

Material Safety Data Sheet

(Automotive Flooded Battery)

1. CHEMICAL AND COMPANY IDENTIFICATION

Manufacturer's Name :

Revision Date : April 1st 2021

Hankook & Company Co., Ltd.
286, Pangyo-ro, Bundang-gu, Seongnam-si,
Gyeonggi-do 13494, Korea

UN Number : UN2794

Telephone Number for Information : 82-42-724-2890

Classification : Battery wet, filled with acid, electric storage

2. HAZARD IDENTIFICATION

1) Classification of the substance or mixture (GHS)

Substances and mixtures, which in contact with water, emit flammable gases, categories 2

Acute toxicity (oral, dermal, inhalation) categories 1

Skin corrosion categories 1

Serious eye damage category 1

Carcinogenicity categories 1A

Germ cell mutagenicity categories categories 2

Reproductive toxicity categories 1A

Specific Target Organ Toxicity - Single exposure categories 1

Specific Target Organ Toxicity - Repeated exposure categories 1

2) GHS Label elements

(1) Pictogram



(2) GHS Signal word : Danger

(3) GHS Hazard statements

H261 In contact with water releases flammable gas

H314 Cause severe skin burns and eye damage

H318 Causes serious eye damage

H330 Fatal if inhaled

H341 Suspected of causing genetic defects

H350 May cause cancer

H360 May damage fertility or the unborn child

H370 Causes damage to organs

H372 Causes damage to organs through prolonged or repeated exposure

(4) GHS Precautionary statements

P201 Obtain special instructions before use

P202 Do not handle until all safety precautions have been read and understood

P223 Do not allow contact with water

P231 + P232 Handle under inert gas. Protect from moisture.

P260 Do not breathe dust/fume/gas/mist/vapour/spray

P264 Wash thoroughly after handling

P270 Do not eat, drink or smoke when using this product

P271 Use only outdoors or in a well-ventilated area

P280 Wear protective gloves/protective clothing/eye protection/face protection

P284 [In case of inadequate ventilation] wear respiratory protection

(5) GHS First aid measure

P301 + P330 + P331 If SWALLOWED : Rinse mouth. Do NOT induce vomiting

P303 + P361 + P353 If ON SKIN(or hair) : Take off immediately all contaminated clothing.
Rinse skin with water/shower

P304 + P340 IF INHALED : IF 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.

P307 + P311 if exposure or exposure is concerned, seek a medical center(doctor)

P308 + P313 IF exposed or concerned : Get medical advice/attention.

P310 Immediately call a POISON CENTER/doctor/

P314 Get medical advice/attention if you feel unwell.

P320 Specific treatment is urgent.

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P321 If you have antidotes or specific cleaning agents, take action.

P335 + P334 Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.

P363 Wash contaminated clothing before reuse.

P370 + P378 In case of fire : Use fire extinguisher to extinguish.

(6) GHS Storage

P402 + P404 Store in a dry place. Store in a closed container.

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

(7) GHS Disposal

P501 Dispose of contents/container (in accordance with local/regional/national/international regulations).

(8) Other hazards which do not result in classification (NFPA)

CALCIUM

| | |
|--------------|---|
| Health | 3 |
| Flammability | 1 |
| Reactivity | 2 |

SULFURIC ACID

| | |
|--------------|---------|
| Health | 3 |
| Flammability | No data |
| Reactivity | 2 |

LEAD

| | |
|--------------|---------|
| Health | 1 |
| Flammability | No data |
| Reactivity | 0 |

TIN

| | |
|--------------|---------|
| Health | 1 |
| Flammability | No data |
| Reactivity | 0 |

SILICA, AMORPHOUS FUSED

| | |
|--------------|---|
| Health | 1 |
| Flammability | 0 |
| Reactivity | 0 |

POLYPROPYLENE

| | |
|--------------|---|
| Health | 1 |
| Flammability | 1 |
| Reactivity | 0 |

