Allied Colloids

I. PRODUCT IDENTIFICATION

Manufacturer:

ALLIED COLLOIDS LTD.
P.O. Box 38,
Low Moor, Bradford,
West Yorkshire, BD12 0JZ
ENGLAND Tel.: 011-44-274-671267

OR

ALLIED COLLOIDS INC.
P.O. Box 820
2301 Wilroy Road
Suffolk, Virginia, U.S.A.
23439-0820 Tel: (804) 538-3700

Distributor:

ALLIED COLLOIDS (CANADA) INC.
11 Automatic Road,
Brampton, Ontario
L6S 4K6
Emergency Tel.: (905) 793-9473

Product Name: **PERCOL E10**

Product Type: Copolymer of sodium acrylate and acrylamide.

II. HAZARDOUS INGREDIENTS

Ingredients:	CAS NUMBER:	CONCENTRATION:	LD50:	LC50:
No hazardous ingredients as per WHMIS Regulations.	N/A	N/A	N/A	N/A

III. PHYSICAL PROPERTIES

Odour and Appearance: Off-white coloured solid.

Bulk Density(Water = 1): not available
Vapour Density: not available
Boiling Point: not available
pH Value: not available
Vapour Pressure: not available
Solubility (in water): soluble

Odour Threshold: not available
Evaporation Rate: not available
Freezing Point: not available
Coeff. of water/oil distr.: not available
Specific Gravity: not available

IV. FIRE AND EXPLOSION HAZARD

Conditions of Flammability: Very low risk.
Flash Point (method of determination) - none exhibited
LEL, UEL - not applicable
Auto-ignition temperature: not available
Flammability Classification: not applicable
Hazardous Combustion Products: none known
Explosion Data: As with most organic powders, flammable dust clouds may be formed in air. Avoid creating dust. Keep away from sources of ignition.

EXTINGUISHING MEDIA and SPECIAL FIRE FIGHTING PROCEDURES
Carbon dioxide, dry chemical, foam, in preference to a water spray.

V. REACTIVITY

Materials to Avoid:
Avoid contact with strong oxidants.

Stability:
This product is stable and will not react violently with water. Hazardous polymerization will not occur.

Hazardous Decomposition Products:
None known

VI. TOXICOLOGICAL PROPERTIES OF PRODUCT

HAZARD STATEMENTS

Nature of Hazard:
May cause mild irritation to the eyes which should cease upon removal of the product. May cause mild irritation of the skin with repeated or prolonged use. The product is non-volatile but inhalation of dust may cause irritation.
WHMIS CLASSIFICATION: NOT A CONTROLLED PRODUCT
TDG CLASSIFICATION: Not Dangerous for Transport

Primary routes of entry:
Ingestion, inhalation, eye and skin contact

Effects of Acute Exposure: (Signs and symptoms of exposure)
Contact with the eye may produce irritation and redness.
Inhalation of dust may cause irritation to the respiratory system.

Effects of Chronic exposure:
None known

Exposure Limit: (8-hour TWA, total inhalable dust)
ACGIH: 10 mg/m^3 OSHA PEL: 10 mg/m^3 MFRS Recommendation: 10 mg/m^3

Carcinogenicity Determination by NTP, IARC, OSHA: None

Sensitization of Product: not a sensitizer
Synergistic Materials: none reported
Reproductive Toxicity: not available
Teratogenicity: not available
Mutagenicity: not available

VII. PREVENTIVE MEASURES

1. PROTECTIVE EQUIPMENT

Eye Protection:
Use splash goggles when eye contact may occur.

Skin Protection:
Use gloves, if needed, to avoid prolonged or repeated skin contact.

Respiratory Protection:
Use dust mask if handling in bulk to prevent inhalation of airborne particles.

Ventilation:
Provide adequate ventilation to minimize dust inhalation.

2. PERSONAL HYGIENE
Minimize breathing dust. Avoid prolonged or repeated breathing of dust and contact with skin. Remove contaminated clothing; launder or dry-clean before reuse. Cleanse skin thoroughly after contact, before breaks and meals and at end of work period. Product is readily removed from skin by washing thoroughly with soap and water.

3. PRECAUTIONARY STATEMENTS
Dust generated in handling of this product can be explosive if sufficient quantities are mixed in air in which case ignition sources should be avoided.

4. SPILLS, LEAKS
Sweep up dry and flush spill area with water. Spills of dilute solutions may be flushed with copious amounts of water, or alternatively, they may be absorbed with an inert material such as earth or speedi-dry and contained for disposal. The product or its solutions should not be allowed to enter waterways without treatment. Product should be disposed of in accordance with applicable federal, provincial and local regulations.
Spilled solutions can create a hazard because of their slippery nature.

