SAFETY DATA SHEET

1. IDENTIFICATION

A. Product name

- A/F7830(F)-DARKBROWN

B. Recommended use and restriction on use

- General use	: Where long life service of anti-fouling property to be required.Hull outside of new building or repair ship operating the area where organotin compounds are banned or restricted.
- Restriction on use	: Do not use except for purpose

C. Supplier information

- Company name	: KCC Corporation
- Address	: 30, Bangeojinsunhwando-ro, Dong-gu, Ulsan
- Emergency telephone number	: 82-52-280-1717

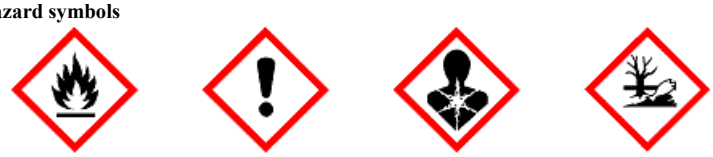
2. HAZARD IDENTIFICATION

A. GHS Classification

- Acute toxicity (oral) : Category4
- Acute aquatic toxicity : Category1
- Chronic aquatic toxicity : Category3
- Carcinogenicity : Category1B
- Serious eye damage/irritation : Category2
- Flammable liquids : Category3
- Aspiration hazard : Category1

B. GHS label elements

○ **Hazard symbols**



○ **Signal words**

- Danger

○ **Hazard statements**

- H226 Flammable liquid and vapour
- H302 Harmful if swallowed
- H304 May be fatal if swallowed and enters airways
- H319 Causes serious eye irritation
- H350 May cause cancer
- H400 Very toxic to aquatic life
- H412 Harmful to aquatic life with long lasting effects

○ **Precautionary statements**

1) Prevention

- P201 Obtain special instructions before use.
- P202 Do not handle until all safety precautions have been read and understood.
- P210 Keep away from heat/sparks/open flames/hot surfaces. ? No smoking.
- P233 Keep container tightly closed.
- P240 Ground/bond container and receiving equipment.
- P241 Use explosion-proof electrical/ventilating/lighting/equipment.
- P242 Use only non-sparking tools. Flammable liquids (chapter 2.6) 1, 2, 3
- P243 Take precautionary measures against static discharge.
- P264 Wash hands thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P273 Avoid release to the environment.

- P280 Wear protective gloves/protective clothing/eye protection/face protection.
- P281 Use personal protective equipment as required.

2) Response

- P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- P301+P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
- P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P308+P313 If exposed or concerned: Get medical advice/attention.
- P330 Rinse mouth.
- P331 Do NOT induce vomiting.
- P337+P313 If eye irritation persists: Get medical advice/attention.
- P370+P378 In case of fire: Use Suitable extinguishing media for extinction(Refer Section MSDS 5).
- P391 Collect spillage.

3) Storage

- P403+P235 Store in a well-ventilated place. Keep cool.
- P405 Store locked up.

4) Disposal

- P501 Dispose of contents/container in accordance with local/regional/national/international regulation

C. Other hazards which do not result in classification : (NFPA Classification)

○ **NFPA grade (0 ~ 4 level)**

- Health : 2, Flammability : 3, Reactivity : 0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Trade names and Synonyms	CAS No.	Content(%)
Dicopper oxide	-	1317-39-1	10 ~ 20
Zinc oxide	C.I. PIGMENT WHITE 4	1314-13-2	10 ~ 20
Solvent naphtha (petroleum), light arom.	Naphtha	64742-95-6	10 ~ 20
Thermoplastic acrylic resin	-	-	1 ~ 10
Talc, non-asbestos form	Talcum	14807-96-6	1 ~ 10
n-Butyl alcohol	1-Butanol	71-36-3	1 ~ 10
Xylene	Dimethylbenzene	1330-20-7	1 ~ 10
Diiron trioxide	Iron oxide (Fe2O3)	1309-37-1	1 ~ 10
2-Pyridinethiol-1-oxide, copper salt	bis(1-hydroxy-1H-pyridine-2-thionato-O,S)copper	14915-37-8	1 ~ 10
Secret	Secret	-	30 ~ 40

4. FIRST AID MEASURES

A. Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15minutes and call a doctor/physician.
- Get medical attention immediately.
- Go to the hospital immediately if symptoms(flare, irritate) occur.
- Remove contact lenses if worn.

