Material Safety Data Sheet

Reference to ST/SG/AC.10/30/Rev.9(GHS)

Section 1- Chemical Product and Company Identification

Chemical Product Identification
Sample Description: ALKALINE BATTERY
Sample Model: LR03
Recommended Uses: N/A
Restrictions on Use: N/A
Supplier Name: Wuxi Noran Battery Co.,Ltd
Address: NO.10 of Middle YanyuRoad,Wuxi ,Jiangsu,China
Phone Number: 0086-0510-83381858
FAX: 0086-0510-83399778
E-mail: 269938716@qq.com
Emergency Phone Number: 0086-0510-83399778

Section 2- Hazards Identification

Emergency overview: This product is a battery. Intended use of the product should not result in exposure to the Chemical substance. In case of rupture the below hazards exist.

Classification according to GHS
Acute toxicity, oral (4)
Acute toxicity, inhalation: Dusts and mists (4)
Skin corrosion/irritation (1A, 1B, 1C)
Specific target organ toxicity, repeated exposure (2)
Hazardous to the aquatic, long-term hazard (2)

Label elements

Hazard pictogram(s):

Signal word:
Hazard statement(s):
H302 Harmful if swallowed
H332 Harmful if inhaled
H314 Causes severe skin burns and eye damage
H373 May cause damage to organs through prolonged or repeated exposure
H411 Toxic to aquatic life with long lasting effects

Precautionary statement(s):

Prevention:

P201 Obtain special instructions before use.

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

P260 Do not breathe dusts or mists.

P264 Wash skin and clothing thoroughly after handling.

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

P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

P280 Wear protective gloves, protective clothing, eye protection, face protection.

Response:

P330 Rinse mouth.

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.

P310 Immediately call a POISON CENTER.

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.

P363 Wash contaminated clothing before reuse.

P321 Specific treatment(See additional emergency instructions)

P391 Collect spillage.

Storage

P405 Store locked up.

Disposal:

P501 Send contents to approved waste treatment plants

Other hazards

Physical and chemical hazards: See Section 10

Human health hazards: See Section 11

Environmental hazards: See Section 12

Section 3- Composition/Information on Ingredients

Chemical characterization: Mixture

Chemical Composition	CAS No.	Weight(%)
Manganese Dioxide	1313-13-9	40
Zinc Metal	7440-66-6	16
Potassium hydroxide	1310-58-3	8

Water	7732-18-5	10
Iron	7439-89-6	17
Paper	RR-01108-	1
Copper	7440-50-8	3
Nylon	9008-75-7	2
Graphite	7782-42-5	3

Section 4- First Aid Measures

Description of first aid measures
General information No special measures required.
After eye contact
Flush eyes with plenty of water for several minutes while holding eyelids open. Get medical attention if irritation persists.
After skin contact
Remove contaminated clothing and shoes. Immediately wash with water and soap and rinse thoroughly. Wash clothing and shoes before reuse. If irritation occurs, get medical attention.
After inhalation
Remove victim to fresh area. Administer artificial respiration if breathing is difficult. Seek medical attention.
After swallowing
Do not induce vomiting. Get medical attention

Personal protective equipment for first-aid responders: No data available.
Most important symptoms/effects, acute and delayed: No data available.
Indication of immediate medical attention and special treatment needed: Treat symptomatically.

Section 5- Fire Fighting Measures

Suitable extinguishing media:
Use extinguishing agent suitable for local conditions and the surrounding environment
Such as dry powder , CO2.
Unsuitable extinguishing media:
No data available.

Specific Hazards arising from the chemical:

Special hazards arising from the substance or mixture

Battery may burst and release hazardous decomposition products when exposed to a fire situation. Some may burn but none ignite readily. Containers may explode when heated Some may be transported hot.

Specific protective actions for fire-fighters:

Protective equipment: Wear self-contained respirator. Wear fully protective impervious suit.

Section 6- Accidental Release Measures

Personal precautions:

Wear protective equipment. Keep unprotected persons away. Ensure adequate ventilation

Protective equipment:

No data available.

Emergency procedures:

Remove ignition sources, evacuate area. Sweep up using a method that does not generate dust. Collect as much of the spilled material as possible, placed the spilled material into a suitable disposal container. Keep spilled material out of sewers, ditches and bodies of water

Environmental precautions:

Do not allow material to be released to the environment without proper governmental permits.

Methods and materials for containment and cleaning up:

For all waste handing must refer to United Nations, National and Local Regulations for disposal.

See Section 7 for information on safe handling

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information

Section 7- Handling and Storage

Precautions for safe handling:

Avoid short circuiting the battery. Avoid mechanical damage of the battery. Do not open or disassemble. Batteries may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity. Avoid all personal contact, including inhalation. Wear protective clothing when risk of exposure occurs. Use in a well-ventilated area. Prevent concentration in hollows and sumps.

