School Material Safety Data Sheet

Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

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CALCIUM
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SECTION 1. INTRODUCTORY INFORMATION 1

MATERIAL NAME AND FORMULA: CALCIUM; Ca
SYNONYMS: Calcium Metal

CAS NUMBER: 7440-70-2
TYPICAL COMPOSITION: Calcium; ca 100%
DOT CLASSIFICATION: Flammable Solid; UN No. 1401; Dangerous When Wet (Label)
MANUFACTURER'S INFORMATION: Always request material safety data sheets from your chemical supplier. These should indicate the manufacturer's emergency telephone number. See the Resources/Manufacturers Index for some of the larger manufacturers and available telephone numbers.

NFPA FIRE HAZARD SYMBOL

DESCRIPTION: Calcium is a silver white, crystalline, lustrous metal. It tarnishes to blue-gray white on exposure to air. Much harder than sodium but softer than aluminum or magnesium. Odorless.

PRELIMINARY INFORMATION: Calcium is a flammable solid that can ignite in air when finely divided. Its contact with moisture produces hydrogen gas; it can also be a fire or explosion hazard if heated or in contact with strong oxidizers. Its most common area of use in schools would be in the chemistry laboratory for chemical properties or organic synthesis reactions.

SECTION 2. USE AND STORAGE INFORMATION

— PRELIMINARY PLANNING CONSIDERATIONS —

- PROVIDE FOR SAFE DISPOSAL OF ALL CHEMICAL WASTE generated in the lab. Check applicable regulations prior to use.
- Wear safety glasses or goggles and appropriate protective clothing (rubberized apron, etc.) during all experiments.
- Be sure that eyewash station and safety shower are in good working order.
- Rubber gloves are recommended to minimize skin contact when working with this material.
- Minimize the use of calcium metal; its use in demonstrations is preferable to general student usage.

— USAGE PRECAUTIONS AND PROCEDURES —

- READ THE LABEL and follow all precautions.
- Practice good housekeeping to avoid unintentional mixing of incompatible materials. Do not allow residues or dust to build up in the lab or work area.
- For safety, DO NOT WEAR CONTACT LENSES IN THE LABORATORY; soft lenses may absorb irritants, and all lenses may concentrate them. Particles can also adhere to contact lens surfaces and cause corneal damage.
- After working with this material, always wash hands and face before eating, drinking, or smoking.
- Do not smoke in storage or use area.
- Keep calcium away from strong oxidizing agents and sources of heat or ignition.
- Remove contaminated clothing and launder it before wearing it again.
- Keep this material away from notebooks, textbooks, and personal belongings to avoid contamination and the transport of chemical residues out of the lab/work area.
- Do not let calcium come into contact with eyes, skin, or clothing. Do not taste or swallow this substance.
- Clean up spilled material promptly and thoroughly.

— ADDITIONAL INFORMATION —

Calcium is not known to polymerize. It is not stable.

- Calcium reacts with water considerably less than sodium metal does.
- Incompatible materials include strong oxidizers, moist air, water, alcohols, and halogens. Contact with alkali hydroxides or carbonates may cause detonation.
- Artificial isotope ^{47}Ca is radioactive (half-life = 4.7 days); used for biological and medical purposes.

— PREFERRED STORAGE LOCATION AND METHODS —

- Storage area should be cool and well ventilated. Containers should be tightly closed. Calcium containers must be airtight to prolong shelf life. It can develop explosive pressures in containers; keep it dry at all times.
- Do not store chemicals alphabetically by name; store them by chemical family, instead, to keep compatibles together.
- Protect all chemical containers from physical damage and keep them out of direct sunlight.
- Do not permit smoking in areas where chemicals are stored. Have appropriate fire extinguishers available near storage (see sect. 6).
- Purchase only amounts equivalent to one year's needs.
- Store with compatible materials on sturdy shelving. Storage of the primary container inside of a heavy-duty plastic bag or other container may be advisable. Calcium may be stored under kerosene, naphtha, or coal oil. Never store under halogenated hydrocarbons. Do not store with combustible solvents or with oxidizers.
- This material should not be stored near automatic water sprinklers.

SECTION 3. SPILLS AND DISPOSAL PROCEDURES

IF MATERIAL IS SPILLED:

- Ventilate area of spill. If spilled material contacts water or acid, flammable hydrogen gas may be evolved.
- Clean up spilled material promptly and thoroughly.
- Cleanup personnel should wear personal protective equipment to prevent skin or eye contact and inhalation of dust.
- Sweep, vacuum, or scoop up spilled solid, avoiding generation of dust. Place it in a suitable container (with a secure lid) for later disposal.

DISPOSAL OF SMALL QUANTITIES:

NOTE: Emptied containers could contain chemical residues; handle with care.

- Do not flush down drains (explosion hazard)
- Contact your supplier or a licensed disposal contractor for specific treatment/disposal procedures.

