

MATERIAL SAFETY DATA SHEET

1 IDENTIFICATION

Product name :TH-21
 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	:Not available
Acute toxicity - dermal	:Not identified
Acute toxicity - inhalation (air)	:Not identified
Acute toxicity - inhalation (vapors)	:Not available
Acute toxicity - inhalation (dust, mist)	:Not identified
Skin corrosion/irritation	:Category 2
Eye damage/irritation	:Category 2
Sensitization - respiratory	:Not identified
Sensitization - skin	:Not identified
Germ cell mutagenicity	:Category 1
Carcinogenicity	:Not available
Toxic to reproduction	:Category 1
Effects on or via lactation	:Not identified
Specific target organ systemic toxicity (Single exposure)	:Category 1 Respiratory system, Central nervous system :Category 1 Systemic toxicity, Kidney :Category 1 Liver :Category 3 Respiratory system, Anesthetizing action
(Repeated exposure)	:Category 1 Liver, Sensory system :Category 1 Central nervous system Lungs :Category 1 Peripheral nervous system :Category 2 Arterial system, Nervous system
Aspiration toxicity	:Not identified
Hazardous to the aquatic environment	
-Acute hazard	:Not available
-Chronic hazard	:Not available

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GHS label elements

Hazard symbols:

**Signal word:** Danger**Hazard statement and precautionary statement:**

- Highly flammable liquid and vapour
- Causes skin irritation
- Causes eye irritation
- May cause genetic defects
- May damage fertility or the unborn child
- Causes damage to respiratory system , central nervous system systemic toxicity, kidney and liver - single exposure
- May cause respiratory irritation,drowsiness or dizziness-single exposure
- Causes damage to liver, sensory system,central nervous system, and peripheral nervous system through prolonged or repeated exposure.
- May cause damage to arterial system and 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, CO₂, water splay (fog) or foam 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.

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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
Ethanol	38-42	64-17-5
Ethyl Acetate	28-32	141-78-6
2-butanone	18-22	78-93-3
2-Propanol	5-9	67-63-0
Cyclohexanone	0-5	108-94-1
Methanol	0-5	67-56-1

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 nearest medical 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 soon 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 medical attention.

5 Fire-fighting measures**Suitable extinguishing media;**

Use dry chemical, CO₂, water spray (fog) or foam.

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

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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)	
Ethanol	:1000
Ethyl Acetate	:400
2-butanone	:200
2-Propanol	:200
Cyclohexanone	:25(skin)
Methanol	:200(skin)
ACGIH STEL(ppm)	
Ethanol	:No data
Ethyl Acetate	:400
2-butanone	:300
2-Propanol	:4500
Cyclohexanone	:None known
Methanol	:250(skin)

9 Physical and chemical properties

Appearance	
Physical state	:Liquid
Color	:Clear
Odor	:Solvent odor
Boiling point	: 78.3 (ethanol)
Flash point	:-9.0 (closed cup)
Upper/lower flammability or explosive limits	:Lower 4.3 vol%, Upper 19 vol%(ethanol)
Vapor pressure	: 5.9kPa(20)(ethanol)
Vapor density (Air = 1)	:1.59(ethanol)

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Relative density	:0.82(20)
Solubility (Water)	:water;infinite(ethanol)
Partition coefficient: n-octanol/water	:-0.32(ethanol)
Auto-ignition temperature	:390 (ethanol)
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;

Ethanol

TDLo(ori,man): 700mg/kg(NTOTDY 8,77,1986)

LD50(ori,rat): 9000mg/kg(VCVGK* -, 93, 1984)

LC50(ihl,rat): 20000ppm/10H(NPIRI* 1,44,1974)

TCLo(ihl,human): 2500mg/m3/20M(VCVGK* -, 93,1984)

Ethyl Acetate

LD50(ori,rat): 5620mg/kg(YKYUA6 32,, 1241, 1981)

LC50(ihl,mouse): 45gm/m3/2H(85GMAT -, 65, 1982)

2-butanone

LD50(ori,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(ori,human): 714.3mg/kg(VCVGK* -, 417, 1994)

2-Propanol

LD50(ori,rat): 5000mg/kg(VCVGK* -, 97, 1984)

LC50(ihl,rat): 72600mg/m3(VCVGK* -, 97, 1984)