Conditions for safe storage, including any incompatibilities:

Store in a cool, dry, well-ventilated place. Keep away from heat, avoiding the long time of sunlight.

Section 8 - Exposure Controls/Personal Protection

Control parameters

CAS No.	ACGIH	NIOSH	OSHA
1313-13-9	N/A	N/A	N/A
1310-58-3	TLV-Peak 2mg/m^3	REL-Peak 2mg/m^3	N/A
7782-42-5	TLV-TWA 2mg/m^3	REL -TWA 2.5mg/m^3	PEL-TWA 15mppcf PEL-TWA 20mppcf
7439-89-6	N/A	N/A	N/A
RR-01108-	N/A	N/A	N/A
7440-66-6	N/A	N/A	N/A
7732-18-5	N/A	N/A	N/A
9008-75-7	N/A	N/A	N/A
7440-50-8	TLV-TWA 0.2mg/m^3 TLV-TWA 1ma/m^3	REL -TWA 1mg/m^3 REL-TWA 0.1ma/m^3	PEL-TWA 0.1mg/m^3 PEL-TWA 1mg/m^3

Appropriate engineering controls:

The usual precautionary measures for handling chemicals should be followed

Keep away from foodstuffs, beverages and feed.

Remove all soiled and contaminated clothing immediately.

Wash hands before breaks and at the end of work.

Personal Protective Equipment:

Respiratory protection: Wear suitable protective mask. For a large large number of battery leakages, wear chemical protective clothing, including self-contained breathing apparatus.

Hand Protection: Wear appropriate protective gloves to reduce skin contact.

Eye Protection: Wear safety goggles or eye protection combined with respiratory protection

Skin and Body Protection:

Working environment required, wear suitable protective clothing to minimize contact with skin. The type of protective equipment must be according to the concentration and the content of certain hazardous substances in the workplace.

Section 9- Physical and Chemical Properties

Information on basic physical and chemical properties

Colour:	Black gold
Physical State:	Cylindrical
Odour:	Not available.
Odour threshold:	Not available.
pH:	Not available.
Melting point/freezing point:	Not available.
Initial boiling point and boiling range:	Not available.
Flash Point:	Not available.
Evaporation rate:	Not available.

Flammability (solid, gas):	Not available.
Explosion Limits (vol% in air):	Not available.
Vapour pressure, kPa at 20℃:	Not available.
Vapor density:	Not available.
Density/Relative density (water = 1):	Not available.
Solubility(ies):	Not available.
Partition coefficient: n-octanol/water:	Not available.
Auto-ignition temperature:	Not available.
Decomposition temperature:	Not available.
Viscosity:	Not available.
Other information:	
Voltage	1.5V
Electric capacity	1000mAh

Section 10 - Stability and Reactivity

Reactivity: No data available.
Chemical stability: Stable.
Possibility of hazardous reactions: No data available.
Conditions to Avoid: Flames, sparks, and other sources of ignition, incompatible materials.
Incompatible materials: Oxidizing agents, acid base.
Hazardous decomposition products: Carbon monoxide, carbon dioxide.

Section 11 - Toxicological Information

Acute Toxicity:

CAS No.	LC5O/LD50
1313-13-9	No data available
1310-58-3	LD50 Rat (oral): 284mg/kg
7782-42-5	No data available
7439-89-6	No data available
7440-66-6	LD50 Rat (oral): >2000mg/kg
7732-18-5	No data available
7440-50-8	No data available
9008-75-7	No data available

Skin irritation/corrosion:
Eye danger/irritation: No data available.
Respiratory or Skin sensitisation: No data available.
Reproductive Cell Mutagenicity: No data available.
Carcinogenicity: No data available.
Reproductive Toxicity: No data available.
Specific target organ toxicity-Single exposure: No data available.
Specific target organ toxicity-Repeated exposure: No data available.
Aspiration hazard: No data available.
Potential Health Effects: No data available.
Inhalation: No data available.
Skin contact: No data available.
Eye contact: No data available.
Ingestion: No data available.

Section 12 - Ecological Information

Ecological Toxicity:
CAS# 7440-66-6
ErC50: 0.15 mg/L-Algae (Pseudokirchneriella subcapitata) -72h

Persistence and degradability: No data available.
Bioaccumulative Potential: No data available.
Mobility in Soil: No data available.
Other adverse effects: No data available.

Section 13- Disposal considerations

Disposal methods:
Recommendation:
Consult state, local or national regulations to ensure proper disposal.
Uncleaned packaging
Recommendation: Disposal must be made according to official regulations.

Section 14- Transport information

UN Number	
IATA. IMDG, Model Regulation	N/A

UN Proper shipping name **IATA, IMDG, Model Regulation**	N/A
Transport hazard class(es) **IATA. IMDG, Model Regulation**	Not Subjected for transport of dangerous goods
Packing group **IATA. IMDG, Model Regulation**	N/A
Environmental hazards **Marine pollutant:**	No
Special precautions for user	Not applicable.

