# SAFETY DATA SHEET

**according to Regulation (EC) No. 1907/2006**

**Revision Date : 07.08.2018**

**Version : 2.2**

## SECTION 1 : IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

### 1.1 Product Name

| | | |
|---|---|---|
| Product Name | : | LEAD – ACID BATTERY |
| Classification | : | Electric storage battery |
| REACH Registration No. | : | A registration number is not available for this product as the product or its uses are exempted from registration according to Regulation (EC) No. 1907/2006. |

### 1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

| | | |
|---|---|---|
| Identified Uses | : | It is used for starter battery for motor vehicle, power source for both of electrical vehicle and stationary. |

### 1.3 Details of the Supplier of the Safety Data Sheet

| | | |
|---|---|---|
| Company | : | Mutlu Battery Factory Tepeören Mah. Eski Ankara Asfaltı Caddesi No:210 34959 Tuzla – İstanbul |
| Phone | : | +90 216 304 1590 |
| Fax | : | +90 216 304 1869 |
| E-mail | : | ecemrek@mutlu.com.tr |

### 1.4 Emergency Phone Number

| | | |
|---|---|---|
| Emergency Phone | : | +90 216 304 1590 |

## SECTION 2 : HAZARDS IDENTIFICATION

### 2.1 Classification of the Substance or Mixture

**Classification according to Regulation (EC) No. 1272/2008**

Acute toxicity, Category 4, Oral, H302 / Inhalation, H332

Carcinogenicity, Category 1B (lead), Oral, H350

Carcinogenicity, Category 1A (acid vapor), Inhalation, H350i

Reproductive toxicity, Category 1A, H360

Specific target organ toxicity – repeated exposure, Category 2, H373

Chronic aquatic toxicity, Category 1, H410

Explosive chemical, Division 1.3, H203

### 2.2 Label Elements

**Labelling According to Regulation (EC) No. 1272/2008: Hazard pictograms**

| | | |
|---|---|---|
| Signal word | : | **DANGER** |
| **Hazard statements** | | |
| H203 | : | Explosive; fire, blast or projection hazard. |
| H220 | : | Extremely flammable gas (Hydrogen). |
| H302 | : | Harmful if swallowed. |
| H314 | : | Causes severe skin burns and eye damage. |
| H332 | : | Harmful if inhaled. |
| H350 | : | May cause cancer. |
| H350i | : | May cause cancer by inhalation. |
| H360 | : | May damage fertility or the unborn child. |
| H373 | : | May cause damage to organs through prolonged or repeated exposure. |
| H410 | : | Very toxic to aquatic life with long lasting effects. |
| **Precautionary statements** | | |
| P210 | : | Keep away from heat/sparks/open flames/hot surfaces – No smoking. |
| P260 | : | Do not breathe dust/fume/gas/mist/vapours/spray. |
| P264 | : | Wash with soap and water thoroughly after handling. |
| P273 | : | Avoid release to the environment. |
| P280 | : | Wear protective gloves/protective clothing/eye protection/face protection. |
| P312 | : | Call a POISON CENTER or doctor/physician if you feel unwell. |
| P372 | : | Explosion risk in case of fire. |
| P391 | : | Collect spillage. |
| 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: 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. |
| P370 + P380 | : | In case of fire: Evacuate area. |
| P403 | : | Store in a well-ventilated place. |
| P501 | : | Dispose of contents/container in accordance with local/regional/national/ international regulations. |

### 2.3 Other Hazards

Batteries subjected to abusive charging at excessively high currents for prolonged periods of time without vent caps in place, may creat offensive strong inorganic acid mist containing sulfuric acid.

## SECTION 3 : COMPOSITION/INFORMATION ON INGREDIENTS

| Ingredients | Formula | Molar Mass | CAS-No. | EC-No. | % by Weight |
|---|---|---|---|---|---|
| Lead | Pb | 207,21 g/mol | 7439-92-1 | 231-100-4 | 55 – 65 |
| Electrolyte | $H_2SO_4$ | 98.08 g/mol | 7664-93-9 | 231-639-5 | 25 – 35 |
| Container – Polypropylene* | $(C_3H_6)_n$ | - | 9003-07-0 | - | 5 – 9 |
| Container – SAN* | $(C_8H_8)_n$-$(C_3H_3N)_m$ | - | 9003-54-7 | - | 5 – 9 |
| Seperator – Polyethylene* | $(C_2H_4)_n$ | - | 9002-88-4 | - | 1 – 2 |
| Seperator – Glass Fiber* | $SiO_2$ | 60,08 g/mol | 65997-17-3 | 266-046-0 | 1 – 2 |
| Gelling* | Si | 28,09 g/mol | - | - | 1 – 2 |

Lead and electrolyte (sulfuric acid – water solution) are the primary components of each battery manufactured by Mutlu Battery. Other ingredients which include (*) after definition may change depending on battery type.