FOR THE DISPOSAL OF LARGER AMOUNTS contact a licensed disposal company.

•• FOLLOW ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS FOR ALL WASTE DISPOSAL ••

SECTION 4: HEALTH HAZARDS

Calcium has not been identified as a known or suspected carcinogen by the NTP, IARC, or OSHA.

Current OSHA PEL and ACGIH TLV: No exposure limits established.

- Artificial isotopes ^{45}Ca and ^{47}Ca pose a radiation hazard; they emit beta and/or gamma radiation.
- Calcium is a severe eye, skin, and mucous membrane irritant. It is harmful if swallowed, inhaled as a mist (calcium hydroxide), dust, or fume (calcium oxide), or comes into contact with the skin or mucous membranes.
- Solid calcium will react with moisture to form corrosive calcium hydroxide that will burn skin and eyes. Fume from burning calcium (Ca oxide) is highly irritating to the skin, eyes, and mucous membranes of the upper respiratory tract.

- Acute Effects: Corrosive and irritating to body tissue. May cause skin burns and corneal damage. Inhalation of dust, mist, or fume may cause respiratory irritation, cough, wheezing, difficulty in breathing (dyspnea), and chemical pneumonitis.

- Chronic Effects: Prolonged inhalation of dust or fume may cause severe mucous membrane irritation and chemical pneumonitis.

- Calcium with water yields calcium hydroxide (Genium School MSDS 125); it is corrosive to tissues (TLV = 5 mg/m^3).
- Calcium oxide (Genium School MSDS 23) is also corrosive to tissues (TLV = 2 mg/m^3).

SECTION 5: FIRST AID PROCEDURES

Eye contact:
- Flush eyes promptly, including under the eyelids, with plenty of running water. Continue for at least 15 minutes.
- Get prompt medical attention if burns are present.*

Skin contact:
- Remove contaminated clothing promptly and remove calcium residue from skin with a dry cloth.
- Flush affected area with large amounts of water until all calcium is removed.
- Get medical attention if irritation or burns occur.*

Inhalation:
- Remove victim to fresh air; restore/support his breathing as necessary. Keep him warm and at rest.
- Get medical help if victim is breathing with difficulty or coughing.*

Ingestion:
- If swallowed, and victim is conscious, give him large amounts of water to dilute the alkali. Do not induce vomiting. Get prompt medical attention.*
- Never give anything by mouth to someone who is unconscious or convulsing.

* Get medical help (in school, paramedic, or community) for further treatment, observation, and support after first aid.

SECTION 6: FIRE PROCEDURES AND DATA

- Calcium is a flammable solid and dangerous when wet (see decomposition products below).
- Substance may develop explosive pressures in closed containers, especially if moisture is present.
- If possible to do so safely, remove containers of this material from the fire area.
- Extinguishing media: Use only dry graphite, soda ash, powdered sodium chloride, or appropriate metal fire-extinguishing dry powder such as Met-L-X®.
- Do not use water, CO_2, foam, or Halon fire-extinguishing agents.
- Contact with alkali hydroxides or carbonates may cause detonation.
- For major fires, or if large quantities of this material are involved, fire fighters should wear appropriate protective clothing and use respiratory protection. Self-contained breathing apparatus is recommended.
- Fires involving calcium may reignite after being extinguished.
- Runoff to sewer or drain may create an additional fire or explosion hazard.

HAZARDOUS PRODUCTS OF DECOMPOSITION INCLUDE Toxic fumes: Calcium oxide, which can react with water to produce heat; calcium hydroxide (corrosive); and flammable hydrogen gas (explosion hazard).
FLASH POINT: Flammable Solid
AUTOIGNITION TEMPERATURE: Not Applicable
FLAMMABILITY LIMITS IN AIR (Vol %) : Not Applicable

SECTION 7: PHYSICAL DATA

BOILING POINT (@ 1 atm.): 2703°F (1484°C)
VAPOR PRESSURE (@ 1801°F, mm Hg): 10
ATOMIC WEIGHT: 40.08 (Has 6 Stable Isotopes)
ATOMIC NUMBER: 20
VALENCE: 2

SOLUBILITY IN WATER (@ 20°C): Reacts*
pH OF AQUEOUS SOLUTION: >7 (Alkaline)
SPECIFIC GRAVITY (H_2O = 1): 1.5
BRINELL HARDNESS: 17
MELTING POINT: 1542°F (839°C)

*Soluble in water, forming hydroxide; soluble in acids, forming salts. Also soluble in alcohol and ammonia.

REFERENCES: **Genium Industrial MSDS 222 (4/87) and references** 1-11, 18, 24, 37, 39, 44, 82, 84, 506, 510, 511, 521.
(see glossary for titles)

Approvals: Author Joe Barton
Indust. Hygiene/Safety
Medical Review