Transport information: Alkaline zinc manganese battery LR03 1.5V is exempt from dangerous goods. It is considered non-dangerous goods by the International Civil Aviation Organization (ICAO), the International Air Transport Association (IATA) DGR64th Edition, IATA Special Provisions A123, International Martine Dangerous Goods Regulations IMDG Code 2020Edition(Amdt 40-20), or the 《Recommendations on the Transport of Dangerous Goods-Model Regulations》(22nd).

S.P.A123 This entry applies to Batteries, electric storage, not otherwise listed in Subsection 4.2-List of Dangerous Goods. Examples of such batteries are: alkali-manganese, zinc-carbon and nickel-cadmium batteries. Any electrical battery or battery powered device, equipment or vehicle having the potential of a dangerous evolution of heat must be prepared or transport so as to prevent(a) a short-circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals; or, in the case of equipment, by disconnection of the battery and protection of exposed terminals); and(b) accidental activation The words "Not Restricted" and the Special Provision number must be included in the description of the substance on the Air Waybill as required by 8.2.6, when an Air Waybill is issued

Transport Fashion: By air, by sea, by railway, by road.

Section 15 –Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

CAS No.	TSCA	IECSC	DSL/NDSL	EINECS/ELINCS/NLP
1313-13-9	Listed	Listed	Listed DSL	Listed
7440-66-6	Listed	Listed	Listed DSL	Listed
1310-58-3	Listed	Listed	Listed DSL	Listed
7732-18-5	Listed	Listed	Listed DSL	Listed
7439-89-6	Listed	Listed	Listed DSL	Listed

RR-01108-	Listed	Listed	Listed DSL	Listed
7440-50-8	Listed	Listed	Listed DSL	Listed
9008-75-7	Listed	Listed	Listed DSL	Listed
7782-42-5	Listed	Listed	Listed DSL	Listed

Section 16 –Other information

Issue Date: 2023-01-04
Issue Department: Technical department
Modification record:
Notice to reader:

To the best of our knowledge, the information contained herein is accurate. However, nethier the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exists.

Other information:
CAS: (Chemical Abstracts Service);
EC: (European Commission)
ACGIH: (American Conference of Governmental Industrial Hygienists);
NIOSH: (US National Institute for Occupational Safety and Health);
OSHA: (US Occupational Safety and Health);
TLV: (Threshold Limit Value);
TWA: (Time Weighted Average);
STEL: (Short Term Exposure Limit);
PEL: (Permissible Exposure Level);
PEL: (Permissible Exposure Level);
REL: (Recommended Exposure Limit);
PC-STEL: (Permissible concentration-short time exposure limit);
PC-TEA: (Permissible concentration-time weighted average);
LC50: (Lethal dose, 50 percent kill);
IRAC: (International Agency for Research on Cancer);
EC50: (Median effective concentration);
BCF: (Bioconcentration Factor);
BOD: (Biochemical oxygen demand);
NOEC: (No observed effect concentration);
NTP: (US National Toxicology Program);
RTECS: (Registry of Toxic Effects of Chemical Substances);

IATA: (International Air Transport Association);
IMDG: (International Maritime Dangerous Goods);
TDG: (Recommendations on the TRANSPROT OF DANGEROUS GOODS Model Regulations);
TOC: (Total Organic Carbon);
TSCA: (Toxic Substances Control Act of USA);
DSL: (the Domestic Substances List of Canada);
NDSL: (the Non-domestic Substances List of Canada)

Issued date: Jan. 04, 2023

******End of report******

无锡市诺雷电池有限公司
WUXI NORAN BATTERY CO.,LTD.

产 品 规 格 书
PRODUCT SPECIFICATION
碱性锌锰电池
ALKALINE ZINC-MANGANESE BATTERY

LR03-AAA-1.5V

文件编号：NR-JS-LR03-A

版　　本：　C　

发行日期：　2024-03-22

制　　作：　_____

核　　准:　_____

无锡市诺雷电池有限公司

地址：无锡市惠山区前洲镇堰玉中路 10 号

产 品 规 格 书 TECHNICAL SPECIFICATION

1.简介/About

诺雷碱性电池 REIDEN ALKALINE BATTERY
型 号 Model# ：LR03 / AAA /AM-4
化学成分 Chemical system: Zn/KOH—H_2O/MnO_2 碱性锌锰
标称电压 Nominal voltage: 1.5Volt
近似重量 Approx. weight： 11.5g
电池外壳 Jacket：仿金属铝膜 Aluminum Foil Jacket
参考标准 Reference :
IEC 60086-1:2000 …*Primary Batteries-Part1:General*
IEC 60086-2:2000 …*Primary Batteries-Part2:Physical and Electrical Specification*
GB/T 7112-1998 …*Zinc-Manganese Dry Batteries of R03,R1,R6,R14and R20*
Alkaline Zinc-Manganese Dry Batteries of LR03,LR1,LR6,LR14and LR20
重金属含量 Heavy Metal Contents: 无汞无隔 Mercury and Cadmium Free