3. COMPOSITION/INFORMATION ON INGREDIENTS

| Hazardous Components Specific Chemical Identity (Common Name(s)) | CAS No.* | Percent By Weight (wt%) |
|--|----------------|----------------------------|
| Lead | 7439-92-1 | 47 – 63 |
| Electrolyte (solution of sulfuric acid and water) | 7664-93-9 | 33 – 44 |
| Polypropylene (PP) | 9003-07-0 | 2 - 5 |
| Separator | Not Applicable | 1 – 3 |
| Tin | 7440-31-5 | <1 |
| Antimony | 7440-36-0 | <1 |

* CAS Number : Chemical Abstracts Service Registry Number

4. FIRST AID MEASURES

Emergency and First Aid Procedures : Contact with internal components if battery is opened, broken or spilled.

- Inhalation** : Remove to fresh air and provide medical oxygen/CPR if needed. Obtain medical attention.
- Eyes contact**: Immediately flush with water for at least 15minutes, hold eyelids open. obtain medical attention.
- Skin contact**: Flush contacted area with large amounts of water for at least 15 minutes. Remove contaminated clothing and obtain medical attention if necessary.
- Ingestion** : Do not induce vomiting. If conscious drink large amounts of water/milk. Obtain medical attention. Never give anything by mouth to an unconscious person.

5. FIREFIGHTING MEASURES

Flash Point : Not applicable **Flammable Limits** **Hydrogen** **Lower** **Upper**
in Air % by volume (H₂) 4.1% 74.2%
(When charging)

Extinguisher Media : Class ABC, CO₂ Halon **Auto-Ignition Temperature** : Polypropylene 675°F

Special Fire Fighting Procedures : Lead-acid batteries do not burn or burn with difficulty. Do not use water on fires where molten metal is present. Extinguish fire with agent suitable for surrounding combustible materials. Cool exterior of battery if exposed to fire to prevent rupture. The acid mist and vapors generated by heat or fire are corrosive. Use NIOSH approved self-contained breathing apparatus (SCBA) and full protective equipment in positive-pressure mode.

Unusual Fire and Explosion Hazards : Hydrogen gas and sulfuric acid vapors are generated upon overcharge and polypropylene case failure. Ventilate charging areas as per ACGIH Industrial Ventilation : A Manual of Recommended Practice and National Fire Code, 1980 Vol.1, P.12, B-9, 10. Hydrogen gas may be flammable or explosive when mixed with air, oxygen, chlorine. Avoid open flames/sparks/other sources of ignition near battery. To avoid risk of fire or explosion, keep sparks or other sources of ignition away from batteries and do not allow metallic materials to simultaneously contact negative and positive terminals of cells and batteries. SULFURIC ACID REACTS VIOLENTLY WITH WATER/ORGANICS.

6. ACCIDENTAL RELEASE MEASURES

Procedures for Cleanup : Stop release, if possible. Avoid contact with any spilled material. Contain spill, isolate hazard area, and deny entry. Limit site access to emergency responders. Neutralize with sodium bicarbonate, soda ash, lime or other neutralizing agent. Place battery in suitable container for disposal. Dispose of contaminated material in accordance with applicable local, state and federal regulations. Sodium bicarbonate, soda ash, sand, lime or other neutralizing agent should be kept on-site for spill remediation.

Personal Precautions : Acid resistant aprons, boots and protective clothing. ANSI approved safety glasses with side shields/face shield recommended. Ventilate enclosed areas.

Environmental Precautions : Lead and its compounds and sulfuric acid can pose a severe threat to the environment. Contamination of water, soil, and air should be prevented.

7. HANDLING AND STORAGE

Precautions to be Taken in Handling and Storage : Keep away from flames during and immediately after charging. Combustion or overcharging may create or liberate toxic and hazardous gases and liquids including hydrogen, sulfuric acid mist, sulfur dioxide, sulfur trioxide, stibine, arsine and sulfuric acid. Store batteries in cool, dry, well ventilated area. Do not short circuit battery terminals, or remove vent caps during storage or recharging. Protect battery from physical damage.