B. Skin contact

- Flush skin with plenty of wter for at least 15 minutes while removing contaminated clothing and shoes.
- Laundering enough contaminated clothing before reuse.
- Get medical attention immediately.
- Remove contaminated clothing, shoes and isolate.
- Wear gloves when washing the patient, and please avoid contact with contaminated clothing.

C. Inhalation contact

- When exposed to large amounts of steam and mist, move to fresh air.

- Take specific treatment if needed.
- Get medical attention immediately.
- If breathing is stopped or irregular, give artificial respiration and supply oxygen.

D. Ingestion contact

- About whether I should induce vomiting Take the advice of a doctor.
- Rinse your mouth with water immediately.
- Get medical attention immediately.
- If swallowed, large amounts of water to drink and do not induce vomiting.

E. Delayed and immediate effects and also chronic effects from short and long term exposure

- Not available

F. Notes to physician

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.
- If exposed or concerned, get medical attention/advice.

5. FIREFIGHTING MEASURES

A. Suitable (Unsuitable) extinguishing media

- Dry chemical, carbon dioxide, regular foam extinguishing agent, spray
- Avoid use of water jet for extinguishing

B. Specific hazards arising from the chemical

- Not available

C. Special protective actions for firefighters

- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- Notify your local firestation and inform the location of the fire and characteristics hazard.
- Using a unattended and water devices in case of large fire and leave alone to burn if you do not imperative.
- Avoid inhalation of materials or combustion by-products.
- Do not access if the tank on fire.
- Keep containers cool with water spray.
- Vapor or gas is burned at distant ignition sources can be spread quickly.
- The extremely low flash point made by fire-fighters may be less effective at digesting weeks.

6. ACCIDENTAL RELEASE MEASURES

A. Personal precautions, protective equipment and emergency procedures

- Must work against the wind, let the upwind people to evacuate.
- Do not touch spilled material. Stop leak if you can do it without risk.
- Move container to safe area from the leak area.
- Handling the damaged containers or spilled material after wearing protective equipment.
- Do not direct water at spill or source of leak.
- Avoid skin contact and inhalation.
- Cleanup and disposal under expert supervision is advised.
- Keep unauthorized people away,isolate hazard area and deny entry.

B. Environmental precautions

- Prevent runoff and contact with waterways, drains or sewers.
- If large amounts have been spilled, inform the relevant authorities.

C. Methods and materials for containment and cleaning up

- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notification to central government, local government. When emissions at least of the standard amount
- Dispose of waste in accordance with local regulation.
- Appropriate container for disposal of spilled material collected.

- Small leak: sand or other non-combustible material, please let use absorption.
- Wipe off the solvent.
- Dike for later disposal.
- Avoid entering to sewers or water system.
- Do not use plastic containers.
- Prevent the influx to waterways, sewers, basements or confined spaces.
- Spilled material should be treated as a potential risk of waste collected.

7. HANDLING AND STORAGE

A. Precautions for safe handling

- Since emptied containers retain product residue(vapor, liquid, solid) follow all MSDS and label warnings even after container is emptied.
- Get the manual before use.
- Operators should wear antistatic footwear and clothing.
- Do not inhale the steam prolonged or repeated.
- Avoid contact with heat, sparks, flame or other ignition sources.
- Contaminated work clothing should not be allowed out of the workplace.

