

1. IDENTIFICATION

A. PRODUCT NAME

- ☐ HFH 412

B. Recommended Use and Restriction on Use

- ☐ General use : Not available
- ☐ Restriction on Use : Not applicable

C. Information of Manufacturer

– Manufacturer

- ☐ Company name : Korea Kumho Petrochemical Co., Ltd.
- ☐ Address : 260-257, Cheoyong-ro, Nam-gu, Ulsan, Korea
- ☐ Dept. : Quality Assurance Team
- ☐ Person in charge :
- ☐ Telephone number : +82-52-279-8852
- ☐ Fax number : +82-52-279-8840
- ☐ Emergency :

– Supplier / distributor

- ☐ Company name :
- ☐ Address :
- ☐ Dept. :
- ☐ Person in charge :
- ☐ Telephone number :
- ☐ Fax number :
- ☐ Emergency :

2. HAZARD IDENTIFICATION

A. GHS Classification : Not applicable

- Carcinogenicity : Category 1B
- Reproductive toxicity : Category 1B
- Specific target organ toxicity (Single exposure) : Category 2(Respiratory)

B. GHS label elements

☐ Hazard symbols :



☐ Signal word : Danger

☐ Hazard statement :

- H350 May cause cancer
- H360 May damage fertility or the unborn child
- H371 May cause damage to respiratory

☐ Precautionary statements :

- Prevention
 - P201 Obtain special instructions before use.
 - P202 Do not handle until all safety precautions have been read and understood.
 - P281 Use personal protective equipment as required.
 - P260 Do not breathe dust/fume/gas/mist/vapours/spray.
 - P270 Do not eat, drink or smoke when using this product.
- Response
 - P308+P313 IF exposed or concerned: Get medical advice/attention.
 - P309+P311 IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
- Storage
 - P405 Store locked up.
- Disposal
 - P501 Dispose of contents/container in accordance with local/regional/national/international regulation

C. Other hazards which do not result in classification :

- NFPA rating: (0~4 steps) : Health=0, Flammability=0, Reactivity=0

3. COMPOSITION/INFORMATION ON INGREDIENTS

| Chemical name | CAS No./ECL No./EINECS No. | Contents(%) |
|-----------------------------|-------------------------------|-------------|
| Butadiene-Styrene | 9003-55-8/KE-13257/- | 85~90 |
| Antimony Trioxide | 1309-64-4/KE-9846/215-175-0 | 0.3~1.5 |
| Bis(pentabromophenyl)ethane | 84852-53-9/97-3-898/284-366-9 | 5~10 |
| Antioxidant | 2082-79-3/KE-03070/218-216-0 | 0.1~10 |
| Wax | 110-30-5/KE-13662/203-755-6 | 0.1~5 |

※ Reference No. : ECL(Registration number of Korean Existing Chemical List)
EINECS(Registration number of Europe Existing Chemical List)

4. FIRST-AID MEASURES

A. Eye Contact :

- Immediately flush eyelids down enough with plenty of water at least 15minutes.
- If irritation persists, get a doctor's examination.

B. Skin Contact :

- Wash the contaminated skin area with running water.
- Remove contaminated clothes and shoes.
- If irritation persists, get a doctor's examination.

C. Inhalation :

- Intake the water to clean the throat and blow nose to remove the dust.
- Remove exposed person to fresh air.
- Do the artificial respiration if not breathing.
- Give oxygen, if breathing is difficult
- Get medical attention.

D. Ingestion :

- Rinse mouth with water.

- Give large amounts of water to relieve stimulus.
- If irritation or symptoms occurs, get a doctor's examination.

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

- Steams by plastic processing at high temperature may cause eyes and respiratory irritation.

F. Notice to Physician :

- Treatment may vary with condition of victim and specifics of incident.

5. FIRE FIGHTING MEASURE

A. Suitable (Unsuitable) extinguishing media :

- ☐ Extinguishing media : Powder foam, carbon dioxide, water or foam.
- ☐ Unsuitable Extinguishing media : Do not use direct water.
- ☐ Large fire : Water spray, regular foam

B. Specific hazards arising from the chemical

- ☐ Combustion :
 - Irritating, corrosive and/or toxic gases may occur by fire.
 - Generate pyrolysis such as carbon dioxide, carbon monoxide and styrene when combustion.
- ☐ Levels of fire hazard :
 - Containers may rupture or explode if exposed.
 - Dust / air mixtures may ignite or explode.

C. Fire fighting procedures and equipments :

- Wear appropriate personal protective equipment(see section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION).
- Avoid inhalation of smoke or gas when fire fighting.
- Move container from fire area if it can be done without risk.
- Cool containers with water until well after fire is out.
- Stay upwind and keep out of low areas.
- Avoid inhalation of substance itself or combustion.

6. ACCIDENTAL RELEASE MEASURES

A. Personal Precautions, Protective Equipment and Emergency procedures :

- Perform in accordance with 「 See section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION」 . Put on appropriate personal protective equipment.
- Use a way to minimize dust.
- Avoid contact with eyes and skin.
- Avoid inhalation of substance itself or combustion.
- Evacuation against the wind.
- Keep unauthorized personnel out.
- Avoid contact with heat, sparks, flame or other ignition sources.

B. Environmental Precautions

- Avoid dispersal of spilt material and runoff and contact with waterways, drains and sewers. If large spills, advise emergency services.

C. Methods and materials for containment and cleaning up :

- For small spills.
 - Remove all sources of ignition.
 - Suppression occurrence of dust.
 - Appropriate container for disposal of spilled material collected.
 - Ventilate leak areas and clearing leak area.
- For large spills.
 - Remove all sources of ignition.
 - Suppression occurrence of dust.
 - Avoid entering to sewers or water system.
 - For disposal of spilled material in appropriate containers collected and clear surface.
 - Appropriate container for disposal of spilled material collected.

7. HANDLING AND STORAGE

A. Handling :

- Perform in accordance with 「 See section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION」 . Put on appropriate personal protective equipment.
- Handle in a well-ventilated place.
- Avoid contact with heat, sparks, flame or other ignition sources.
- Remove all sources of ignition.
- Use all the equipment after the ground.
- Wash thoroughly after handling.

B. Storage Precautionary Statements :

- Keep in original container and tightly closed.
- Avoid contact moisture.
- Avoid contact with incompatible materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limit

- Exposure limit under ISHL :
 - Butadiene-Styrene : Not available
 - Antimony Trioxide
TWA = 0.5 mg/m³
 - Brominated flame retardant : Not available
- ACGIH :
 - Butadiene-Styrene : Not available
 - Antimony Trioxide :
TWA = 0.5 mg/m³ (when Antimony)
 - Brominated flame retardant : Not available
- Biological exposure limits : Not applicable

B. Engineering Controls

- A system of local and/or general exhaust is recommended to keep employee exposures above the Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. The use of local exhaust ventilation is recommended to control emissions near the source.

C. Personal Protective Equipment :

- Respiratory Protection : Use the respirator be given official approval by Korea Occupational Safety & Health Agency. 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.
 - Dust, mist, fume–purifying respiratory protection
 - Any air–purifying respirator with a corpuscle filter of high efficiency
 - Any respiratory protection with a electromotion fan(for dust, mist, fume–purifying)
 - ※ For Unknown Concentration or Immediately Dangerous to Life or Health
 - Self–contained breathing apparatus(pressure–demand or other positive–pressure mode in combination)
 - Supplied–air respirator with full facepiece
- Eye Protection : Wear primary eye protection such as splash resistant safety goggles with a secondary protection faceshield. Provide an emergency eye wash station and quick drench shower in the immediate work area.
- Hand Protection : Wear chemical resistant protected gloves if there is hazard potential for direct skin contact. Wear heat resistant protected gloves to withstand the temperature of molten product.
- Body Protection : Wear chemical resistant protected clothing if there is hazard potential for direct contact.

9. PHYSICAL AND CHEMICAL PROPERTIES

- A. Appearance : Pellet
- B. Odor : Odorless
- C. Odor threshold : Not available
- D. pH : Not available
- E. Melting point/Freezing point : 150~170℃
- F. Initial Boiling Point/Boiling Ranges : Not applicable
- G. Flash point : 350℃
- H. Evapourating Rate : Not available
- I. Flammability(solid, gas) : Not available

- J. Upper/Lower Flammability or explosive limits : Not available
- K. Vapour pressure : Not applicable
- L. Solubility : Insoluble
- M. Vapour density(Air=1) : Not applicable
- N. Relative density : 1.15~1.18
- O. Partition coefficient of n-octanol/water : Not available
- P. Autoignition Temperature : 455℃
- Q. Decomposition Temperature : Not applicable
- R. Viscosity : 150~170℃
- S. Molecular weight : Not available

10. STABILITY AND REACTIVITY

- A. Stability
 - This material is stable under recommended storage and handling conditions
- B. Possibility of Hazardous Reaction
 - Will not occur.
- C. Conditions to Avoid
 - Avoid contact with heat, sparks, flame or other ignition sources.
- D. Materials to Avoid
 - Strong oxidizing agents.
- E. Hazardous Decomposition Products
 - Generate pyrolysis such as carbon dioxide, carbon monoxide and styrene when combustion.

11. TOXOCOLOGICAL INFORMATION

- A. Information on the likely routes of exposure
 - (Respiratory tracts) : May cause damage to the respiratory tract
 - (Oral) : Not applicable
 - (Eye · Skin) : Not applicable

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

○ Acute toxicity :

– Acute oral toxicity

- Butadiene–Styrene : Not available
- Antimony Trioxide : LD50(rat) 5000 mg/kg
- Brominated flame retardant : Not available

– Acute dermal toxicity : Not available

– Acute Inhalation toxicity : Not available

○ Skin corrosion/irritation :

- Butadiene–Styrene : Not available

- Antimony Trioxide :

Classification not possible, “Irritative” according to EU Risk Phrase (2005), but data that can serve as evidence are unknown.

- Brominated flame retardant : Not available

○ Serious eye damage/irritation :

- Butadiene–Styrene : Not available

- Antimony Trioxide :

Category 2B, "mild irritation" from rabbit eye irritation tests.

- Brominated flame retardant : Not available

○ Respiratory sensitization : Not available

○ Skin sensitization : Not available

○ Carcinogenicity :

- Butadiene–Styrene : Not available

- Antimony Trioxide : the substance is classified as Category A2 by ACGIH.

- Brominated flame retardant : Not available

○ Germ cell mutagenicity :

- Butadiene–Styrene : Not available

- Antimony Trioxide :

Not classified, Based on the absence of data on multi-generation mutagenicity tests, negative data on germ cell multi-generation mutagenicity tests in vivo (chromosome aberration tests), somatic cell mutagenicity tests in vivo (chromosome aberration tests) show negative (the results of a single administration show negative, while those of 21–

day administration show an increase in the incidence of bone marrow chromosome aberrations). The judgment conforms to that of experts (i.e., classification based on the information obtained from the search of literatures).

- Brominated flame retardant : Not available

○ Reproductive toxicity :

- Butadiene–Styrene : Not available
- Antimony Trioxide :

Category 1B, Based on the description in the report on rat teratogenicity and reproductive toxicity tests (IARC 47 (1989)): Infertility and an increase in absorbed embryos (during pre- and post implantation stages) are observed at dosing levels not toxic to dams. The judgment conforms to that of experts: Although the substance could be classified into Category 2 based solely on the results of animal studies, Category 1B should be appropriate because epidemiological data are not considered "reliable enough to provide evidence for the classification into Category 1A."

- Brominated flame retardant : Not available

○ Specific target organ toxicity(single exposure) :

- Butadiene–Styrene : Not available
- Antimony Trioxide :

Category 1 (heart)

Category 2 (respiratory organs), Based on the human evidence including "a total of fifty–six inpatients developed burning pain in the stomach, colicky pain and nausea", "heart muscle necrosis was observed in autopsy specimens", and the evidence from animal studies including "mild and local discoloration of the lungs, white protuberant lesions". The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 2.

- Brominated flame retardant : Not available

○ Specific target organ toxicity(repeated exposure) :

- Butadiene–Styrene : Not available
- Antimony Trioxide :

Category 1 (respiratory organs), Based on the human evidence including "pneumonia (diagnosed by X-ray examination)," "antimony pneumoconiosis associated with symptoms of pneumoconiosis," "a

correlation reported between abnormal x-ray shadows in the chest, antimony deposition in the lungs and exposure time," "infiltrating patchy shadows with a diameter of less than 1mm and their concentration in the middle lobe", and the evidence from animal studies including "discoloration of the lungs (autopsy findings), phagocytes containing particles, degenerated phagocytes, cellular debris in the wall of the alveoli, interstitial fibrosis, enlargement/hyperplasia of alveolar epithelial cells, granulomatous inflammation, granuloma", "body weight reduction, pulmonary interstitial fibrosis, enlargement/hyperplasia of alveolar epithelial cells, cubic/columnar epithelium metaplasia". The effects on experimental animals were observed at dosing levels within the guidance value ranges for Category 1.

· Brominated flame retardant : Not available

○ Aspiration hazard : Not available

○ Chronic effect : Not available

C. Calculation the classification of the mixture(acute toxicity estimate calculation etc.) :

The acute toxicity estimate(ATE) of the mixture is calculates from the acute toxicity values for all relevant ingredients in product according to the following formula.

$[100 - (\Sigma \text{Cunknown if } > 10\%)] / \text{ATE}_{\text{mix}} = \Sigma \text{Ci} / \text{ATE}_{\text{i}}$,

$100(\Sigma \text{Cunknown if } < 10\%) / \text{ATE}_{\text{mix}} = \Sigma \text{Ci} / \text{ATE}_{\text{i}}$

– Acute toxicity estimate value(Oral) :

$\text{ATE}_{\text{mix}} = 5000 \text{ mg/kg}$, Out of Category.

(The total concentration of the ingredients with unknown is > 10%)

– Acute toxicity estimate value(Dermal) : Not available

– Acute toxicity estimate value(Inhalation) : Not available

12. ECOLOGICAL INFORMATION

A. Ecotoxicity : Not available

B. Persistence and degradability : Not available

C. Bioaccumulative potential

☐ Bioaccumulation :

- Butadiene–Styrene : Not available
- Antimony Trioxide : BCF = 5983 (calculated)
- Brominated flame retardant : Not available

☐ Biodegradability : Not available

D. Mobility in soil :

- Butadiene–Styrene : Not available
- Antimony Trioxide : log Koc = 5.4066 (calculated)
- Brominated flame retardant : Not available

E. Other adverse effects : Not available

13. DISPOSAL CONSIDERATION

A. Disposal methods

- The user of this product must properly characterize the waste/container generated from the use of this product in accordance with all applicable federal, state and/or local laws and regulations in order to determine the proper disposal of the waste in accordance with all applicable federal, state and/or local laws and regulations.

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 local regulation.

14. TRANSPORT INFORMATION

A. UN number : Not regulated for transport of dangerous goods

B. Proper shipping name : Not applicable

C. Hazard class : Not applicable

D. Packing group : Not applicable

E. Marine pollutant : Not applicable

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

- 1) EmS FIRE SCHEDULE : F-A
- 2) EmS SPILLAGE SCHEDULE : S-H

G. IATA Transport : Not Classified as dangerous for IATA Transport

15. REGULATORY INFORMATION

A. Korea Industry Safety and Health Law (ISHL) :

- ☐ This product is subject to the chemical for classification and labeling under ISHL Article 41.
- ☐ Korea. OELs (ISHL Article 42; MOL Public Notice No. 2008-26)
 - Antimony Trioxide; 1309-64-4
- ☐ Regulated hazardous substances (Industrial Health Standards Article 166, Table 7.)
 - [Antimony Trioxide; 1309-64-4] and its compounds : Contents > 1%

B. The Toxic Chemical Control Act in Korea(TCCA)

- ☐ This product is not classified as Toxic chemical and Observational chemical under TCCA Article 2.3. and 2.4.
- ☐ Toxic Release Inventory(TRI) Chemicals :
 - [Antimony Trioxide; 1309-64-4] and its compounds : Contents > 0.1%,
Handling amounts : 10ton/annual

C. Dangerous goods Safety Management Law in Korea : Not applicable

D. US regulations

- ☐ OSHA regulation (29CFR1910.119) : Not applicable
- ☐ CERCLA section 103 (40CFR302.4) : Not applicable
- ☐ EPCRA section 302(40CFR355.30) : Not applicable
- ☐ EPCRA section 304(40CFR355.40) : Not applicable
- ☐ EPCRA section 313(40CFR372.65) : Not applicable

E. Other local or international regulation

- ☐ POPs Management Law : Not applicable
- ☐ Rotterdam Convention on Harmful Chemicals & Pesticides : Not applicable
- ☐ Stockholm Convention on Persistent Organic Pollutants : Not applicable
- ☐ Montreal Protocol on Substances That Deplete the Ozone Layer
: Not applicable
- ☐ Information of EU Classification :
 - Antimony Trioxide
 - Classification : Carc. Cat. 3; R40
 - Risk Phrases : R40
 - Safety Phrases : S2 , S22, S36/37
- ☐ REACH Regulation (EC) No 1907/2006 : compliance

16. OTHER INFORMATION

A. Reference

- This MSDS is prepared in accordance with ISHL Article 41 and MOL Notification No. 09-68 in Korea and consider the internal regulations by Korea Kumho Petrochemical Co., Ltd.

B. Issue date : 2010. 03. 10

C. Revision number and Last revised : 5th, 2018. 07. 19

D. Other information : Not available