MATERIAL SAFETY DATA SHEET

1. Identification of the substance or mixture and of the supplier

GHS product identifier : HANWHA wire and cable compound CLBA-8450BK

Recommended use of the chemical and restrictions on use.

- Recommended use: raw material and cable
- Restrictions on use: Use for recommended use.

Supplier identifier.

- Manufacturers information
  - Manufacturers name: Hanwha Chemical Corporation
  - Address: 117 Yeosu Sandan 3-ro, Yeosu-si, Jeollanam-do, Korea (Yeosu plant)
  - Respondent: PE production 1team
    - Tel: +82-61-688-1687, Fax: +82-61-688-1680

- Supplier information
  - Supplier name: Hanwha Chemical Corporation
  - Address: Hanwha Building, 86 Chenggyecheon-ro, Jung-gu, Seoul, Korea (PO department)
  - Respondent: W&C sales team
    - Tel: +82-2-729-3050, Fax: +82-2-729-1405

- Emergency phone number: +82-61-688-1672

2. Hazards identification

GHS classification of the substance/mixture:

- Acute toxicity (oral): Category 5
- Serious Eye Damage/ Irritation: Category 2B

GHS label elements, including precautionary statements.

- Pictogram and symbol: Not applicable
- Signal word: Warning
- Hazard statements:
  H303: May be harmful if swallowed.
  H320: Causes eye irritation.
- Precautionary statements:
  - Precaution:
    - P264: Wash thoroughly after handling.
  - Treatment:
    - P312: Call a POISON CENTER or doctor/physician if you feel unwell
    - P305+P351+P338: IF IN EYES Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do. continue rinsing.
    - P337+P313: If eye irritation persists, Get medical advice/attention.

- Storage: Not applicable
- Disposal: Not applicable

NFPA

- health: **1** fire: **1** reactive: **0**

3. Composition/information on ingredients

Chemical Name	Common Name Synonyms	CAS number	Content (%)
LINEAR LOW DENSITY POLYETHYLENE	Ethene copolymer	9002-88-4	> 97
Two kinds of additives Besides carbon black	-	-	< 3

4. First aid measures

Eye contact:

- In case of contact with substance, immediately flush eyes with running water for more than 20 minutes.
- Remove contact lenses if present and easy to do.
- If irritation, edema, pain, tear and dazzling develop and persist, get medical attention.

Skin contact:

- Removing contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin with running water for more than 20 minutes.

Inhalation:

- Get medical attention immediately if irritation and symptoms persist.

Ingestion:

- Do NOT induce vomiting.
- If swallowed, immediately call a POISON CENTER or doctor/physician.

Acute and delayed symptoms/effects

- Skin and eye contact: May cause slightly irritation.

Indication of immediate medical attention and notes for physician:

- Call 911 or emergency medical service. Get immediate medical advice/attention, if you needed.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

5. Firefighting measures

Suitable (and unsuitable) extinguishing media

- Suitable extinguishing media: Dry chemical, CO_2, water spray, regular foam
- unsuitable extinguishing media: Not available
- In case of major fire and large quantities: regular extinguishing agent, fine water spray

Specific hazards arising from the chemical

- Thermal decomposition products: halogen compounds, carbon oxides, hydrogen chloride, carbon monoxide, carbon dioxide
- Fires and an explosion
  - It could be a slight fire hazard.

Special protective equipment and precautions for fire-fighters

- Move containers from fire area if you can do it without risk.
- Do not scatter spilled material with high pressure water streams.
- Make an embankment for further processing.
- Use extinguishing agent suitable for type of surrounding fire.
- Avoid inhalation of the substance or combustion products.
- Stay upwind.
- Keep out of low areas.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures:

- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- Isolate exposed area.
- Keep unauthorized personnel away.
- Prevent dust and scattering.
- Move materials to suitable containers for later disposal.

Environmental precautions and protective procedures

- Atmosphere: Provide local exhaust ventilation system.
- Land: Make an embankment for further processing.
- Underwater: Prevent entry into waterways, sewers, basements or confined areas.