B. Conditions for safe storage, including any incompatibilities

- Check regularly for leaks.
- Do not use damaged containers.
- Do not apply direct heat.
- Do not apply any physical shock to container.
- Keep sealed when not in use.
- By specifying a storage area for carcinogenic substances.
- Collected them in sealed containers.
- Do not eat, drink or smoke when using this product.
- Store away from water and sewer.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits

○ **ACGIH TLV**

- [Zinc oxide] : TWA 2 mg/m3, Respirable particulate mass STEL 10 mg/m3, Respirable particulate mass
- [Talc, non-asbestos form] : TWA 2 mg/m3, Respirable particulate matter (containing no asbestos and <1% crystalline silica)
- [n-Butyl alcohol] : TWA, 20 ppm (61 mg/m3)
- [Xylene] : TWA 100 ppm (434 mg/m3), STEL, 150 ppm (651 mg/m3)
- [Diiron trioxide] : TWA, 5 mg/m3, Repirable particulate mass

○ **OSHA PEL**

- [Diiron trioxide]: 10 mg/m3 (fume)
- [Diiron trioxide]: 15 mg/m3 (Total dust), 5 mg/m3 (Respirable fraction)
- [Talc, non-asbestos form]: 20 mppcf (containing no asbestos, respirable dust)
- [Xylene]:100ppm 435mg/m3
- [Zinc oxide]: 5mg/m3
- [Zinc oxide]: 15 mg/m3 (Total dust), 5 mg/m3 (Respirable fraction)
- [n-Butyl alcohol]:100ppm 300mg/m3

B. Engineering controls

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C. Personal protective equipment

○ **Respiratory protection**

- Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.
- Respiratory protection is ranked in order from minimum to maximum.
- Consider warning properties before use.
- Any chemical cartridge respirator with organic vapor cartridge(s).
- Any chemical cartridge respirator with a full facepiece and organic vaporcartridge(s).

- Any air-purifying respirator with a full facepiece and an organic vapor canister.

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○ **Eye protection**

- Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.
- Provide an emergency eye wash station and quick drench shower in the immediate work area.

○ **Hand protection**

- Wear appropriate chemical resistant glove.

○ **Skin protection**

- Wear appropriate chemical resistant protective clothing.

○ **Others**

- Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

A. Appearance	
- Appearance	Liquid(Viscous liquid)
- Color	DARKBROWN
B. Odor	Solvent odor
C. Odor threshold	Not available
D. pH	Not available
E. Melting point/Freezing point	Not available
F. Initial Boiling Point/Boiling Ranges	Not available
G. Flash point	26℃
H. Evaporation rate	Not available
I. Flammability(solid, gas)	Not available
J. Upper/Lower Flammability or explosive limits	11.2%/1%
K. Vapour pressure	Not available
L. Solubility	Not available
M. Vapour density	> 1(Air=1)
N. Specific gravity(Relative density)	1.6170 ~ 1.6570
O. Partition coefficient of n-octanol/water	Not available
P. Autoignition temperature	343-536
Q. Decomposition temperature	Not available
R. Viscosity	80 ~ 100 KU
S. Molecular weight	Not available

10. STABILITY AND REACTIVITY

A. Chemical Stability

- This material is stable under recommended storage and handling conditions.

B. Possibility of hazardous reactions

- Cylinders exposed to fire may vent and release flammable gas.

C. Conditions to avoid

- Avoid contact with incompatible materials and condition.
- Avoid : Accumulation of electrostatic charges, Heating, Flames and hot surfaces
- Avoid contact with heat, sparks, flame or other ignition sources.

D. Incompatible materials

- Not available

E. Hazardous decomposition products

- May emit flammable vapour if involved in fire.

11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure

○ **(Respiratory tracts)**

- May be fatal if swallowed and enters airways

○ **(Oral)**

- Harmful if swallowed

○ **(Eye·Skin)**

- Causes serious eye irritation

B. Delayed and immediate effects and also chronic effects from short and long term exposure

○ **Acute toxicity**

*** Oral**

- [Dicopper oxide] : LD50 = 470 ㎎/㎏ Rat
- [Zinc oxide] : LD50 = 7950 ㎎/㎏ Other
- [Solvent naphtha (petroleum), light arom.] : LD50 = 8400 ㎎/㎏ Rat
- [n-Butyl alcohol] : LD50 = 790 ㎎/㎏ Rat
- [Xylene] : LD50=3550 mg/kg rat
- [Diiron trioxide] : LD50 > 10000 ㎎/㎏ Rat

