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School Materials Safety Manual:

No. 231 Magnesium Chloride
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♦ SECTION 1 INTRODUCTION

Material Magnesium Chloride, ca 100%

Chemical Formula $MgCl_2$

CAS Number 7786-30-3; Magnesium chloride hexahydrate ($MgCl_2 \cdot 6H_2O$), 7791-18-6

DOT Classification Not listed as a Hazardous Material for Transportation (49 CFR 172.101)

EPA Classification Not listed as a RCRA Hazardous Waste (40 CFR 261.33), a CERCLA Hazardous Substance (40 CFR 302.4), a SARA Extremely Hazardous Substance (40 CFR 355), or a SARA Toxic Chemical (40 CFR 372.65)

OSHA Classification Not listed as an Air Contaminant (29 CFR 1910.1000, Subpart Z)

Synonym Magnogene

NFPA Hazard Rating Not found

Genium Hazard Rating

4 = Extreme

3 = High

2 = Moderate

1 = Slight

0 = Minimum



Description Soft, white or colorless deliquescent (water-absorbent) crystals; no odor.

Overview Magnesium chloride is considered moderately toxic by ingestion and harmful if inhaled. In addition to possible use in the chemistry lab, this material may be an ingredient of products a vocational education class or the custodial/maintenance staff uses. It has uses as a catalyst or a chemical lab reagent; in floor-sweeping compounds, fire extinguishers, and ceramics; and for fireproofing wood. Staff or students using this chemical or materials containing it should follow all precautions listed on its package label and MSDS, especially with regard to ventilation and personal protective equipment.

Manufacturer Always request an up-to-date MSDS from your chemical supplier. That sheet should identify the substance's manufacturer and include an emergency phone number. This *Manual's* Resources/Manufacturers Index lists some larger manufacturers and available emergency phone numbers.

♦ SECTION 2 USE AND STORAGE DATA

Preliminary Planning Considerations *Plan and provide for safe disposal of all school-generated chemical waste.* Check applicable regulations prior to use. For safety, *do not wear contact lenses in the lab*: soft lenses may absorb, and all lenses concentrate, irritants. Particles adhering to contact lens surfaces can cause corneal damage. Employees and students should know the location of eyewash and shower facilities near where chemicals are used. Be sure that eyewash stations and safety showers are in good working order. Provide adequate ventilation. Wear rubber gloves to minimize skin contact.

Usage Precautions and Procedure Before using, *read this material's container label* and follow all precautions. Do not smoke in storage or use area. Do not let mag-

nesium chloride contact eyes, skin, or clothing. Avoid inhaling its dust or solution mist. Do not taste or swallow this substance. Practice good housekeeping to avoid unintentionally mixing incompatibles. Avoid creating airborne dust conditions. Do not allow chemical residue or dust buildup in lab or work areas. Wear safety glasses or goggles and appropriate protective clothing when working with this substance. After working with chemical materials, and before eating, drinking, or smoking, always wash hands and face. Keep this material away from notebooks, textbooks, and personal belongings to avoid transporting chemical residues from the lab/work area. Remove and launder contaminated clothing before reusing. When dissolved in water, clean up a spill promptly and thoroughly. When dissolved in water, magnesium chloride releases considerable heat. To prevent rapid, uncontrolled heating, always add $MgCl_2$ to water, not water to it. When slowly heated to 572 °F (300 °C) or more, magnesium chloride slowly releases hazardous chlorine gas (Cl_2).

Additional Data Magnesium chloride is stable at room temperature under normal handling and storage conditions. It does not polymerize. A hazardous reaction involving this material and 2-furon carboxylic acid is reported.⁽⁸⁴⁾ No other incompatibilities are noted.

Preferred Storage Location and Methods Storage areas should be cool and well ventilated. Since this material liquifies by water absorption when exposed to air, containers must be airtight and out of direct sunlight. To separate incompatible chemicals, store by chemical family, not by alphabetical name, on sturdy shelving. Storage of the primary container inside a heavy-duty plastic bag or other container is advisable. Protect all chemical containers from physical damage. Prohibit smoking in chemical storage areas. Purchase amounts equal to only a year's needs, if at all.

♦ SECTION 3 SPILL/DISPOSAL PROCEDURES

If Spilled Ventilate spill area. Clean up spilled material promptly and thoroughly. Cleanup personnel should protect against skin or eye contact and dust inhalation. If magnesium chloride is spilled and contacts water, it evolves considerable heat as it dissolves. If water contact is not preventable, add flooding amounts of water to safely absorb excess heat. For liquid (solution) spills, cover with an inert, solid absorbent (vermiculite, dry sand, etc.) and scoop into appropriate disposal containers (with a secure lid) in accordance with existing regulations. For larger spills, dike the spill area with an inert, absorbent material, as needed, to contain the spilled material. Carefully collect and scoop spilled dry material into a secure disposal or reclamation container. Avoid creating airborne dust conditions. Sweep, vacuum (with an appropriate filter), or wet mop to minimize dust dispersion.