## SECTION 4 : FIRST AID MEASURES

### 4.1 Description of First Aid Measures

General advice : Take proper precautions to ensure you own health and safety before attempting to rescue a victim and provide first aid. Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled : Elektrolyte: Remove to fresh air. Wear an oxygen mask if necessery.
Lead: Remove from exposure. Gargle, wash nose and lips. Consult physician immediately.

In case of skin contact : Elektrolyte: Remove contaminated clothes and shoes. Flush with large amounts of soap and water.
Lead: Wash immediately with soap and water.

In case of eye contact : Elektrolyte / Lead: Flush immediately with large amounts of water for at least 15 minutes. Consult physician immediately.

If swallowed : Elektrolyte: Give large quantities of water. Do not induce vomiting. Consult physician.
Lead: Consult physician immediately.

### 4.2 Most Important Symptoms and Effects, Both Acute and Delayed

In general, due to the poor absorbability of lead compounds via the gastrointestinal tract, only very high doses lead to acute cases of intoxication. After a latency period of several hours, metallic taste, nausea, vomiting and colics occur, in many instances followed by shock. Chronic uptake causes peripheral muscular weakness (as known as drop-wrist), anaemia and central-nervous disorders. Women of childbearing age should not be exposed to the substance over longer periods of time. Electrolyte may cause irritation, itching and burning sensation due to irritiation, cough, shortness of breath, nausea, vomiting, diarrhea and blindness. Other symptoms and effects are described in Section 2 and 11.

### 4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

No data available.

## SECTION 5 : FIRE FIGHTING MEASURES

### 5.1 Extinguishing Media

Suitable : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment like foam, dry chemical or carbon dioxide.

Unsuitable : Do not use water spray.

### 5.2 Special Hazards Arising From the Substance or Mixture

Sulfuric acid is not flammable, but reacts with most of metals and causes release of flammable hydrogen gas. In case of fire, lead oxides and hazardous vapours can be released, avoid breathing. If batteries are on charge, shut off power to the charging equipment. But strings of series connected batteries may still pose risk of electric shock even when charging equipment is shut down.

### 5.3 Advice For Fire Fighters

Wear self-contained breathing apparatus and acid-resistant full protective clothing for fire fighting.

### 5.4 Further Information

On charge or in operation, batteries generate and release flammable hydrogen gas due to electrochemical reactions. Therefore they must always be assumed to contain this gas. If hydrogen ignited by burning cigarette, naked flame or spark, may cause battery explosion and dangerously dispersion of casing fragments and corrosive liquid electrolyte. Keep away all sources of gas ignition and do not allow metallic articles to simultaneously contact the negative and positive terminals of a battery. Carefully follow manufacturer's instructions for installation and service.

## SECTION 6 : ACCIDENTAL RELEASE MEASURES

### 6.1 Personal Precautions, Protective Equipment and Emergency Procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Evacuate the danger zone and remove personnel to safe areas.

For protective equipment see section 8.

### 6.2 Environmental Precautions

Prevent further leakage or spillage if safe to do so. Do not let electrolyte enter drains, ground-water or surface water. Discharge into the environment must be avoided.

### 6.3 Methods and Materials For Containment and Cleaning up

General advices : Cover drains. Keep in suitable, closed containers for disposal, bind if necessary. Clean up affected area. Do not use combustible materials like sawdust as absorbent.

Large spillages : Stop flow of electrolyte, absorb spills with dry sand, earth, and vermiculite. If possible, carefully neutralize spilled electrolyte with soda ash, sodium bicarbonate, lime, etc.

Small spillages : Wipe up spillage with cloth, threadwaste, fleece, etc. Clean up surface.

### 6.4 Reference to Other Sections

For disposal see section 13.