The methods of purification and removal

- Small spill:
  - Dispose of materials by mechanical means.

  - Absorb with non-combustible material.
- Large spill:
  - Make an embankment for further processing.
  - ELIMINATE all ignition sources.

7. Handling and storage

Precautions for safe handling:

- Wash thoroughly after handling.
- Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures.
- DO NOT eat, drink or smoke in product area.

Conditions for safe storage:

- Store in a closed container.
- Avoid contact with light.
- Call a POISON CENTER or doctor/physician if you needed.

8. Exposure controls/personal protection

Occupational Exposure limits

- Korean Occupation of Safety and Health Regulation : Not available
- ACGIH: Not available
- OSHA: Not available
- NIOSH: Not available
- Biological exposure index : Not available
- EU Regulation:
  - Bulgaria: OEL-TWAs=10.0mg/m^3 (dust)
  - China: OEL- STEL=10 mg/m^3 (total dust), TWA=5 mg/m^3 (total dust)
  - Czech Republic: OEL-TWAs= 5.0 mg/m^3 (dust)
  - Latvia: OEL-TWAs (AERs)= 5 mg/m^3
  - Lithuania: OEL-TWAs (IPRVs)=10 mg/m^3, MAC=0.1 mg/m^3
  - Russia: OEL-MACs=10 mg/m^3 (aerosol)
  - Slovak Republic: OEL-TWAs= 5.0 mg/m^3 (total solid aerosol)

Appropriate engineering controls:

- Provide local exhaust ventilation system or other engineering controls to keep the airborne concentrations of vapours below their respective threshold limit value.
- Check legal suitability of exposure level.

Personal protective equipment

- Respiratory protection:
  -Respiratory protection: Wear NIOSH or European Standard EN 149 approved full or half face piece (with goggles) respireatory protective equipment when necessary.
- Eye/Face protection:
  -An eye wash unit and safety shower station should be available nearby work place.
  -Wear facepiece with goggles to protect from scattering toxic substance.

- Hand protection: If you contact with heated material, wear durability gloves, protective equipment.
- Body protection: Wear appropriate protective chemical-resistant clothing.

9. Physical and chemical properties

Appearance: Solid (white or milky)

Odor: odorless

Odor threshold: Not available

Tatse: Not available

Taste threshold: Not available

pH: Not available

Melting point/freezing point: 100 ~ 125 °C

Initial boiling point and boiling range: Not available

Flash point: Not applicable

Evaporation rate: Not available

Flammability : Not available

Upper/lower flammability or explosive limits: Not available

Vapor pressure: Not applicable

Vapor density: Not available

Relative density: Not available

Solubility (ies): Insoluble

Specific gravity: 0.910 ~ 0.925

Partition coefficient: n-octanol/water: Not available

Auto ignition temperature: 435 °C

Decomposition temperature: Not available

Viscosity: Not available

Molecular weight: tens of thousands ~ hundreds of thousands

10. Stability and reactivity

Chemical stability: Stable under normal temperatures and pressures.

Possibility of hazardous reactions: No dangerous reaction known under conditions of normal use.

Conditions to avoid (e.g., static discharge, shock or vibration):

- Avoid heat, sparks, flames and other sources of ignition.
- Avoid contact with prohibited mixture materials.
- Avoid release to the environment.

Incompatible materials: strong oxidizing agents

- Hazardous decomposition products: halogen compounds, carbon oxides, hydrogen chloride, carbon monoxide, carbon dioxide

11. Toxicological information

Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact);

- Skin and eye contact: May cause slightly irritation.