Other Precautions : GOOD PERSONAL HYGIENE AND WORK PRACTICES ARE MANDATORY. Refrain from eating, drinking or smoking in work areas. Thoroughly wash hands, face, neck, and arms before eating, drinking or smoking. Launder soiled clothing before reuse. Emptied batteries contain hazardous sulfuric acid residue.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Respiratory Protection(Specify Type) : Acid/gas NIOSH approved respirator is required when the PEL is exceeded or employee experiences respiratory irritation. When exposure levels are unknown or when firefighting, wear a self-contained breathing apparatus with a full face piece operated in a positive pressure mode.

Ventilation : Must be provided when charging in an enclosed area. Change air every 15min.

Local Exhaust : When PEL is exceeded.

Mechanical(General) : Normal mechanical ventilation recommended for stationary applications.

Protective Gloves : Wear rubber or plastic acid resistant gloves with elbow length gauntlet when filling batteries.

Eye Protection : ANSI approved safety glasses with side shields/face shield recommended safety goggles.

Other Protective Clothing or Equipment : Ventilation as described in the **Industrial Ventilation Manual** produced by the American Conference of Governmental Industrial Hygienists, shall be provided in areas where exposures are above the PEL or TLV specified by OSHA or other local, state and federal regulations.
Acid-resistant rubber or plastic apron, boots and protective clothing. Safety shower and eyewash.

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point : Electrolyte Approx. 235°F

Specific Gravity : Electrolyte 1.250-1.320 pH<2

Percent Volatile by Volume : No Data

Evaporation Rate : No Data

Reactivity in Water : Electrolyte - water reactive(1)

Appearance and Odor

Battery : Polypropylene or hard rubber case, solid.

Lead : Gray, metallic, solid

Electrolyte : Liquid, colorless, oily fluid; naissance odor when got or charging battery.

Vapor Pressure : Electrolyte 1mm Hg @ 145.8°F

Melting Point : Polypropylene <320°F

Vapor Density : Hydrogen(Air=1) - 0.069

Electrolyte(Air=1) - 3.4 At STP

Solubility in Water : Electrolyte - 100% Soluble

10. STABILITY AND REACTIVITY

Chemical stability and possibility of hazardous reaction: Stable

Conditions to Avoid(Electrostatic Discharge, Impact, Vibration): High temperatures – cases decompose at < 320 °F

Avoid overcharging and smoking, or sparks near battery surface and rapid overcharge.

Incompatibility(Materials to Avoid) : Spark, Open flames, Keep battery case away from strong oxidizers.

Hazardous Decomposition Products : An explosive hydrogen/oxygen mixture within the battery may occur during charging. Combustion can produce carbon dioxide(CO₂) and carbon monoxide(CO). Molten metals produce fumes and/or vapor that may be toxic or respiratory irritants.

Hazardous Polymerization : Will Not Occur (Do not overcharge)

11. TOXICOLOGICAL INFORMATION

Information on the likely routes of exposure: The primary routes of exposure to lead are ingestion or inhalation of dust and fumes.

ACUTE :

INGESTION/INHALATION : Exposure to lead and its compounds may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anemia, and pain in the legs, arms and joints. Kidney damage, as well as anemia, can occur from acute exposure.

CHRONIC :

INHALATION/INGESTION : Prolonged exposure to lead and its compounds may produce many of the symptoms of short-term exposure and may also cause central nervous system damage, gastrointestinal disturbances, anemia, and wrist drop. Symptoms of central nervous system

12. ECOLOGICAL INFORMATION

Aquatic and terrestrial ecotoxicity: In most surface water and groundwater, lead forms compounds with anions such as hydroxides, carbonates, sulfates, and phosphates and precipitates out of the water column.

Persistence and degradability: Lead may occur as sorbed ions or surface coatings on sediment mineral particles or may be carried in colloidal particles in surface water.

Bioaccumulative potential: Lead(when in the dissolved phase) is bioaccumulated by plants and animals, both aquatic and terrestrial.