2.额定值/Ratings

额定电压/Nominal Voltage		1.5V
使用温度范围 Temperature Range for operation	标准温度 Standard Temperature	20℃±2℃
	专用温度 Special Temperature	30℃±2℃
	高温 High temperature	45℃±2℃
相对湿度范围 Humidity Range for Storage	标准相对湿度 Standard Humidity	45%~75%
	专用相对湿度 Special Humidity	35%~65%
尺寸 Dimension	直径/Diameter	10.05-10.25mm
	高度/Height	43.9-44.1mm
近似重量/Approx weight		11.5g

3.电 性 能/Electrical Characteristics

Battery status	开路电压（V） Off-load voltage (V)	负荷电压（V） On-load voltage (V)	短路电流（A） Short circuit current (A)	验 收 标 准 Acceptance Standard
新 电（30 天内） Initial within (30days)	1.62	1.55	11	GB2828 一般检验水平 commonly sampling AQL=0.4
常 温 12 个月 After 12 months	1.59	1.49	9	

（条件：负荷电压 3.9Ω，精度±0.5%，测量时间 0.3 秒，测量温度 20℃±2℃，短路电流用指针式安培表，精度±0.5%（0.5 级）。

Conditions:3.9Ω ±0.5% load resistance, measuring time 0.3 seconds, temperature at 20℃±2℃, the hair spring type ampere meter with ±0.5% accuracy (0.5level) shall be used.

4. 放 电 性 能 Service Time

放 电 条 件 Discharge condition			最 小 平 均 放 电 时 间 Average minimum discharge time	
放电负载 Discharge load(Ω)	放电时间 Daily discharge	终止电压(V) End voltage (V)	新 电 (30 天内) Initial within 30 days	20℃±2℃ 储存 12 个月 After 12months under 20℃±2℃
3.9Ω	24h/d	0.9	150min	140min
20Ω	24h/d	0.9	18.1h	17.3h
10Ω	1h/d	0.9	8.2h	7.5h
250mA	24h/d	0.9	2.8h	2.5h

容量: 1200mAh(标准温度下 25mA 恒流放电至 0.9V)

Capacitance:1200mAh (S.T. 25mA constant-current discharge to 0.9 V)

(验收标准：每一种放电条件取 9 只电池进行放电。平均放电时间等于或大于规定值，而且放电时间少于规定值的 80%的电池数不大于 1，则认为电池的放电时间符合要求。)

（ Inspect standard: discharge 9 sample-batteries for each condition. It passes when average discharge time is no less than Rated Time and the quantity of the batteries which the value is under 80% of Rated Value is no more than one）

5.耐漏液性能/Anti-leakage characteristic

项 目 Item	条 件 Condition	期 限 Period	特 性 Characteristics	验 收 条 件 Inspect standard
过放电耐漏性能 Over-discharge characteristics	10Ω连续放电，温度：20℃±2℃，相对湿度：65±20%RH 10Ω continuous discharges at temp. 20℃±2℃, relative humidity 65%±20%RH	48 h	电池变形不超出电池尺寸上限或没有漏液情况。 no deformation exceeding the specified dimensions nor visible leakage	N=9 Ac=0 Re=1
贮存期耐漏性能 Storage characteristics	温度：45℃±2℃，相对湿度：,65%RH At temp. 45℃±2℃, relative humidity 65%RH	90 days		N=40 Ac=0 Re=1
	室 温 At room temp.	12 month		

6、安 全 性 能 Safty characteristic

项 目 Item	条 件 Condition	期 限 Period	特 性 Characteristics	验 收 条 件 nspect standard

短 路 性 能 Short circuit characteristics	温度 Temp.：20℃±2℃	24H	电池没有爆炸 There shall be no explosion	N=8 Ac=0 Re=1
反 充 电 性 能 Abuse characteristics	4 只电池串联，其中 1 只极性相反。 Short circuit 4 pieces of battery in series, one of the batteries has to be connected with its polarity reversed	24H		

7.标记 Marks:

在电池外标明以下内容:/The following marks will be printed or stamped on the batteries's body

(1) 型号:/Model
(2) 标称电压/Nominal Voltage
(3) 极性/Pole
(4) 警告/Warning
(5) 生产日期/到有效期日期:Manufactured Date /Exp date

8、保存期限 Storage life

于常温及合适环境可储存 5 年 Under room temp and suitable environment, its shelf time is 5 years