*** Dermal**

- [Dicopper oxide] : LD50 = 2000 ㎎/㎏ Rat
- [Solvent naphtha (petroleum), light arom.] : LD50 > 2000 ㎎/㎏ Rabbit
- [n-Butyl alcohol] : LD50 = 3402 ㎎/㎏ rabbit
- [Xylene] : LD50 4350 ㎎/㎏ Rabbit

*** Inhalation**

- [Dicopper oxide] : LC50 = 5 ㎎/ℓ 4 hr Rat
- [Zinc oxide] : LC50 > 5.7 ㎎/ℓ 4hr, Mouse
- [Solvent naphtha (petroleum), light arom.] : LC50 > 5.2 mg/L 4 hr Rat, LC50=3400 ppm 4hr
- [n-Butyl alcohol] : Steam LC50 = 24.25 mg/L/4 hr Rat
- [Xylene] : Steam LC50 6700 ppm 4 hr Rat (Equivalents : 29.09 mg/L)

○ **Skin corrosion/irritation**

- Not available

○ **Serious eye damage/irritation**

- Causes serious eye irritation

○ **Respiratory sensitization**

- Not available

○ **Skin sensitization**

- Not available

○ **Carcinogenicity**

*** IARC**

- [Talc, non-asbestos form] : Group 2B (Talc-based body powder (perineal use of))
- [Talc, non-asbestos form] : Group 3 (Talc not containing asbestos or asbestiform fibres)
- [Diiron trioxide] : Group 3
- [Xylene] : Group 3

*** OSHA**

- Not available

*** ACGIH**

- [Talc, non-asbestos form] : A4 (Talc(containing no asbestos fibers))
- [Diiron trioxide] : A4
- [Xylene] : A4

*** NTP**

- Not available

*** EU CLP**

- [Solvent naphtha (petroleum), light arom.] : Carc.1B

○ **Germ cell mutagenicity**

- Not available

○ **Reproductive toxicity**

- Not available

○ **STOT-single exposure**

- Not available

○ **STOT-repeated exposure**

- Not available

○ **Aspiration hazard**

- May be fatal if swallowed and enters airways

12. ECOLOGICAL INFORMATION

A. Ecotoxicity

○ **Fish**

- [Dicopper oxide] : LC50 = 0.075 ㎎/ℓ 96 hr
- [Zinc oxide] : LC50 = 2246 ㎎/ℓ 96 hr
- [Solvent naphtha (petroleum), light arom.] : LC50 = 9.22 ㎎/ℓ 96 hr Oncorhynchus mykiss
- [Talc, non-asbestos form] : LC50 > 100000 ㎎/ℓ 24 hr Brachydanio rerio
- [n-Butyl alcohol] : LC50 > 100 ㎎/ℓ 96 hr

○ **Crustaceans**

- [Dicopper oxide] : EC50 = 0.042 ㎎/ℓ 48 hr
- [Zinc oxide] : LC50 = 0.098 ㎎/ℓ 48 hr
- [Solvent naphtha (petroleum), light arom.] : EC50 = 6.14 ㎎/ℓ 48 hr Daphnia magna
- [Talc, non-asbestos form] : LC50 = 94983.781 ㎎/ℓ 48 hr
- [n-Butyl alcohol] : EC50 = 1983 ㎎/ℓ 48 hr

○ **Algae**

- [Zinc oxide] : EC50 = 0.17 ㎎/ℓ 72 hr
- [Solvent naphtha (petroleum), light arom.] : EC50 = 19 ㎎/ℓ 72 hr Selenastrum capricornutum
- [Talc, non-asbestos form] : LC50 = 48545.539 ㎎/ℓ
- [n-Butyl alcohol] : EC50 = 28 ㎎/ℓ 48 hr

B. Persistence and degradability

○ **Persistence**

- [Solvent naphtha (petroleum), light arom.] : log Kow = 2.1 ~ 6 (Estimates)
- [Talc, non-asbestos form] : log Kow = -1.50
- [Diiron trioxide] : log Kow = 0.97 (Estimates)