## SECTION 7 : HANDLING AND STORAGE

### 7.1 Precautions For Safe Handling

Handle carefully and avoid tipping, which may allow electrolyte leakage. There is a possible risk of electric shock from charging equipment and from strings of series connected batteries, whether or not being charged.
Shut-off power to chargers whenever not in use and before detachment of any circuit connections. Batteries being charged will generate and release flammable hydrogen gas. Charging space should be ventilated. Prohibit smoking and avoid creation of flames and sparks nearby. Keep battery vent caps in position. Do not overcharge beyond the recommended upper charging voltage limit. Wear face and eye protection when near batteries being charged. Applying pressure or deforming the battery may lead to disassembly followed by eye, skin and throat irritation.

### 7.2 Conditions For Safe Storage, Including Any Incompatibilities

Store batteries in warehouse or under roof in cool, dry, well-ventilated areas. Prevent extreme heat and frost. Separate from activities that may create flames, spark, or heat. Do not use organic solvents, etc. as cleaners on the batteries. Keep away from metallic objects that could bridge the terminals on a battery and create a dangerous short-circuit. If batteries have to be stored in storage rooms, it is imperative that the instructions for use are observed. For other incompatibilities see section 10.

### 7.3 Specific End Uses

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated.

## SECTION 8 : EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1 Control Parameters

| Ingredient | CAS Number | Based on | Type | Occupational Exposure Limits (mg/m$^3$) |
|---|---|---|---|---|
| Lead | 7439-92-1 | TR OEL | TWA | 0,15 |
| | | EU OEL | TWA | 0,15 |
| | | US OSHA | TWA | 0,05 |
| | | US NIOSH | TWA | 0,05 |
| Sulfuric acid | 7664-93-9 | TR OEL | TWA | 0,05* |
| | | EU OEL | TWA | 0,05* |
| | | US OSHA | PEL | 1,00 |
| | | US NIOSH | TWA | 1,00 |

(*)Thoracic fraction

### 8.2 Exposure Controls

**Appropriate engineering controls**

Store and handle in well-ventilated area (typically 10 air changes per hour). If mechanical ventilation is used, components must be acid-resistant. Make certain vent caps are on securely. Use personal protective equipment.

**Personal protective equipment**

Eye and face protection:

Use safety glasses with side-shields and face protection equipment tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection:

Wear chemical resistant protective gloves. Gloves must be inspected prior to use. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it. Remove gloves without touching its outer surface to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws. Wash hands.

Body protection:

Wear complete suit and shoes protecting against acid. Immediately change contaminated clothing.

Respiratory protection:

None required under normal conditions of finished product. When concentrations of sulfuric acid mist are known to exceed PEL, exposure levels are not known or there is uncontrolled release due to fire/explosion, use full-face positive-pressure air-supplied respirators and components tested and approved under appropriate government standards such as CEN (EU) or NIOSH (US). Ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.

**Control of environmental exposure**

Prevent further leakage or spillage if safe to do so. Do not let electrolyte enter drains. Discharge into the environment must be avoided.

## SECTION 9 : PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on Basic Physical and Chemical Properties

| | | |
|---|---|---|
| Form | : | Lead – solid / Elektrolyte – liquid |
| Appearance | : | Manufactured article, in different sizes polypropylene or SAN boxes |
| Colour | : | According to box colour, black, gray, red, etc. |
| Odour | : | Odourless |
| Odour threshold | : | Not applicable |
| pH | : | < 1,0 (Elektrolyte) |
| Melting point | : | 130 °C (Polypropylene box) / 220 °C (SAN box) |
| Boiling point and boiling range | : | 110 – 113 °C (Elektrolyte) |
| Flash point | : | Does not flash |
| Evaporation rate (Butyl Acetate = 1) | : | < 1,0 |
| Flammability (solid, gas) | : | No data available |
| Upper/lower explosive limits | : | UEL: % 74 / LEL: % 4 (as Hydrogen gas) |
| Vapour pressure | : | 11,70 mm Hg, 20 °C (Elektrolyte) |

| | | |
|---|---|---|
| Vapour density (Air = 1) | : | > 1,0 (Elektrolyte) |
| Relative density | : | 1,1 – 1,4 g/cm$^3$, 20 °C (Elektrolyte) |
| Water solubility | : | % 100 (Elektrolyte) |
| Partition coefficient (n-octanol/water) | : | Not applicable |
| Auto-ignition temperature | : | Not applicable |
| Decomposition temperature | : | Not applicable |
| Viscosity | : | Not applicable |
| Explosive properties | : | No data available |
| Oxidizing properties | : | No data available |

**9.2 Other Safety Information**

No data available.