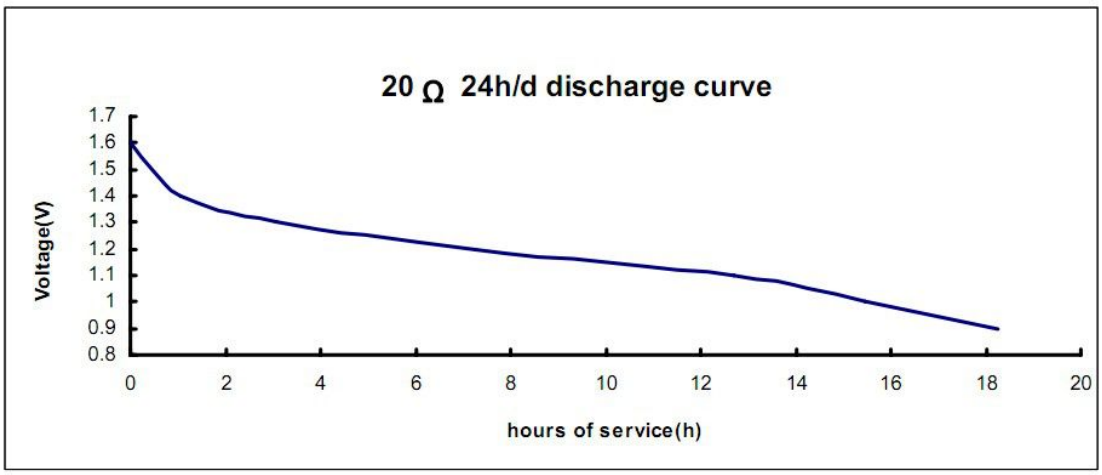
9、放电曲线 Discharge Curves

终止电压 End Voltage：0.90V

放电方式 Discharge Pattern：24h/day

负载电阻 Load Resistance：20Ω

标准时间 Minimum Duration：18.1hrs



SAFETY DATA SHEET

Issuing Date 10-Jun-2011 **Revision Date** 13-May-2015 **Revision Number** 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name **TIANQIU Alkaline Dry Battery LR03/AAA**

Other means of identification

Synonyms None

Recommended use of the chemical and restrictions on use

Recommended Use Alkaline battery

Uses advised against No information available

Details of the supplier of the safety data sheet

Supplier Name GUANGZHOU TIANQIU ENTERPRISE CO., LTD.

Supplier Address 9/F TianQiu Building No.16-30, He Yi Rd., San Yuan Li Ave., GuangZhou China
GUANGZHOU
GUANDONG
510410
CN

Supplier Phone Number Phone:8620-13825131170
Fax:8620-36323339
Contact Phone8615989631997

Supplier Email idsale6@gztianqiu.com

Emergency telephone number

Company Emergency Phone Number 8620-13825131170

2. HAZARDS IDENTIFICATION

Classification

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200). This product is an article which is a sealed battery and as such does not require an MSDS per the OSHA hazard communication standard unless ruptured. The hazards indicated are for a ruptured battery. This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Acute toxicity - Oral	Category 4
Acute toxicity - Inhalation (Gases)	Category 4
Acute toxicity - Inhalation (Dusts/Mists)	Category 4
Skin corrosion/irritation	Category 1 Sub-category A
Serious eye damage/eye irritation	Category 1
Specific target organ toxicity (repeated exposure)	Category 2

GHS Label elements, including precautionary statements

Emergency Overview

Signal word **Danger**

Hazard Statements
Harmful if inhaled
Causes severe skin burns and eye damage
May cause damage to organs through prolonged or repeated exposure

This is a battery. In case of rupture: the above hazards exist. .

Appearance No information available **Physical state** Solid **Odor** No information available

Precautionary Statements - Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Wear protective gloves/protective clothing/eye protection/face protection

Precautionary Statements - Response
Immediately call a POISON CENTER or doctor/physician
Specific treatment (see supplemental first aid instructions on this label)

Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician

Skin
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse

Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Immediately call a POISON CENTER or doctor/physician

Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth

Do NOT induce vomiting

Precautionary Statements - Storage
Store locked up

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Not applicable

Unknown Toxicity
4.52 % of the mixture consists of ingredient(s) of unknown toxicity

Other information

Very toxic to aquatic life with long lasting effects

Interactions with Other Chemicals
Use of alcoholic beverages may enhance toxic effects.

3. COMPOSITION/INFORMATION ON INGREDIENTS

.

Chemical name	CAS No.	Weight-%	Trade Secret
Manganese dioxide	1313-13-9	30 - 60	*
Iron	7439-89-6	10 - 30	*
Zinc	7440-66-6	10 - 30	*
Potassium hydroxide	1310-58-3	3 - 7	*
Copper	7440-50-8	1 - 5	*
Graphite	7782-42-5	1 - 5	*
PVC (Chloroethylene, polymer)	9002-86-2	1 - 5	*

*The exact percentage (concentration) of composition has been withheld as a trade secret

4. FIRST AID MEASURES

Description of first aid measures

General Advice Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye contact Rinse thoroughly with plenty of water, also under the eyelids. If symptoms persist, call a physician.

