Section 1 - Product and Company Information

Product Name                  PERCHLORIC ACID, 70%, A.C.S. REAGENT
Product Number                244252
Brand                         SIAL
Company                       Sigma-Aldrich Canada, Ltd
Address                       2149 Winston Park Drive
                                Oakville ON L6H 6J8 CA
Technical Phone:              9058299500
Fax:                          9058299292
Emergency Phone:             800-424-9300

Section 2 - Composition/Information on Ingredient

Substance Name                CAS #                  SARA 313
PERCHLORIC ACID >= 50%       7601-90-3             No

Formula                      HC104
RTECS Number:                SC7500000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW
Oxidizing. Corrosive.
Heating may cause an explosion. Contact with combustible material may cause fire. Harmful if swallowed. Causes severe burns.

HMIS RATING
HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 3
SPECIAL HAZARD(S): Oxidizer

NFPA RATING
HEALTH: 3
FLAMMABILITY: 0
REACTIVITY: 3
SPECIAL HAZARD(S): Oxidizer

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE
If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE
If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE
In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

**EYE EXPOSURE**
In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

### Section 5 - Fire Fighting Measures

**FLASH POINT**

235 °F   113 °C   Method: closed cup

**AUTOIGNITION TEMP**

N/A

**FLAMMABILITY**

N/A

**EXTINGUISHING MEDIA**

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

**FIREFIGHTING**

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions. Contact with other material may cause fire. May accelerate combustion.

### Section 6 - Accidental Release Measures

**PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL**

Evacuate area.

**PROCEDURE(S) OF PERSONAL PRECAUTION(S)**

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

**METHODS FOR CLEANING UP**

Cover with dry lime or soda ash, pick up, keep in a closed container, and hold for waste disposal. Ventilate area and wash spill site after material pickup is complete.

### Section 7 - Handling and Storage

**HANDLING**

User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

**STORAGE**

Suitable: Keep tightly closed. Keep away from combustible materials, heat, sparks, and open flame.

### Section 8 - Exposure Controls / PPE

**ENGINEERING CONTROLS**

Use only in a chemical fume hood. Safety shower and eye bath.

**PERSONAL PROTECTIVE EQUIPMENT**

Respiratory: Use respirators and components tested and approved
under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES
Wash thoroughly after handling. Remove and wash contaminated clothing promptly.

EXPOSURE LIMITS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
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</thead>
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<tr>
<td>Poland</td>
<td>NDS</td>
<td>1 MG/M3</td>
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<tr>
<td>Poland</td>
<td>NDSCh</td>
<td>3 MG/M3</td>
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<td>NDSP</td>
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Section 9 - Physical/Chemical Properties

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<td>MP/MP Range</td>
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<td>Freezing Point</td>
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<td>Vapor Pressure</td>
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<td>Saturated Vapor Conc.</td>
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<tr>
<td>Solubility</td>
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N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.
Conditions of Instability: Although 68-72% cold perchloric acid
behaves as a strong but nonoxidizing acid, it becomes an extreme oxidant and powerful dehydrator at elevated temperatures (>160°C) or when anhydrous. It may be fairly readily dehydrated to the anhydrous acid, e.g. strong concentrated acids (sulfuric, oleum, fuming nitric), inorganic anhydrides (sulfur trioxide and dioxide, phosphorous pentoxide, thionyl chloride, etc.), organic anhydrides, and halogens. Contact with alcohols, glycols, or polyhydroxy compounds produce explosive compounds. Contact with wood, cellulose, and its derivatives (paper, cardboard, etc.) can produce violent explosions. Attempts to dissolve bismuth or its alloys in hot perchloric acid carries a very high risk of an explosion occurring. Contact with sulfoxides or ethers may produce explosions. The crystalline salt obtained by the action of phosphine on 68% perchloric acid at -20°C is dangerously explosive, sensitive to moist air, increase in temperature, or friction, and cannot be dried. Violent reactions with trichlorethylene, sodium phosphinate, zinc phosphide, organophosphorous compounds, and unsaturated organics have occurred on heating with perchloric acid.


HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Chlorine.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Skin Contact: Causes severe burns.
Skin Absorption: May be harmful if absorbed through the skin.
Eye Contact: Causes severe burns.
Inhalation: May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract.
Ingestion: Harmful if swallowed.

SIGNS AND SYMPTOMS OF EXPOSURE
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

TOXICITY DATA

Oral
Rat
1100 mg/kg
LD50

Subcutaneous
Mouse
250 MG/KG
LD50

Oral
Dog
400 mg/kg
LD50

Section 12 - Ecological Information
No data available.

Section 13 - Disposal Considerations
APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information
DOT
Proper Shipping Name: Perchloric acid [with more than 50 percent but not more than 72 percent acid, by mass]
UN#: 1873
Class: 5.1
Packing Group: Packing Group I
Hazard Label: Oxidizer
Hazard Label: Corrosive
PIH: Not PIH

IATA
Proper Shipping Name: Perchloric acid
IATA UN Number: 1873
Hazard Class: 5.1
Packing Group: I
Not Allowed - Aircraft: Cargo aircraft only. Not permitted on passenger aircraft.

Section 15 - Regulatory Information
EU DIRECTIVES CLASSIFICATION
Symbol of Danger: O-C
R: 5-8-35
Risk Statements: Heating may cause an explosion. Contact with combustible material may cause fire. Causes severe burns.
S: 23-26-36-45
Safety Statements: Do not breathe vapor. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US CLASSIFICATION AND LABEL TEXT
Risk Statements: Heating may cause an explosion. Contact with combustible material may cause fire. Harmful if swallowed. Causes severe burns.
Safety Statements: Do not breathe vapor. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Keep away from combustible material. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2009 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.