## SECTION 10 : STABILITY AND REACTIVITY

**10.1 Reactivity**

This product is non-reactive under normal conditions of use, storage, and transport.

**10.2 Chemical Stability**

Battery is considered stable under recommended storage conditions.

**10.3 Possibility of Hazardous Reactions**

If elektrolyte contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, finely divided metals, sulfur trioxide gas, strong oxidizers, chlorates, nitrates and picrates.

**10.4 Conditions to Avoid**

Keep away from heat, hot surfaces, open flames, sparks, and other sources of heat and ignition. No smoking. Do not prolonged overcharge at high current.

**10.5 Incompatible Materials**

| | | |
|---|---|---|
| Electrolyte | : | Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas. |
| Lead | : | Avoid contact with strong acids, bases, halides and halogenates, potassium nitrate, peroxides, permanganates and reducing agents. |

**10.6 Hazardous Decomposition Products**

As a result of thermal decomposition, sulfuric acid will produce sulfur dioxide, sulfur trioxide, hydrogen sulfide, and sulfuric acid mist, and lead components of battery may release lead oxides.

## SECTION 11 : TOXICOLOGICAL INFORMATION

**NOTE: Under normal conditions of use, this product does not present a health hazard. The following information is provided for battery container breakage or under extreme conditions such as fire.**

### 11.1 Information on Toxicological Effects

Acute Oral Toxicity: Electrolyte, LD50 rat 2.140 mg/kg (IUCLID – Regulation (EC) No. 1272/2008, Annex VI), absorption

Elemental lead, Acute Toxicity Estimate (ATE) 500,1 mg/kg

Acute Inhalation Toxicity: Electrolyte, LC50 rat 510 mg/$m^3$, 2 hours

No data available for elemental lead

Skin corrosion/irritation: Electrolyte, Skin – Rabbit Result: Causes serious tissue irritation and burns

Elemental lead is not absorbed through the skin and is not a dermal sensitizer

Eye damage/irritation: Electrolyte, Eyes – Rabbit Result: Severe eye irritation and burns, may cause blindness

Elemental lead, may cause eye irritation

Respiratory sensitisation: Breathing of sulfuric acid vapors/mists and lead dust/fumes may cause severe respiratory and lungs irritation.

Germ cell mutagenicity: No data available.

Carcinogenicity: The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a Category 1 carcinogen, a substance that is carcinogenic to humans. This classification does not apply to liquid form of sulfuric acid or electrolyte contained within a battery. Nevertheless, misusage of battery, such as overcharging, may result in the generation of sulfuric acid mist. Lead is listed as a Category 2B carcinogen, possibly carcinogenic to humans, likely in animal studies at extreme doses (oral). Proof of carcinogenicity in humans is lacking at present.

Reproductive toxicity: Suspected of damaging fertility.

Teratogenicity: May damage the unborn child.

Specific target organ toxicity – single exposure: Not classified as specific target organ toxicant with single exposure.

Specific target organ toxicity – repeated exposure: Lead and its compounds may cause damage to organs (blood, central nervous system) through prolonged or repeated exposure.

Aspiration hazard: No data available.

### 11.2 Additional Information

Generally lead compounds have been reported to cross the placenta and to induce embryo mortality. They also have teratogenic effect in some animal species. Adverse effects of lead on human reproduction, embryonic and fetal development, and postnatal somatic and mental development have been reported. Excessive exposure can affect blood, nervous, and digestive systems. The synthesis of hemoglobin is inhibited and results in anemia. If left untreated, neuromuscular dysfunction, possible paralysis, and encephalopathy can result.

Additionally other symptoms of overexposure include joint and muscle pain, weakness of the extensor muscles (frequently the hand and wrist), headache, dizziness, anorexia, convulsions, abdominal pain, diarrhea, constipation, nausea, vomiting, blue line on the gums, insomnia, and metallic taste. High body levels cause increased cerebrospinal pressure, brain damage, and stupor leading to coma and often death. Danger of cumulative effects. All HEAVY METALS are taken into the body primarily by inhalation and ingestion. This product should be handled with particular care.