Symptoms related to the physical, chemical and toxicological characteristics

- Explosives, Water reactive substances, Oxidizing, Self-reactive substances, Organic peroxides: Not applicable (no relevance to molecular structure)
- Refer to "5) Acute and delayed symptoms/effects" of "4.First aid measures"

Symptoms related to the physical, chemical and toxicological characteristics;

- Acute toxicity:
  - oral: Category 5 ATEmix= 2021.8 mg/kg bw
    -Linear low density polyethylene: LD_{50}> 2000 mg/kg bw (Rat)
  - dermal: Not available
  - Inhalation: Not available
- Skin Corrosion/ Irritation: Not classified
  -Linear low density polyethylene: Tested the acute dermal irritation of polyethylene on three New Zealand White rabbits, Polyethylene caused a primary irritation index of 0.0, according to the Draize index. No corrosive effects were noted.
- Serious Eye Damage/ Irritation: Category 2B
  -Linear low density polyethylene: The acute eye irritation potential of polyethylene (average molecular weight of 450) was tested on three New Zealand White rabbits weighing 3.00 to 3.18 kg and ages 12 to 16 weeks old. Redness, chemosis, and discharge of the conjunctivae were scored, with a maximum score of 20. The iris irritation

was scored for a maximum score of 10; also, the degree and area of opacity of the cornea were scored, for a maximum score of 80. Polyethylene caused a maximum group mean score of 11.0 and was classified as a mild irritant.

- Respiratory sensitizer: Not available
- Skin Sensitization: Not classified (2% of this product consist of ingredients of unknown toxicity)
  -Linear low density polyethylene: The authors/ tested the sensitization potential of polyethylene (average molecular weight of 450) on 34 female albino Dunkin Hartley guinea pigs (299-364 g, 8-12 weeks old).No reactions were observed after any of the inductions or after the challenge. Polyethylene did not cause sensitization in any of the guinea pigs tested.
- Carcinogenecity: Not classified
  -Linear low density polyethylene: IARC: 3
  ACGIH, NTP, OSHA, EC Directive 1272/2008: not listed
  Albino (Longacre) mice given subcutaneous implants of a pure, plain film, 3/29 survivors developed malignant tumours at the site of implantation. Among 102 female Wistar rats that received intrauterine insertions of a 10 mm portion of a polyethylene intrauterine contraceptive device,five developed epidermoid carcinomas and one a sarcoma of the uterus within two years; all animals that had epidermoid carcinomas also had pyometra, which is associated with squamous metaplasia.
- Mutagenicity: Not classified
  -Linear low density polyethylene:
  -*In vitro* -Ames test(S. typhimurium): Negative
- Reproductive toxicity: Not available
- Specific target organ toxicity (single exposure): Not classified
  -Linear low density polyethylene: Acute Exposureinvestigated the acute oral toxicity of polyethylene (average molecular weight of 450) in ten male and female Sprague-Dawley CD strain rats (201-223g). During the experimental period, no rats died or had signs of systemic toxicity.
- Specific target organ toxicity (repeat exposure): Not classified
  -Linear low density polyethylene: In a 90-day study, rats and dogs were fed an extract of low molecular weight PE film. Rats fed at a level of 13,500 ppm film extract showed liver changes (fat droplets, cloudy swelling, and increased liver weight) that were considered reversible in all cases. Rats fed at levels of 2700 and 540 ppm and dogs fed 2700 ppm showed no adverse effects.
- Aspiration Hazard: Not available

12. Ecological information

Aquatic Ecotoxicity

-Acute toxicity: Not classified (97% of this product consist of ingredients of unknown toxicity)
-Chronic toxicity: Not classified(97% of this product consist of ingredients of unknown toxicity)

Persistence degradability:

- Persistence:
- -Linear low density polyethylene: Polymers are not degradable, therefore it represents a potential for persistence in the environment.

- Degradability:
- -Linear low density polyethylene: Polymers are not degradable, therefore it represents a potential for persistence in the environment.

Bioaccumulative potential:

- Bioaccumulation:
- -Linear low density polyethylene: Polymers are not degradable, a potential for bioaccumulation has to be expected.
- Biodegradation:
  -Linear low density polyethylene: Based on an log Kow and estimation BCF(BCF=81~667.1), a potential for bioaccumulation has to be expected.

