetic analysis; hamster; fibroblast; 40gm/l(FCTOD7 22,623,1984)
Cyclohexanone
Mutation in microorganisms; S.typhimurium; cells; 20µL/L(EJMBA2 18,213,1983)
Cytogenetic analysis; human; lymphocyte; 5µg/L(GISAAA 46(5), 76, 1981)
Mutation in mammalian somatic cells; hamster; ovary; 7500µL/L(ENMUDM 7(Suppl 3), 60, 1985)

Carcinogenicity;
2-butanone
Not available
Methanol
Not available
Acetone
Not listed as carcinogen on NTP, IARC, OSHA, ACGIH. Negative results on EHC, SIDS.
Cyclohexanone
Not available

Reproductive toxicity;
2-butanone
TCLo(ihl,rat): 2900mg/m3(female 6-10 D preg); Specific Developmental Abnormalities - craniofacial(VCVGK* -, 418, 1994)
Methanol
TCLo(ihl,rat): 10000ppm/7H(7-15 D preg)(FAATDF 5,727,1985)
TDLo(orl,rat): 5200µL/kg(10 D preg)(REPTED 11,503,1997)
Acetone
TDLo(orl,rat): 273gm/kg(13 W male)(NTIS** PB91-185975)
TCLo(ihl,mammal): 31500µg/m3/24H(1-13D preg); (GTPZAB 26(6),24,1982)
Cyclohexanone
TCLo(ihl,rat): 105mg/m3/4H(1-20 D preg); Fertility - pre - implantation mortality(TPKVAL 14,26,1975)
TDLo(orl,mouse): 11mg/kg(8-12 D preg); Effects on Newborn - growth statistics(TCMUD8 6,361,1986)

STOST-single exposure;

2-butanone

The influence of the central nervous system, rat/mouse(EHC 143, 1992; PATTY 4th, 1994; IRIS 2003)

The influence of kidny, oral, rat(DFGOT vol 12,1999; IRIS 2003; ATSDR 1992)

The respiratory tract irritation, human (ACGIH 7th, 2001; DFGOT vol 12,1999; PATTY 4th, 1994; ATSDR 1992)

Methanol

The restraint of central nervous system and damage of the visual organ, human, oral or ihl(EHC 196,1997; ACGIH, 7th,2001; DFGOT vol.16, 2001),

The respiratory tract irritation, rat,(EHC 196,1997; PATTY 4th,1994),

Anesthesia, rat , mouse and rhesus monkey(EHC 196,1997;PATTY 4th,1994)

Acetone

Human, irritation of throat 12000ppm(ACGIH, 2001) ; Human irritation of throat, nose and trachea 1190mg/m3/6h(EHC 207, 1998); Human, irritation of throat 1000ppm/4h(EHC 207, 1998)

Cyclohexanone

None known

STOST-repeated exposure;

2-butanone

The sensory paralysis of hand and arm, human(EHC 143, 1992; DFGOT vol 12, 1999; IRIS 2003)

The dmade of central nervous system, human(DFGOT vol 12, 1999; IRIS 2003)

Methanol

The restraint of central nervous system and damage of the visual organ, human, oral or ihl(EHC 196,1997; ACGIH, 7th,2001; DFGOT vol.16, 2001),

The respiratory tract irritation, rat,(EHC 196,1997; PATTY 4th,1994),

Anesthesia, rat , mouse and rhesus monkey(EHC 196,1997;PATTY 4th,1994)

Acetone

The increase of white blood cell and eosinophile leukocyte(ACGIH, 2001)

Cyclohexanone

None known

Aspiration hazard.

2-butanone

Not available

Methanol

Not available

Acetone

Classified into Category 2 due to be the ketone of under C13.

Cyclohexanone

None known

12 Ecological information

Toxicity:

2-butanone

LD50(orl,rat): 2737mg/kg(TXAPA9 19, 699, 1971)

LCLo(ihl,rat): 23500mg/m3/8H(AIHAAP 20, 364, 1959)

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Cyclohexanone
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LD50(skin,rabbit): 1mL/kg(AIHAAP 30, 470, 1969)
LDLo(orl,human): 714.3mg/kg(VCVGK* -, 455, 1994)
TCLo(ihl,human): 0.09mg/m3(VCVGK* -, 455, 1994)

Persistence and degradability:
2-butanone
Not available
Methanol
This material is biodegradable.
Acetone
This material is biodegradable
Cyclohexanone
This material is biodegradable.

Bioaccumulative potential:
2-butanone
Not available
Methanol
Not available
Acetone
Not available
Cyclohexanone
Not available

Mobility in soil:
2-butanone
Not available
Methanol
Not available
Acetone
Not available
Cyclohexanone
None known

13 Disposal considerations
Scrap materials may be disposed by licensed contractor or burn in an approved incinerator.

Do not dump into sewer, on the ground or into any body of water.
Follow national and local regulations.

14 Transport information

Follow all regulations in your country.

UN Number	:1210
UN Proper Shipping Name	:Printing ink, flammable
Transport hazard class	:Class 3(Flammable liquid)
Packing Group	: **II**
Environmental hazards	:No

15 Regulatory information

Follow all regulations in your country.
Content of RoHS Directive material Cd<100ppm Pb, Hg, Hexavalent Cr, PBB, PBDE<1000ppm

16 References

1) Solvent, dye MSDS
2) Results of Eco-toxicity tests of chemicals conducted by Ministry of the Environment in Japan (-2006)
3) International Chemical Safety Cards