Sulfuric acid is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. May cause spasm, inflammation and edema of the larynx and bronchi, pneumonitis, pulmonary edema, burning sensation, cough, wheezing, laryngitis, shortness of breath, headache, nausea, vomiting. Effects may be delayed. Ensure adequate ventilation at working space. Wash hands, face, neck and arms thoroughly before eating, smoking or leaving the work site.

Do not keep and use at the same place with food, tobacco and cosmetics. Contaminated work clothes and work equipment should never be taken home or laundered with personal non-contaminated clothing. Keep this product out of reach of children.

## SECTION 12 : ECOLOGICAL INFORMATION

### 12.1 Toxicity

Electrolyte: Toxicity to fish, LC50 – Brachydanio rerio (Zebra fish) – 82 mg/l – 24 hours*

LOEC (lowest observable effect concentration) – Cyprinus carpio (Carp fish) – 22 mg/l – 96 hours*

Lead: Toxicity to fish, LC50 – Oncorhynchus mykiss (Rainbow trout) – 1,17 mg/l – 96 hours*

*Reference: The above information is taken from ECOTOX database.

### 12.2 Persistence and Degradability

Lead is very persistent in soil and sediments.
Due to biodegradability measuring methods are not applicable to inorganic substances, no data available.

### 12.3 Bioaccumulative Potential

Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants but little bioaccumulation occurs through the food chain. Most studies include lead compounds and not elemental lead.

### 12.4 Mobility in Soil

Mobility of metallic lead between ecological compartments is slow.

### 12.5 Results of PBT and vPvB Assessment

According to Regulation (EC) No. 1907/2006, Annex XIII, PBT or vPvB assessment is not required/not applicable for this product.

### 12.6 Other Adverse Effects

Very toxic to aquatic life with long lasting effects. Discharge into the environment must be avoided.

## SECTION 13 : DISPOSAL CONSIDERATIONS

### 13.1 Waste Treatment Methods

| | | |
|---|---|---|
| Product | : | Lead-acid batteries are completely recyclable. Dispose of product in accordance with local, regional, national or international regulations. Keep separately from other wastes. |
| Contaminated packaging | : | Treat contaminated packaging as product itself. |

## SECTION 14 : TRANSPORT INFORMATION

### 14.1 Ground (ADR/RID)

| | | |
|---|---|---|
| UN Number | : | 2794 |
| UN Proper Shipping Name | : | Batteries, Wet, Filled with Acid |
| Hazard Class | : | 8 |
| Packaging Group | : | III |
| Environmental Hazards | : | Yes |
| Special Precautions For User | : | No data available |

### 14.2 Vessel (IMDG)

| | | |
|---|---|---|
| UN Number | : | 2794 |
| UN Proper Shipping Name | : | Batteries, Wet, Filled with Acid |
| Hazard Class | : | 8 |
| Packaging Group | : | III |
| Marine Pollutant | : | Yes |
| EmS | : | F – A, S – B |
| Special Precautions For User | : | No data available |
| Reference | : | IMDG, 2014, Packaging Instructions P801 |

### 14.3 Aircraft (IATA)

| | | |
|---|---|---|
| UN Number | : | 2794 |
| UN Proper Shipping Name | : | Batteries, Wet, Filled with Acid |
| Hazard Class | : | 8 |
| Packaging Group | : | III |
| Environmental Hazards | : | No |
| Special Precautions For User | : | No data available |
| Reference | : | IATA DGR, 59th Edition, 2018, Section 5, Packaging Instructions 870 |

## SECTION 15 : REGULATORY INFORMATION

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

### 15.1 Safety, Health and Environmental Regulations/Legislation Specific For the Substance or Mixture

Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators (or the EU Battery Directive as it is more commonly known)

### 15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out.

## SECTION 16 : OTHER INFORMATION

### 16.1 General Reminders

MUTLU Battery granted license to make unlimited paper copies for internal use only.

The information in this document is based on the present state of our knowledge or data records and was provided as guide for necessary and appropriate safety precautions. It does not represent a guarantee of any properties of the product.
MUTLU Battery; shall not be held liable for any damage resulting from transporting, handling or from contact with the product.

### 16.2 Training Advice

Provide adequate information, instruction and training for users.

### 16.3 Revision Information

All sections were revised and were made eligible to the relevant new legislations.