Skin contact Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician.

Inhalation Remove to fresh air. If symptoms persist, call a physician.

Ingestion Do NOT induce vomiting. Drink plenty of water. If symptoms persist, call a physician.

Self-protection of the first aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid contact with skin, eyes or

clothing. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Use personal protective equipment as required. Wear personal protective clothing (see section 8).

Most important symptoms and effects, both acute and delayed

Most Important Symptoms and Effects Burning sensation. Coughing and/ or wheezing. Difficulty in breathing.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
CAUTION: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical
The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Carbon oxides.

Physical/Chemical Reaction Properties No data available.

Explosion Data
Sensitivity to Mechanical Impact No.

Sensitivity to Static Discharge No.

Protective equipment and precautions for firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with eyes.

Other Information Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions Refer to protective measures listed in Sections 7 and 8.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with eyes.

Conditions for safe storage, including any incompatibilities

Storage Keep container tightly closed.

Incompatible materials None known.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Manganese dioxide 1313-13-9	TWA: 0.02 mg/m³ Mn respirable particulate matter TWA: 0.1 mg/m³ Mn inhalable particulate matter	(vacated) Ceiling: 5 mg/m³ Ceiling: 5 mg/m³ Mn	IDLH: 500 mg/m³ Mn TWA: 1 mg/m³ Mn STEL: 3 mg/m³ Mn
Zinc 7440-66-6	STEL: 10 mg/m³ respirable fraction TWA: 2 mg/m³ respirable fraction	TWA: 5 mg/m³ fume TWA: 15 mg/m³ total dust TWA: 5 mg/m³ respirable fraction	IDLH: 500 mg/m³ Ceiling: 15 mg/m³ dust TWA: 5 mg/m³ dust and fume STEL: 10 mg/m³ fume
Potassium hydroxide 1310-58-3	Ceiling: 2 mg/m³	(vacated) Ceiling: 2 mg/m³	Ceiling: 2 mg/m³
Copper 7440-50-8	TWA: 0.2 mg/m³ fume	TWA: 0.1 mg/m³ fume TWA: 1 mg/m³ dust and mist (vacated) TWA: 0.1 mg/m³ Cu dust, fume, mist	IDLH: 100 mg/m³ dust, fume and mist TWA: 1 mg/m³ dust and mist TWA: 0.1 mg/m³ fume
Graphite	TWA: 2 mg/m³ respirable particulate	TWA: 15 mg/m³ total dust synthetic	IDLH: 1250 mg/m³

7782-42-5	matter all forms except graphite fibers	TWA: 5 mg/m³ respirable fraction synthetic (vacated) TWA: 2.5 mg/m³ respirable dust natural (vacated) TWA: 10 mg/m³ total dust synthetic (vacated) TWA: 5 mg/m³ respirable fraction synthetic TWA: 15 mppcf natural	TWA: 2.5 mg/m³ respirable dust
PVC (Chloroethylene, polymer) 9002-86-2	TWA: 1 mg/m³ respirable particulate matter	-	

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits Immediately Dangerous to Life or Health

Appropriate engineering controls

Engineering Measures Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face protection No special protective equipment required.

Skin and body protection No special protective equipment required.

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Solid
Appearance No information available
Color No information available

Odor No information available
Odor Threshold No information available

Property	Values	Remarks Method
pH	No data available	None known
Melting / freezing point	No data available	None known
Boiling point / boiling range	No data available	None known
Flash Point	No data available	None known
Evaporation Rate	No data available	None known
Flammability (solid, gas)	No data available	None known
Flammability Limit in Air		
Upper flammability limit	No data available	
Lower flammability limit	No data available	
Vapor pressure	No data available	None known
Vapor density	No data available	None known
Specific Gravity	0	None known
Water Solubility	Negligible	None known
Solubility in other solvents	No data available	None known
Partition coefficient: n-octanol/water	No data available	None known
Autoignition temperature	No data available	None known
Decomposition temperature	No data available	None known

Kinematic viscosity	No data available	None known
Dynamic viscosity	No data available	None known
Explosive properties	No data available	
Oxidizing properties	No data available	

Other Information

Softening Point	No data available
VOC Content (%)	No data available
Particle Size	No data available
Particle Size Distribution	

10. STABILITY AND REACTIVITY

Reactivity

No data available.

Chemical stability
Stable under recommended storage conditions.

Possibility of Hazardous Reactions
None under normal processing.

Hazardous Polymerization
Hazardous polymerization does not occur.