LC50(ihl,mouse): 53000mg/m3(VCVGK* -, 97, 1984)

TDLo(ori,human): 286mg/kg(VCVGK* -, 97, 1984)

Cyclohexanone

LD50(ori,rat): 1800mg/kg(VCVGK* -, 455, 1994)

LC50(ihl,rat): 19000mg/m3(VCVGK* -, 455, 1994)

LD50(skin,rabbit): 1mL/kg(AIHAAP 30, 470, 1969)

LDLo(ori,human): 714.3mg/kg(VCVGK* -, 455, 1994)

TCLo(ihl,human): 0.09mg/m3(VCVGK* -, 455, 1994)

Methanol

LD50(ori,rat): 5628mg/kg(GTPZAB 19(11),27,1975)

LC50(ihl,rat): 64000ppm/4H(NPIRI* 1,74,1974)

TDLo(ori,man): 9450?L/kg(AJEMEN 16,538,1998)

TCLo(ihl,human): 300ppm(NPIRI* 1,74,1974)

Skin corrosion/irritation;

Ethanol

Skin; rabbit; 20mg/24H; Moderate(85JCAE -, 189, 1986)

Ethyl Acetate

No irritation: human(DFGOT vol.12,1999)

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No irritation:rabbit(IUCLID 2000)
 2-butanone
 Skin; rabbit; 402mg/24H; Mild(TXAPA9 19, 276, 1971)
 2-Propanol
 Skin; rabbit; 500mg; Mild(NTIS** AD-A106-944)
 Cyclohexanone
 Skin; rabbit; 500mg; Mild; Open(UCDS**)
 Skin; human; 50%/48H; Mild(ADVEA4 27, 189, 1992)
 Methanol
 Skin; rabbit; 20mg/24H; Moderate(85JCAE -,187,1986)

Serious eye damage/irritation;

Ethanol
 rabbit; 100mg/4S; Moderate(FCTOD7 20,573,1982)
 Ethyl Acetate
 Eye; human; 400 ppm (JIHTAB 25,282,1943)
 2-butanone
 Eye; rabbit; 80mg(TXAPA9 19, 276, 1971)
 2-Propanol
 Eye; rabbit; 100mg/24H; Moderate(85JCAE -,191,1986)
 Cyclohexanone
 Eye; rabbit; 250?g/24H; Severe(85JCAE -,289,1986)
 Methanol
 Eye; rabbit; 100mg/24H; Moderate(85JCAE -,187,1986)

Respiratory or skin sensitization;

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

Germ cell mutagenicity;

Ethanol
 DNA damage; S.cerevisiae; 850mmol/L(MUREAV 326,165,1995)
 Mutation in microorganisms; S.typhimurium; 11pph(ENVRAL 52, 225, 1990)
 Cytogenetic analysis; human; lymphocyte; 2.5pph/24H(MUREAV 537, 117, 2003)
 Ethyl Acetate
 Cytogenetic analysis; hamster; fibroblast; 9 gm/L(FCTOD7 22,623,1984)
 Sex chromosome loss and nondisjunction; S.cerevisiae; 24400ppm(MUREAV 149, 339, 1985)
 2-butanone
 Reverse mutation assay in S.typhimurium and E.coli; Negative

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Sex chromosome loss and nondisjunction; *S.cerevisiae*; 33800ppm(MUREAV 149, 339, 1985)
 2-Propanol
 TDLo(ori,rat): 8gm/kg(female 6-15 D preg)(RTOPDW 23,183,1996)
 TCLo(ihl,rat): 3500ppm/7H(female 1-19 D preg)(FCTOD7 26,247,1988)
 Cyclohexanone
 Mutation in microorganisms; *S.typhimurium*; cells; 20?L/L(EJMBA2 18,213,1983)
 Cytogenetic analysis; human; lymphocyte; 5?g/L(GISAAA 46(5), 76, 1981)
 Mutation in mammalian somatic cells; hamster; ovary; 7500?L/L(ENMUDM 7(Suppl 3), 60, 1985)
 Methanol
 Mutation in microorganisms; mouse; lymphocyte; 7900mg/L(ENMUDM 7(Suppl 3),10,1985)

Carcinogenicity;