Mobility in soil: Most lead is strongly retained in soil, resulting in little mobility. Lead may be immobilized by ion exchange with hydrous oxides or clays or by chelation with humic or fulvic acids in the soil.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods(includes methods of disposal of contaminated containers and packaging):

Safe Handling & Disposal

- Dispose in accordance with federal, state or local regulations.

Disposal of Contaminated Packaging

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult local or regional waste management authority for disposal if no suitable treatment or disposal facility can be identified.
- Treat and neutralise at an approved treatment plant. Treatment should involve: Mixing or slurring in water; Neutralisation followed by: burial in a land-fill specifically licenced to accept chemical and / or pharmaceutical wastes or Incineration in a licenced apparatus (after admixture with suitable combustible material)
- Decontaminate empty containers.

14. TRANSPORT INFORMATION

GROUND – US-DOT/CAN-TDG/EU-ADR/APEC-ADR:

Proper Shipping Name Batteries, Wet, Filled with Acid

Hazard Class : 8 ID Number : UN2794

Packing Group : N/A Labels : Corrosive

Marine pollutant substances (applicable/not applicable) : Not Applicable.

AIRCRAFT – ICAO-IATA:

Proper Shipping Name Batteries, Wet, Filled with Acid

Hazard Class : 8 ID Number : UN2794

Packing Group : N/A Labels : Corrosive

Marine pollutant substances (applicable/not applicable) : Not Applicable.

Reference IATA packing instructions 870

VESSEL – IMO-IMDG:

Proper Shipping Name Batteries, Wet, Filled with Acid

Hazard Class : 8 ID Number : UN2794

Packing Group : N/A Labels : Corrosive

Marine pollutant substances (applicable/not applicable) : Not Applicable.

Reference IMDG packing instructions P801

Additional information

- Batteries must be kept upright at all times and packaged as required to prevent short circuits
- Transport may require packaging and paperwork, including the Nature and Quantity of goods, per applicable origin/destination/customs points as-shipped.

15. REGULATORY INFORMATION

U.S Hazardous Under Hazard Communication Standard : Lead : Yes

Sulfuric Acid : Yes

Antimony : Yes

Ingredients Listed on TSCA Inventory : Yes
CERCLA Section 304 Hazardous Substances : Lead : Yes RQ : NA*
Sulfuric Acid : Yes RQ : 1000 pounds
Antimony : Yes RQ : 5000 pounds

*Reporting not required when diameter of the pieces of solid metal released is equal to or exceeds 100 micrometers.

EPCRA Section 302 Extremely Hazardous Substance : Sulfuric acid : Yes
EPCRA Section 313 Toxic Release Inventory : Lead : CAS No 7439-92-1
Sulfuric Acid : CAS No 7664-93-9
Antimony : CAS NO 7440-36-0

16. OTHER INFORMATION

1) Source of information

Guideline for Globally Harmonized System of Classification and Labelling of Chemicals (GHS)
Corporate Solution From Thomson Micromedex(<http://csi.micromedex.com>)
ECB-ESIS(European chemical Substances Information System)(<http://ecb.jrc.it/esis>)
ECOTOX Database, EPA(<http://cfpub.epa.gov/ecotox>)
IUCLID Chemical Data Sheet, EC-ECB
International Chemical Safety Cards(ICSC)(<http://www.nihs.go.jp/ICSC>)
TOXNET, U.S. National Library of Medicine(<http://toxnet.nlm.nih.gov>)

2) The date of initial preparation of the MSDS : January 2009

3) The number of times revised and the date of preparation of the latest revision : Eight times / April 1st 2021

4) Other Information

The information above is believed to be accurate and represents the best information currently available to us. However, Hankook & Company Co., Ltd. Makes no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

Although reasonable precautions have been taken in the consideration and investigation.

This material safety data sheet provides guidelines for the safe handling and use of this product ; it does not and cannot advise on all possible situations, Therefore, your specific use of this product should be evaluated to determine if additional precautions are required.