Conditions to avoid
None known.

Incompatible materials
None known.

Hazardous Decomposition Products
Carbon oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information	Product does not present an acute toxicity hazard based on known or supplied information. In case of rupture:. .
Inhalation	Specific test data for the substance or mixture is not available. Corrosive by inhalation. (based on components). Inhalation of corrosive fumes/gases may cause coughing, choking, headache, dizziness, and weakness for several hours. Pulmonary edema may occur with tightness in the chest, shortness of breath, bluish skin, decreased blood pressure, and increased heart rate. Inhaled corrosive substances can lead to a toxic edema of the lungs. Pulmonary edema can be fatal. May cause irritation of respiratory tract. Harmful by inhalation.
Eye contact	Specific test data for the substance or mixture is not available. Causes burns. (based on components). Corrosive to the eyes and may cause severe damage including blindness.

Causes serious eye damage. May cause irreversible damage to eyes.

Skin contact Specific test data for the substance or mixture is not available. Corrosive. (based on components). Causes burns.

Ingestion Specific test data for the substance or mixture is not available. Causes burns. (based on components). Ingestion causes burns of the upper digestive and respiratory tracts. May cause severe burning pain in the mouth and stomach with vomiting and diarrhea of dark blood. Blood pressure may decrease. Brownish or yellowish stains may be seen around the mouth. Swelling of the throat may cause shortness of breath and choking. May cause lung damage if swallowed. May be fatal if swallowed and enters airways. Ingestion may cause irritation to mucous membranes. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. May be harmful if swallowed.

Component Information

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Manganese dioxide 1313-13-9	= 9000 mg/kg (Rat)	-	> 1500 mg/m³ (Rat) 4 h
Iron 7439-89-6	= 30 g/kg (Rat)	-	-
Zinc 7440-66-6	= 630 mg/kg (Rat)	-	-
Potassium hydroxide 1310-58-3	= 284 mg/kg (Rat)	-	-
Graphite 7782-42-5	-	-	> 2000 mg/m³ (Rat) 4 h

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms Erythema (skin redness). Burning. May cause blindness. Coughing and/ or wheezing.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization No information available.

Mutagenic Effects No information available.

Carcinogenicity Contains no ingredient listed as a carcinogen.

Chemical name	ACGIH	IARC	NTP	OSHA
PVC (Chloroethylene, polymer) 9002-86-2		Group 3		

Reproductive toxicity No information available.

STOT - single exposure No information available.

STOT - repeated exposure Causes damage to organs through prolonged or repeated exposure. Based on classification criteria from the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200), this product has been determined to cause systemic target organ toxicity from chronic or repeated exposure. (STOT RE).

Chronic Toxicity No known effect based on information supplied.

Target Organ Effects None known.

Aspiration Hazard No information available.

Numerical measures of toxicity Product Information

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)
807.00 mg/kg
ATEmix (inhalation-gas)
10,618.00 ppm (4 hr)
ATEmix (inhalation-dust/mist)
3.50 mg/l
ATEmix (inhalation-vapor)
26.00 ATEmix

12. ECOLOGICAL INFORMATION

This product contains a chemical which is listed as a severe marine pollutant according to DOT

Ecotoxicity
Very toxic to aquatic life with long lasting effects. Harmful to aquatic life.

Chemical name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Iron 7439-89-6		96h LC50: = 13.6 mg/L (Morone saxatilis)		
Zinc 7440-66-6	96h EC50: 0.11 - 0.271 mg/L (Pseudokirchneriella subcapitata) 72h EC50: 0.09 - 0.125 mg/L (Pseudokirchneriella subcapitata)	96h LC50: = 7.8 mg/L (Cyprinus carpio) 96h LC50: = 0.24 mg/L (Oncorhynchus mykiss) 96h LC50: 2.16 - 3.05 mg/L (Pimephales promelas) 96h LC50: = 0.41 mg/L (Oncorhynchus mykiss) 96h LC50: = 0.59 mg/L (Oncorhynchus mykiss) 96h LC50: = 2.66 mg/L (Pimephales promelas) 96h LC50: = 3.5 mg/L (Lepomis macrochirus) 96h LC50: 0.211 - 0.269 mg/L (Pimephales promelas) 96h LC50: = 0.45 mg/L (Cyprinus carpio) 96h LC50: = 30 mg/L (Cyprinus carpio)		48h EC50: 0.139 - 0.908 mg/L (Daphnia magna)
Potassium hydroxide 1310-58-3		96h LC50: = 80 mg/L (Gambusia affinis)		
Copper 7440-50-8	72h EC50: 0.0426 - 0.0535 mg/L (Pseudokirchneriella subcapitata) 96h EC50: 0.031 - 0.054 mg/L (Pseudokirchneriella subcapitata)	96h LC50: = 0.2 mg/L (Pimephales promelas) 96h LC50: 0.0068 - 0.0156 mg/L (Pimephales promelas) 96h LC50: = 0.052 mg/L (Oncorhynchus mykiss) 96h LC50: < 0.3 mg/L (Pimephales promelas) 96h LC50: = 0.3 mg/L (Cyprinus carpio) 96h LC50: = 0.8 mg/L (Cyprinus carpio) 96h LC50: = 1.25 mg/L (Lepomis macrochirus) 96h LC50: = 0.112 mg/L (Poecilia reticulata)		48h EC50: = 0.03 mg/L (Daphnia magna)
Graphite 7782-42-5		96h LC50: > 100 mg/L (Danio rerio)		