Disposal of Small Quantities *Handle emptied containers carefully since residues may remain.* Dispose of small quantities of magnesium chloride in a landfill that permits chemical wastes of low toxicity. Investigate recycling, reclamation, or destruction to a less hazardous ma-

terial rather than disposal of untreated waste to a landfill. Follow all applicable regulations for disposal of $MgCl_2$ or its by-products. Check regulations before disposal is necessary. If this method is not practical, feasible, or in accord with existing regulations, contact your supplier or a licensed disposal contractor for specific treatment/disposal procedures.

Disposal of Larger Amounts Contact your supplier or a licensed disposal company.

Follow all applicable local, state, and Federal regulations for all waste disposal.

◆ SECTION 4 HEALTH HAZARDS

Summary Magnesium chloride exhibits low toxicity. Small particles embedded in the skin or sebaceous (fatty) tissue can cause localized inflammatory reactions and irritation. Carefully remove embedded $MgCl_2$ particles. If heated, magnesium chloride releases chlorine gas and compounds that may irritate the eyes and airways. Also, skin contact with a solution of this material and water may cause thermal burns.

1989-90 ACGIH TLV None established

1988 NIOSH REL None established

1989 OSHA PEL None established

1983-4 Toxicity Data Rat, oral, LD_{50} : 2800 mg/kg (also listed as 8100 mg/kg⁽⁵⁰⁶⁾); Mouse, intraperitoneal, LD_{50} : 99 mg/kg; Rat, intraperitoneal, LD_{50} : 225 mg/kg

Carcinogenicity Not listed by the NTP, IARC, or OSHA

Acute Effects Localized skin or eye irritation may result from contact with $MgCl_2$ or its solutions. Some irritant effects may be of a simple mechanical nature.

Chronic Effects None reported

◆ SECTION 5 FIRST AID PROCEDURES

Get appropriate in-school, paramedic, or community medical attention and support.

Eye Contact Promptly flush eyes with plenty of running water for at least 15 min, including under the eyelids. Get prompt medical attention.

Skin Contact Quickly remove heavily contaminated clothing. After flushing with large amounts of water, wash exposed areas with soap and water. If embedded in the skin, carefully remove any $MgCl_2$ particles to prevent aggravation of initial irritation. Get medical attention if irritation persists.

Inhalation Remove victim from exposure to fresh air and support breathing as necessary. Get medical help if victim is breathing with difficulty or coughing. Have a medically trained person administer oxygen as required.

Ingestion Never give anything by mouth to an unconscious or convulsing person. Rinse victim's mouth thoroughly with water. Give several glasses of water to drink.

Do not induce vomiting unless the amount was large and the exposed person is conscious and alert.

◆ SECTION 6 FIRE PROCEDURES AND DATA

Fire Hazards This inorganic salt does not burn. Possible hazards arise from thermal decomposition or reaction with water. For major fires, or for fires involving large quantities of chemical materials, firefighters should wear appropriate protective clothing and respirators. A self-contained breathing apparatus (SCBA) is recommended. If possible to safely do so, remove containers of this material from the fire area. Use of a direct stream of water may be ineffective and could scatter the fire, although water spray is effective in cooling fire-exposed containers and dispersing vapors. If large quantities of $MgCl_2$ are present and exposed to water, use flooding amounts to safely absorb the heat their reaction causes.

Flash Point and Method Noncombustible

Autoignition Temperature Not applicable

Flammability Limits in Air (vol. %) Not applicable

Hazardous Decomposition Products Magnesium fume, oxides of chlorine (ClO_x), and possibly chlorine gas [from slow heating of $MgCl_2$ near 572 °F (300 °C)]

Extinguishing Media Use media appropriate to surrounding fire conditions.

◆ SECTION 7 PHYSICAL DATA

$MgCl_2$

Boiling Point (at 1 atm) 1412 °F (765 °C)

Melting Point (at 1 atm) 1314 °F (712 °C), rapid heating

Formula Weight 95

Specific Gravity ($H_2O = 1$) ca 2.4

$MgCl_2 \cdot 6H_2O$

Boiling Point (at 1 atm) Decomposes to oxychloride

Melting Point (at 1 atm) 244.4°F (118 °C), loses $2H_2O$ at 212°F (100 °C)

Formula Weight 203.3

Specific Gravity ($H_2O = 1$) 1.56

$MgCl_2$ and $MgCl_2 \cdot 6H_2O$

Vapor Pressure (air = 1) 0

Solubility in Water (at 20 °C) Complete*

pH of Aqueous Solution 7 (neutral)

* Also soluble in alcohol.

References 1, 2, 6-7, 84-94, 100, 116, 117, 120, 122, 506, 510, 511, 521, 529; Genium's *Material Safety Data Sheets Collection*, No. 248 (11/88)

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