Mobility in soil:

-Linear low density polyethylene: Low potency of mobility to soil. (Koc values = 9.42L/kg)

13. Disposal considerations

1) Disposal method:

- Method for disposing waste synthetic polymer compounds
  -Thermosetting waste synthetic resins and other waste synthetic polymer compounds shall be crushed, cut or melted to a size at which the maximum diameter is 15 cm or less and thereafter be disposed in a stable landfill facility.
  -Non-thermosetting waste synthetic resins and other waste synthetic polymer compounds shall be incinerated.

2) Matters which require attention when disposing waste:

- Standard and method for disposing the designated waste
  -All the generated waste shall be disposed in accordance with the specific standard and method prescribed in the Act so that the environmental pollution may be minimized in the course of collecting, carrying, keep and disposing the waste.
  -The waste shall not flutter or flow out, and a bad smell shall not be diffused.
  -The pollutants shall be disposed below the allowable exhaust standard.
  -Without just reason, the waste shall not be discarded in a place other than the designated places.
  -The waste shall be disposed in the waste disposal facility.

14. Transport information

UN Number: Not applicable

UN Proper shipping name: Not applicable

Transport Hazard class: Not applicable

Packing group: Not applicable

Marine pollutant: Not applicable

Special precautions

- in case of fire: Not applicable
- in case of lickage: Not applicable

15. Regulatory information

Korea:
-Occupational Safety and Health Regulation : Not regulated
-Toxic Chemical Control Act : KE-28877
-Dangerous Material Safety Management Regulation :
It can be classified as special combustible materials when storage and handling (>3000kg). Therefore, It restricted to mark objects(name of goods, maximum quantites, strictly prohibited firearms), installation height and area, distance between products, fire protection facilities
-Wastes Control Act : Public Controlled Waste (other synthetic resins, 01-01-07)

EU classification:
- Classification: Not available
- Risk phrases: Not available
- Safety phrases: Not available
- EU REACH SVHC Free Certified(Candidate list Updated by ECHA on 16th Dec, 2013)

U.S.A management information
- **OSHA:** Not regulated
- **CERCLA:** Not regulated
- **EPCRA 302:** Not regulated
- **EPCRA 304:** Not regulated
- **EPCRA 313:** Not regulated
- **TSCA Section 8(b) Inventory :** XU
- **FDA - Direct Food Additives:** 21 CFR 172.615 (MW 2000-21000)

Japan management information
- Existing and New Chemical Substances (ENCS): (6)-1; (6)-120; (6)-402

China management information
- Inventory of Existing Chemical Substances (IECSC): Present

Canada management information
- Domestic Substances List (DSL): Present

New zealnad management information
- Inventory of Chemicals (NZIoC): May be used as a single component chemical under an appropriate group standard.

Philippines management information
- Inventory of Chemicals and Chemical Substances (PICCS): Present

Substance of Roterdame Protocol: Not applicable

Substance of Stockholme Protocol: Not applicable

Substance of Montreal Protocol: Not applicable

16. Other information

Information source and references:

-ECB:ESIS (European chemical Substances Information System): http://ecb.jrc.it/esis
-International Uniform Chemical Information Database (IUCLID): http://ecb.jrc.it/esis
-IARC. Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Man. Geneva: World Health Organization, International Agency for Research on Cancer, 1972-PRESENT (Multivolume work)., p. S7 216 (1987)
-REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 16 December 2008
-Korea Occupational Health & Safety Agency: http://www.kosha.net
-U.S. National library of Medicine (NLM) Hazardous Substances Data Bank (HSDB): (http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB.htm)
-NITE: http://www.safe.nite.go.jp
-Registry of Toxic Effects of Chemical Substances (RTECS): http://www.cdc.gov/niosh/rtecs/
-ACGIH, TLV and BEIs # 0108, 2008
-US EPA, EPISUITE v 4.0
-Waste Control Act enforcement regulation attached [1]
-National chemicals information systems (http://ncis.nier.go.kr)
-Korea dangerous material inventory management system (http://hazmat.nema.go.kr)

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