Persistence and Degradability
No information available.

Bioaccumulation
No information available

Chemical name	Log Pow
Manganese dioxide 1313-13-9	<0
Potassium hydroxide 1310-58-3	0.83

Other adverse effects
No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal methods This material, as supplied, is not a hazardous waste according to Federal regulations (40 CFR 261). This material could become a hazardous waste if it is mixed with or otherwise comes in contact with a hazardous waste, if chemical additions are made to this material, or if the material is processed or otherwise altered. Consult 40 CFR 261 to determine whether the altered material is a hazardous waste. Consult the appropriate state, regional, or local regulations for additional requirements.

Contaminated Packaging Dispose of contents/containers in accordance with local regulations.

California Waste Codes 141

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical name	California Hazardous Waste
Zinc 7440-66-6	Ignitable powder
Potassium hydroxide 1310-58-3	Toxic Corrosive
Copper 7440-50-8	Toxic

14. TRANSPORT INFORMATION

DOT NOT REGULATED
- **Proper Shipping Name** NON-REGULATED
- **Hazard Class** N/A
- **Marine Pollutant** This product contains a chemical which is listed as a severe marine pollutant according to DOT

TDG Not regulated
- **Marine Pollutant** This product contains a chemical which is listed as a severe marine pollutant according to TDG.

MEX Not regulated

ICAO Not regulated

IATA Not regulated
- **Proper Shipping Name** NON REGULATED
- **Hazard Class** N/A

IMDG/IMO Not regulated
- **Hazard Class** N/A

RID Not regulated

ADR Not regulated

ADN Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Not determined
DSL	Not determined

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical name	CAS No.	Weight-%	SARA 313 - Threshold Values %
Manganese dioxide - 1313-13-9	1313-13-9	30 - 60	1.0
Zinc - 7440-66-6	7440-66-6	10 - 30	1.0
Copper - 7440-50-8	7440-50-8	1 - 5	1.0

SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications. Under the amended regulations at 40 CFR 370, EPCRA 311/312 Tier II reporting for the 2017 calendar year will need to be consistent with updated hazard classifications.

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Zinc 7440-66-6		X	X	
Potassium hydroxide 1310-58-3	1000 lb			X
Copper 7440-50-8		X	X	

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

Chemical name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Zinc 7440-66-6	1000 lb		RQ 454 kg final RQ RQ 1000 lb final RQ
Potassium hydroxide 1310-58-3	1000 lb		RQ 1000 lb final RQ RQ 454 kg final RQ
Copper 7440-50-8	5000 lb		RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

.

Chemical name	New Jersey	Massachusetts	Pennsylvania	Rhode Island	Illinois
Manganese dioxide 1313-13-9	X		X	X	X
Zinc 7440-66-6	X	X	X	X	
Potassium hydroxide 1310-58-3	X	X	X	X	
Copper 7440-50-8	X	X	X	X	X
Graphite 7782-42-5	X	X	X		
PVC (Chloroethylene, polymer) 9002-86-2	X				

International Regulations

Mexico
National occupational exposure limits

Chemical name	Carcinogen Status	Exposure Limits
Manganese dioxide		Mexico: TWA= 0.2 mg/m³
Potassium hydroxide		Mexico: Ceiling 2 mg/m³
Copper		Mexico: TWA= 1 mg/m³ Mexico: TWA= 0.2 mg/m³ Mexico: STEL= 2 mg/m³
Graphite		Mexico: TWA= 2 mg/m³
PVC (Chloroethylene, polymer)		Mexico: TWA 1 mg/m³

Mexico - Occupational Exposure Limits - Carcinogens

Canada
WHMIS Hazard Class
Not determined

16. OTHER INFORMATION

NFPA	**Health Hazards**	1	**Flammability**	0	**Instability**	0	**Physical and Chemical Hazards** -
HMIS	**Health Hazards**	3 *	**Flammability**	0	**Physical Hazard**	0	**Personal Protection** X

Chronic Hazard Star Legend * = Chronic Health Hazard

Prepared By
Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Issuing Date 10-Jun-2011
Revision Date 13-May-2015
Revision Note No information available

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet