MATERIAL SAFETY DATA SHEETS(MSDS)

1. Identification of the substance/preparation and of the company/undertaking

A. Product name	METAL GUARD CK-656	C. Manufacturer / Supplier / Distributor Information	
		○ Manufacturer	GHI CO.,LTD
PART NUMBER	CK-656	○ Importer	
ITEM NUMBER	00656-01	Address	
General characteristics	Rubber coating	○ Supplier	GHI CO.,LTD
Hazard classification	Hazardous substance, irritant substance	Address	16Gil 6, Jinjang, BugKu, Ulsan, South Korea
B. Recommended use of the product and restrictions on use	Coating agent for peeling Corrosion prevention of iron and nonferrous metals	TEL	+82-52-298-2259, +82-52-294-0250
		E-mail	hq@ghi.cc
		Date of draft	10.01.2015

2. Hazardous Ingredients

A. Hazardous Classification : Flammable liquids : Category 2, Skin corrosion / irritation: Category 2, Serious Eye Damage/Eye Irritation : Category 2, Reproductive toxicity: Category 2, specific target organ toxicity-single exposure : Category 3(narcotic effect), Specific target organ toxicity-single exposure : Category 3(respiratory irritation), Specific target organ toxicity-repeated exposure : Category 2, Acute toxicity (inhalation) : Category 1

B. Label elements

○ Pictogram :

○ Signal word : danger, warning

○ Hazard statement

H225: Highly flammable liquid and vapour.
H304: If swallowed, enter the respiratory tract and it may be fatal.
H315: Causes skin irritation. H319: Causes serious eye irritation. H335: May cause respiratory irritation.
H336: May cause drowsiness or dizziness. H361: Suspected of damaging fertility or the unborn child.
H373: Prolonged or repeated exposure may cause personal injury.

○ precautionary statements

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. - No smoking
P233: Keep container tightly closed. P240: Connect containers and receptacles.
P241: Use explosion-proof electrical / ventilating / lighting / equipment.
P242: Use only non-sparking tools.
P243: Take precautionary measures against static discharge.
P260: Do not breathe dust/mist/spray.
P264: Wash thoroughly after handling.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection.

Response/ P301+P310: IF SWALOWED : Call a POISON CENTER or doctor/physician if you fel unwel.
P302+P352: IF ON SKIN : Wash with plenty of soap and water.
P303+P361+P353: IF ON SKIN(or hair): Femove/take off immediately all contaminated clothing. Finse skin with water/shower.
P304+P340: IN INHALED: Remove person to fresh air and keep comfortable for breathing.
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
P312: Call a Poison Centre/doctor/... if you feel unwell.
P314: Get medical advixe/ attention if you feel unwell.
P331: Do not vomit.
P332+P313: If skin irritation occurs : Get medical advice/attention.
P337+P313: If eye irritation persists : Get medical advice/attention.
P362+P364: Take of contaminated clothing and wash before reuse.
P370+P378: In case of fire: Use a fire extinguisher.

Storage/ P403+P233: Store in a well-ventilated place. Keep container tightly closed.
P410+P411: Protect from sunlight. Do not expose to temperatures exceeding 40℃.
P405: Store locked up.

○ precautionary statements	Disposal/ P501: Dispose of contents and container in accordance with local and national regulations.
C. Other hazard which do not result in classification	N.E

3. Composition / Information on Ingredients

Ingredients	CAS NO.	Contents(%)
SEBS(Styrene Ethylene Butylene Styrene Block Copolymer)	66070-58-4	22~27
Methyl ethyl ketone(MEK)	78-93-3	1~5
Xylene	1330-20-7	34~40
Toluene	108-88-3	30~36
Secret	B.S	1~5

4. First Aid Measures

A. Eye Contact	- If it gets on your eyes, wash it carefully with water for a few minutes. If possible, remove contact lenses. - If eye irritation persists seek medical advice and advice.
B. Skin Contact	- If skin or hair gets wet, remove all contaminated clothing. Wash skin with water. Take a shower. If skin irritation occurs, seek medical advice and advice. - Remove contaminated clothing and shoes and isolate contaminated areas. - Avoid dispersal of the contaminated material in the presence of minor skin contact. - In the case of burns, immediately cool the affected area with cold water and do not remove any clothing adhered to the skin. - Wash skin with soap and water.
C. Inhalation	- If exposure is of concern, seek medical advice. - Do not vomit. - Excessive dust or smoke should be replaced with fresh air. If coughing or other symptoms occur, seek medical attention.
D. Ingestion (Swallowed)	- If swallowed, seek medical advice immediately. - Do not induce vomiting and seek medical attention immediately.
E. Indication of immediate medical attention and special treatment needed	- Contact the medical staff at the time of exposure and take special first aid measures such as follow-up investigations. - Allow medical personnel to recognize and take protective action against the substance.