Ethanol
 TDLo(ori,mouse): 320mg/kg/50W-I(CALEDQ 13,345,1981)
 Ethyl Acetate
 Not available
 2-butanone
 Not available
 2-Propanol
 Not available
 Cyclohexanone
 Not available
 Methanol
 Not available

Reproductive toxicity;

Ethanol
 TDLo(ori,woman): 250mg/kg(37 W preg); Effects on Embryo or Fetus - other effects to embryo(AJOGAH 145,251,1983)
 TDLo(ori,rat): 22.5gm/kg(female 11-20 D preg); Specific Developmental Abnormalities - Central Nervous Systems(NETEEC 24, 719, 2002)
 Ethyl Acetate
 Not available
 2-butanone
 TCLo(ihl,rat): 2900mg/m3(female 6-10 D preg); Specific Developmental Abnormalities - craniofacial(VCVGK* -, 418, 1994)
 2-Propanol
 TDLo(ori,rat): 8gm/kg(female 6-15 D preg)(RTOPDW 23,183,1996)
 TCLo(ihl,rat): 3500ppm/7H(female 1-19 D preg)(FCTOD7 26,247,1988)
 Cyclohexanone
 TCLo(ihl,rat): 105mg/m3/4H(1-20 D preg); Fertility - pre - implantation mortality(TPKVAL 14,26,1975)
 TDLo(ori,mouse): 11mg/kg(8-12 D preg); Effects on Newborn - growth statistics(TCMUD8 6,361,1986)
 Methanol
 TCLo(ihl,rat): 10000ppm/7H(7-15 D preg)(FAATDF 5,727,1985)
 TDLo(ori,rat): 5200?L/kg(10 D preg)(REPTED 11,503,1997)

STOST-single exposure;

Ethanol
 Human ihl, 5000ppm(9,4mg/L), respiratory tract irritation and confusion(ACGIH 2001)
 Ethyl Acetate

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The above part respiratory organ stimulation by 400ppm, human(ACGIH, 2001; DFGOT, vol 12,1999)

Anesthesia and lung damage by the lethal concentration(DFGOT, vol 12,1999)

2-butanone

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

The influence of kidney, 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)

2-Propanol

Not available

Cyclohexanone

None known

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)

STOST-repeated exposure;

Ethanol

Not available

Ethyl Acetate

Not available

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)

2-Propanol

Not available

Cyclohexanone

None known

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)

Aspiration hazard.

Ethanol

Not available

Ethyl Acetate

Not available

2-butanone

Not available

2-Propanol

Not available

Cyclohexanone

None known

Methanol

Not available

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12 Ecological information

Toxicity:

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Ethyl Acetate

LD50(ori,rat): 5620mg/kg(YKYUA6 32,, 1241, 1981)
 LC50(ihl,mouse): 45gm/m3/2H(85GMAT -, 65, 1982)

2-butanone

LD50(ori,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(ori,human): 714.3mg/kg(VCVGK* -, 417, 1994)

2-Propanol

LD50(ori,rat): 5000mg/kg(VCVGK* -, 97, 1984)
 LC50(ihl,rat): 72600mg/m3(VCVGK* -, 97, 1984)
 LC50(ihl,mouse): 53000mg/m3(VCVGK* -, 97, 1984)
 TDLo(ori,human): 286mg/kg(VCVGK* -, 97, 1984)

Cyclohexanone

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

Methanol

LD50(ori,rat): 5628mg/kg(GTPZAB 19(11),27,1975)
 LC50(ihl,rat): 64000ppm/4H(NPIRI* 1,74,1974)
 TDLo(ori,man): 9450?L/kg(AJEMEN 16,538,1998)
 TCLo(ihl,human): 300ppm(NPIRI* 1,74,1974)

Persistence and degradability:

Ethanol

This material is biodegradable.

Ethyl Acetate

This material is biodegradable.

2-butanone

Not available

2-Propanol

This material is biodegradable.

Cyclohexanone

This material is biodegradable.

Methanol

This material is biodegradable.

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Bioaccumulative potential:

Ethanol
Not available
Ethyl Acetate
Not available
2-butanone
Not available
2-Propanol
Not available
Cyclohexanone
Not available
Methanol
Not available

Mobility in soil:

Ethanol
Not available
Ethyl Acetate
Not available
2-butanone
Not available
2-Propanol
Not available
Cyclohexanone
None known
Methanol
Not available

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	:
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

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