○ **Degradability**

- [Solvent naphtha (petroleum), light arom.] : BOD5/COD = 0.43

C. Bioaccumulative potential

○ **Bioaccumulative potential**

- [Zinc oxide] : BCF = 217

○ **Biodegration**

- [Xylene] : 39 (%)

D. Mobility in soil

- [Xylene] : log Kow = 3.12 (measured) (ortho), 3.2 (measured) (meta), 3.15 (measurements) (p) (5)

E. Other adverse effects

- Not available

13. DISPOSAL CONSIDERATIONS

A. Disposal methods

- Since more than two kinds of designaed waste is mixed, it is difficult to treat seperatly, then can be reduction or stabilization by incineration or similar process.
- If water separation is possible, pre-process with Water separation process.
- Dispose by incineration.

B. Special precautions for disposal

- The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.
- Dispose of waste in accordance with all applicable laws and regulations.

14. TRANSPORT INFORMATION

A. UN No. (IMDG)

- 1263

B. Proper shipping name

- PAINT INCLUDING PAINT, LACQUER, ENAMEL, STAIN, SHELLAC SOLUTIONS, VARNISH, POLISH, LIQUID FILLER, AND LIQUID LACQUER BASE

C. Hazard Class

- 3

D. IMDG Packing group

- Ⅱ

E. Marine pollutant

- [Solvent naphtha (petroleum), light arom.] : Applicable

F. Special precautions for user related to transport or transportation measures

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : F-E (Non-water-reactive flammable liquids)
- EmS SPILLAGE SCHEDULE : S-E (Flammable liquids, floating on water)

15. REGULATORY INFORMATION

A. National and/or international regulatory information

○ **POPs Management Law**

- Not applicable

○ **Information of EU Classification**

*** Classification**

- [Dicopper oxide] : Xn; R22 N; 50-53
- [Zinc oxide] : N; R50-53
- [Solvent naphtha (petroleum), light arom.] : Carc. Cat. 2; R45/Muta. Cat. 2; R46, Xn; R65
- [n-Butyl alcohol] : R10 Xn; R 22 Xi; R37/38-41 R67
- [Xylene] : R10 Xn; R20/21 Xi; R38

*** Risk Phrases**

- [Dicopper oxide] : R22, R50/53
- [Zinc oxide] : R50/53
- [Solvent naphtha (petroleum), light arom.] : R45, R65, R46
- [n-Butyl alcohol] : R10, R22, R37/38, R41, R67
- [Xylene] : R10, R20/21, R38

*** Safety Phrase**

- [Dicopper oxide] : S2, S22, S60, S61
- [Zinc oxide] : S60, S61
- [Solvent naphtha (petroleum), light arom.] : S53, S45
- [n-Butyl alcohol] : S2, S7/9, S13, S26, S37/39, S46
- [Xylene] : S2, S25

○ **U.S. Federal regulations**

*** OSHA PROCESS SAFETY (29CFR1910.119)**

- Not applicable

*** CERCLA Section 103 (40CFR302.4)**

- [n-Butyl alcohol] : 2267.995 kg 5000 lb
- [Xylene] : 45.3599 kg 100 lb

*** EPCRA Section 302 (40CFR355.30)**

- Not applicable

*** EPCRA Section 304 (40CFR355.40)**

- Not applicable

*** EPCRA Section 313 (40CFR372.65)**

- [n-Butyl alcohol] : Applicable
- [Xylene] : Applicable

○ **Rotterdam Convention listed ingredients**

- Not applicable

○ **Stockholm Convention listed ingredients**

- Not applicable

○ **Montreal Protocol listed ingredients**

- Not applicable

16. OTHER INFORMATION

A. Reference

##

- This Safety Data Sheet was compiled with data and information from the following sources: KOSHA, NITE, ESIS, NLM, SIDS, IPCS

B. Issue date

- 2016-09-05

C. Revision number and Last date revised

- Not applicable

D. Other

- This SDS is prepared according to the Globally Harmonized System (GHS).