5. Fire-fighting Measures

A. Suitable extinguishing media : Use alcohol foam, carbon dioxide or water spray.
When extinguishing by smothering, use dry sand or earth.

B. Specific hazards arising from the chemical
- Highly flammable liquid and vapor - Violent reactions can cause fire and fumes.
- Vapor may be released to the ignition source and ignite.
- During burning, pyrolysis or combustion can produce irritating and highly toxic gases.
- May form explosive mixture at flash point or more. - The container may explode on heating.
- Highly flammable: Easily ignited by heat, sparks and flames. - Spills may cause fire / explosion.
- Vapors are explosive at room, outdoors, and at the sewers. - Some can ride, but not easily ignite.
- Vapors may form explosive mixtures with air.
- Non-flammable materials themselves are not burned but may cause corrosion or toxic fumes.

C. Special protective equipment and precautions for fire fighters: Move containers from fire area and use water sprayer to cool containers for a period of time. You should also wear a respirator mask.

6. Accidental Release Measure

A. Personal precautions/ measures and equipments	- Avoid breathing dust, fume, gas, mist and spray. - Remove all ignition sources as very fine particles may cause fire or explosion. - Wipe off any spills immediately and follow the precautionary measures. - Stop the leak if it is dangerous. - Do not touch the damaged container without proper protection. - Steam suppression foam may be used to reduce steam generation. - Note the substances and conditions to avoid.
B. Environmental precautions	- Prevent entry into waterways, sewers, basements and confined areas.

C. Methods of cleaning up/ removing	- Pile up the dike to collect the water and turn off the fire. - Absorb with inert materials (eg dry sand or earth) and place in a chemical waste container. - Absorb liquid and rinse contaminated area with detergent and water. - In case of large spills, make a dike distant from liquid spills.

7. Handling and Storage

A. safety handling precaution	- Do not handle until all safety precautions have been read and understood. - Carefully open the cap before opening. - Use only non-sparking tools. - Be aware of static electricity. - Avoid breathing dust, fume, gas, mist and spray. - Handle it outdoors or in a well-ventilated area. - Do not expose to pressure, cutting, welding, soldering, joining, punching, polishing, flames, sparks, static electricity or other sources of ignition. - Avoid prolonged or repeated skin contact. - Pay attention to the materials and conditions to avoid. - When working in a low-lying confined space, measure oxygen concentration during work and ventilate it because there is a risk of oxygen deficiency. - Be careful of high temperatures. - Wash thoroughly after handling.
B. Suitable storage conditions	- Keep away from heat sparks, flames, and heat. (no smoking) - Keep container tightly closed in a well-ventilated place.

8. Exposure controls / personal protection

A. Component exposure limits	National standard	Toluene; TWA 50ppm, STEL 150ppm Xylene: TWA 100ppm, STEL 150ppm MEK: TWA 200ppm, STEL 300ppm SEBS: N.E
	ACGIH	Toluene; TWA- 20ppm Xylene: TWA- 100ppm, STEL-150ppm MEK: TWA- 200ppm, STEL-300ppm SEBS: N.E
	Biological exposure standard	Toluene: 0.02 mg/L Medium: blood Time: prior to last shift of workweek Parameter: Toluene; 0.03mg/L Medium: urine Time: end of shift Parameter: Toluene; 0.3 mg/g creatinine Medium:urine Time: end of shift Parameter : oCresol with hydrolysis (background) Xylene: N.E. MEK: N.E SEBS: N.E
B. Engineering controls	- Use process isolation, local exhaust ventilation, or controlled exposure below air exposure limits. - Install eyewash stations and safety showers where this material is stored and handled.	
C. Persona protective equipments	○ Respiratory protection: Wear organic solvent mask. If sanding dry film, wear respiratory protection respiratory protection suitable for dust and powder.	
	○ Eye protection: Wear protective glasses.	
	○ Hand protection: Wear protective gloves	
	○ Other: wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.	

9. Physical and chemical properties

A. Appearance (physical state, color..)	fluid-liquid / Blue	K. Vapor pressure	N.E
B. Odor	Solvent	L. Solubility	Insoluble in water
C. Odor threshold	N.E	M. Vapor density	N.E
D. pH	N.E	N. Specific gravity	0.85±0.5
E. Melting point/freezing point	N.A.	O. Partition coefficient (n-octanol/water)	N.E
F. Initial boiling point and boiling range	N.E	P. Auto-ignition temperature	N.E
G. Flash point	N.E	Q Decomposition temperature	N.E
H. Evaporation rate	N.E	R. Viscosity	3,000cps
I. Flammability (solid, gas)	Gas	S. Molecular Weight	N.E
J. Upper/lower flammability or explosive limits	N.E	T. Percent volatile	N.E

10. Stability and Reactivity

A. Chemical stability	Stable at normal temperature and pressure.
B. Possibility of hazardous polymerization	Containers may explode upon heating. Some can ride, but not easily ignited. In case of fire, it may cause irritation and toxic gas.
C. Avoid condition (discharge of static electricity, shock, vibration)	Do not get in contact with sources of ignition such as heat, sparks and flames. Avoid heating of the container. Vapors can affect the explosion. Avoid contact with acids, bases or oxidizing agents.
D. Avoid materials	Avoid sources of ignition (heat, sparks, flames, etc.).
E. Decomposition products	N.E

11. Toxicological Information

A. Information for exposure route		○ Respiratory: Irritating. ○ Oral: May cause gastrointestinal disturbances. ○ Eyes, Skin: Eyes / Slightly irritating. Irritating to skin / long-term exposure.
B. Information for health	○ Acute toxicity	
	Oral	Toluene : LD50 5580 ㎎/㎏ Rat (EU Method B.1) Xylene : LD50 3523 ㎎/㎏ Rat (EU Method B.1) Methyl ethyl ketone: LD50 2193 ㎎/㎏ Rat (Analogous substance:78-92-2 OECD TG 423, GLP) SEBS: N.E
	Dermal	Toluene : LD50 5000 ㎎/㎏ Rabbit Xylene : LD50 12126 ㎎/㎏ Rabbit (Isomer: m-xylene) Methyl ethyl ketone: LD50 10 ㎎/㎏ Rabbit (OECD TG 402) SEBS: N.E
	Inhalation	Toluene : Vapor LD50> 20 ㎎/ℓ Rat (OECD TG 403) Xylene : Vapor LD50> 5922 ppm 4hr Rat (25.713 ㎎/ℓ EPA OPP 81-3, GLP) Methyl ethyl ketone: Vapor LD50 32 ㎎/ℓ 4hr Rat SEBS: N.E
	○ Skin corrosion/irritation : May cause irritation and dermatitis by prolonged contact.	
	○ Serious eye damage/eye irritation : May cause mild irritation to eyes.	
	○ Respiratory sensitization ; N.E	
	○ Skin sensitization : May cause irritation.	
	○ Carcinogenicity : N.E	
	○ Germ cell mutagenicity : N.E	
	○ Reproductive toxicity	
	Toluene	Reproductive toxicity studies using rats showed a decrease in sperm count at 2000 ppm (7537 mg / m 3) and a decrease in epididymis at 600 ppm (2261mg/㎥) of NOAEC (P).
	Xylene	Reproductive Toxicity in Rats (Inhalation Repeated Exposure, EPA OPPTS 870.3800) Test Results: No toxic effects related to reproductive and developmental effects were observed up to the highest concentration (500 ppm).Developmental inhalation toxicity test (OECD TG414) using NOAEC (reproductive / developmental / parental toxicity) ≥500 ppm rats Results: BMCL10 (development) = 5761 mg/㎥ as a decrease in neonatal weight, BMCL10 (maternal toxicity) as maternal weight loss = 2675 mg/㎥.
	Methyl ethyl ketone	<Analogous substance: 78-92-2> Second-generation reproductive toxicity test in rats: No fetal toxicity, death, teratogenicity, long-term weight change, histopathological inflammation were observed up to 10000 mg / L (NOAEL F1, P= 10 000 mg / Ldrinking water) (OECD TG 416) Fetal Developmental Toxicity Test on Rats: Body weight decreased. MEK levels were significantly higher in exposed individuals during gestation period. In the concentration group of 3000ppm, embryotoxicity / teratogenicity decreased the delay of ossification of bone between bones. Lumbar ribs increased more than normal number. (NOAECP teratogenicity & maternal toxicity = ca.1002ppm) (OECD TG 414)
	SEBS	N.E
	○ Specific target organ toxicity -single exposure :	
	Toluene	Affects the central nervous system of a person. Tiredness, drowsiness, dizziness, irritation to respiratory system. Causes excitement, vomiting, central nervous system depression, mental disorders. Irritating to eyes, nose and throat. (Experiment) Causes anesthesia to animals. Target Organ: Central Nervous System
	Xylene	Dizziness is reported in people. Significant arousal and narcotic effects were reported in HSDB, IPCS, and experimental animals. Exposure to human 100 ppm 442 mg / m3 has a slight effect on mild irritation and central nervous system in eyes / nose / mouth.

	Methyl ethyl ketone	Specific Target Organ Toxicity Single Exposure : Inhalation exposure results in white rats: Relatively low concentrations may affect the central nervous system. Medium concentrations affect the kidneys of rats. If person inhales or exposes, airway irritation appears.
	SEBS	N.E
	○ Specific target organ toxicity -repeated exposure	
	Toluene	Results of a 90-day oral toxicity study (EU method B.26) using rats: NOAEL 625 mg / kg bw / day with absolute or relative weight gain. Rat 103 weeks inhalation carcinogenicity test (OECD TG453, GLP) Result: NOAEC 600 ppm2250 mg / m3 as local toxicity of nasal epithelium. Inhalation repeated toxicity test (EU method B.29, GLP) using the rat Result: Weight change, long term weight Relative testis weight and hematologic change in brain, heart, lung, male Reduction of leukocytosis, reduction of plasma cholinesteraseacitivity, NOAEC 625 ppm2355 mg / m3
	Xylene	Results of 103 weeks carcinogenicity test (EU Method B.32) using rats : No effect on systemic toxicity or carcinogenicity due to mixed xylene administration. Oral repeated oral toxicity test (OECD TG408) with rats Results: Weight loss limited by mixed xylene. Relatively liver weight and kidney were increased, but histopathological effect was not observed. NOAEL = 150 mg / kg bw / day.
	Methyl ethyl ketone	Chronic inhalation toxicity to rats (90 days trial) Result: Liver weight, liver weight / body weight ratio, liver / brain weight ratio were significantly increased in male subjects at high concentration. The height / weight ratio was also the only high. Increased particulate hemoglobin concentration in females at high concentrations. NOAEC = 5 041 ppm GLP, OECD Guideline 413
	SEBS	N.E
	○ Aspiration hazard	
	Toluene	Hydrocarbons, kinematic viscosity less than 20.5 ㎟/s (at 40 ℃)
	Xylene	Hydrocarbons, kinematic viscosity 0.603 mPa / s (at 25 ° C)
	Methyl ethyl ketone	Ketones with less than 13 carbon atoms, 3.44mPas(50℃), 1.78mPas(75℃)
	SEBS	N.E.

12. Ecological Information

A. Ecotoxicity	Fish	Toluene	LC50 5.5 ㎎/ℓ 96 hr Oncorhynchus kistutch
		Xylene	LC50 2.6 ㎎/ℓ 96 hr (OECD TG 203)
		Methyl ethyl ketone	LC50 2993 ㎎/ℓ 96 hr Pimephales promelas (exponential OECD TG 203, GLP)
		SEBS	N.E
	Crustacea	Toluene	N.E
		Xylene	EC50 3.6 ㎎/ℓ 24 hr (OECD TG 202)
		Methyl ethyl ketone	EC50 308 ㎎/ℓ 48 hr Daphnia magna (exponential OECD TG 202, GLP)
		SEBS	N.E
	Algae	Toluene	N.E
		Xylene	ErC50 4.06 ㎎/ℓ 73 hr (OECD TG201, GLP)
		Methyl ethyl ketone	EC50 2029 ㎎/ℓ 96 hr Selenastrum capricornutum (exponential OECD TG 201, GLP)
		SEBS	N.E
B. Persistence / degradability	Persistence	Toluene	log Kow 2.73 (20℃)
		Xylene	log Kow 3.15
		Methyl ethyl ketone	log Kow 0.3 (40℃, ph=7)
		SEBS	N.E
	Degradability	N.E.	
C. Bioaccumulative potential	Bioaccumulation	Toluene	01 BCF
		Xylene	Oncorhynchus mykiss
		Methyl ethyl ketone	N.E
		SEBS	N.E
	Biodegradable	Toluene	80 01 20 day (dichotomy)
		Xylene	90 01 28 day (dichotomy, OECD TG301F, GLP)
		Methyl ethyl ketone	98 01 28 day (OECD TG 301D)
		SEBS	N.E

D. Soil mobility	-Toluene: N.E -Xylene: log Koc=2.73 -Methyl ethyl ketone: N.E -SEBS: N.E	
E. Other adverse effects	Toluene	- Fish Oncorhynchus kisutch : NOEC 40 d=1.39 mg/L - Crustacea Ceriodaphnia dubia : NOEC 7 d=0.74 mg/L
	Xylene	- Fish Chronic Toxicity Test : NOEC 56d>1.3mg/L - Daphnia Chronic Toxicity Test : US EPA 600/4-91-003 → NOEC=1.17 mg/L
	Methyl ethyl ketone	- Algae : 96h NOAEC Growth rate=1 240 mg/L Pseudokirchnerella subcapitata exponential OECD Guideline 201, GLP
	SEBS	- N.E

13. Disposal Considerations

A. Disposal method	Disposal should be in accordance with relevant laws and local government standards. Dispose of via a licensed waste disposal contractor.

B. Waste information (including waste method of contaminated container and packaging)
Dispose of container and unused contents in accordance with federal, state and local requirements.
For Aerosol, the product must be disposed after being punctured.

14. Transport Information

A. UN number	Toluene : 1294 Xylene: 1307 Methyl ethyl ketone: 1193 SEBS: N.E.	
B. UN proper shipping name	TOLUENE, XYLENE, METHYL ETHYL KETONE	
C. Transport hazard class	Toluene : 3 Xylene: 3 Methyl ethyl ketone: 3 SEBS: N.A.	
D. Packing group	Toluene : Ⅱ Xylene: Ⅲ Methyl ethyl ketone: Ⅱ SEBS: N.A.	
E. Marine pollution	Toluene : N.A. Xylene: N.A. Methyl ethyl ketone: N.A. SEBS: N.E.	
F. Special precaution which a user to be aware of or needs to comply with in connection with transport or conveyance either within or outside their premises	Emergency fire	Toluene: F-E, Xylene: F-E, Methyl ethyl ketone: F-E, SEBS: N.A.
	Emergency Action	Toluene: S-D, Xylene: S-D, Methyl ethyl ketone: S-D, SEBS: N.A.

15. Regulatory Information

According to industrial Safety&health Act	Toluene	Process Safety Report (PSM) Substances to be submitted, hazardous substances to be controlled, substances to be measured for working environment (measurement period: 6 months), substances subject to special medical examination (diagnosis period: 12 months)
	Xylene	Process Safety Report (PSM) Substances to be submitted, hazardous substances to be controlled, substances to be measured for working environment, substances subject to special medical examination
	Methyl ethyl ketone	Process Safety Report (PSM) Substances to be submitted, hazardous substances to be controlled, substances to be measured for working environment, substances for special health examination, exposure standard setting substance.
	SEBS	N.E
According to Chemicals Control Law	Toluene: Accidental substance, toxic substance Xylene: Toxic substance Methyl ethyl ketone: Accidental substance, toxic substance SEBS: N.E	
According to Dangerous Substances Safety Management Act Enforcement Rule	Toluene: Class 4, 2nd petroleum(Water-insoluble) 200L, Xylene: Class 4, 1st petroleum(Water-soluble) 400L Methyl ethyl ketone: Class 4, 1st petroleum(Water-insoluble) 200L, SEBS: N.E	
According to Enforcement Decree of The wastes control Act	Toluene, Xylene, Methyl ethyl ketone: designated waste, SEBS: N.E	
According to other regulations	Domestic regulation/Residual organic matter management Toluene: N.A. Xylene: N.A. Methyl ethyl ketone: N.A. SEBS: N.A.	

16. Other Information

A. Reference : This MSDS has been supplemented and written by a GHI CO., LTD (supplier) on October 1, 2015 in accordance with GHS (Globally Harmonized System of Classification and Labeling Chemicals)/UN guideline.
B. Date of draft : 10.01. 2015
C. Revision number and the latest version date : 3 / 07.02. 2018
D. This Material Safety Data Sheet(MSDS) may be changed or modified without prior notice due to product performance improvements or new technologies.

This MSDS is based on Article 39 (1) and Article 41 of the Industrial Safety and Health Act, Article 32 (2) of the Enforcement Decree of the same Act, Article 81 (1) of the Enforcement Rule, Article 92 (2) It is based on the classification of chemical substances, warning signs, material safety data to be prepared by the employer, and training for workers in accordance with Paragraph 2 of Schedule 11. A person who has been provided with information on the chemical substance pursuant to Article 20 (3) shall not use it for purposes other than therapeutic purposes or for the protection of workers' health, or disclose it to another person. We do not assume any technical or legal liability as a result of this.

B.S.= Business secrecy(영업비밀)
N.A.= Not applicable(해당없음/적용할 것이 없음)
N.E.= Not established(자료없음/확실한 것이 없음)