VIII. EMERGENCY AND FIRST AID PROCEDURES

EYE CONTACT
If splashed into the eyes, flush with clear water for 15 minutes or until irritation subsides. If irritation persists, call a physician.

INGESTION
If ingested, do not induce vomiting; remove product from mouth and call a physician.

SKIN CONTACT
In case of skin contact, remove contaminated clothing and wash skin thoroughly with soap and water.

IX. PREPARATION INFORMATION

Prepared By: ALLIED COLLOIDS (CANADA) INC.
REGULATIONS DEPARTMENT

Date Revised: December 2, 1993

The information and recommendations contained herein are, to the best of Allied Colloids' knowledge and belief, accurate and reliable as of the date issued. Allied Colloids does not warrant or guarantee their accuracy or reliability, and Allied Colloids shall not be liable for any loss or damage arising out of their use thereof.

The information and recommendations are offered for the user's consideration and examination, and it is the user's responsibility to satisfy itself that they are suitable and complete for its particular use.

VAN WATERS & ROGERS LTD. 9800 VAN HORNE WAY RICHMOND, B.C. V6X 1W5

SALES ORDER:

VAN WATERS & ROGERS PRODUCT: 09433

MSDS NUMBER: L1394 VERSION: 1

DATE PRINTED: 15/05/96

ECHO BAY MINES
ATTN: DAVE HOHNSTEIN
FAX: 890-8766

WHMIS CODES: D.2A D.2B

EMERGENCY ASSISTANCE

For Emergency Assistance Involving Chemicals
Call CHEMTREC (800) 424-9300

PRODUCT INFORMATION

Product Name: BORAX ANHYDROUS VW&R Code: L1394

Common Name/Synonym: Sodium Tetraborate, Disodium Tetraborate
CAS Registry Number: 1330-43-4
Chemical Name: Sodium Tetraborate, Disodium Tetraborate
Chemical Family: Inorganic Borates
Formula: $Na_2B_4O_7$
Molecular Weight: 201.27
Product Use: N/D

PREPARATION INFORMATION

Date Issued: 08/93
Supercedes: 07/91 (P1111)
Prepared By: MSDS Coordinator. Contact during business hours, Pacific Time (604)-273-1441.

HAZARDOUS INGREDIENTS

Component(s)/CAS No.	% wt.	Exposure Limits, mg/m3 OSHA PEL	ACGIH TLV
Sodium Tetraborate (1330-43-4)	> 99	10	1

Local regulated limits may vary.

PHYSICAL PROPERTIES

Boiling Point: N/AP
Melting Point: 742 C (1367 F) crystalline phase
Heat of Solution: 92 BTU per pound (evolved)
Freezing Point: N/D
Specific Gravity (Water=1): 2.367
Vapour Pressure: Negligible at 20 C
Viscosity: N/D
Vapour Density: N/D
pH: 9.3 (3.0% solution) at 20 C
Solubility in Water: 3.1% at 25 C
% Volatile: N/D
Evaporation Rate (Butyl Acetate=1): N/D
Odour Threshold: N/D
Coefficient of Water/Oil Distribution: N/D
Appearance and Odour: White, odourless, glass.
Physical State: Solid.

FIRE AND EXPLOSION INFORMATION

Flash Point/Method: None. Non-flammable solid.
Lower Flammable Limit: N/D
Upper Flammable Limit: N/D
Autoignition Temperature: N/D

Extinguishing Media: Any fire extinguishing media may be used on nearby fires.

Special Fire Fighting Procedures: N/D
Unusual Fire and Explosion Hazards: N/D
Hazardous Combustion Products: N/D
Explosion Data
Sensitivity to Mechanical Impact: N/D
Sensitivity to Static Discharge: N/D

Conditions of Flammability: None, because Sodium Tetraborate is not flammable, combustible or explosive. The product is itself a flame retardant.

----------HAZARDOUS REACTIVITY----------

Stability: Sodium Tetraborate is a stable product.
Hazardous Polymerization: N/D
Conditions to Avoid: N/D
Materials to Avoid: Will react with water to form sodium borate hydrates.
Hazardous Decomposition Products: None.
Conditions of Reactivity: N/D

----------FIRST AID MEASURES----------

If Inhaled: No specific treatment is necessary since Sodium Tetraborate is not likely to be hazardous by inhalation. Prolonged exposure to dust levels in excess of regulatory limits should always be avoided.

In Case of Eye Contact: Immediately flush eyes with plenty of water. If irritation persists for more than 30 minutes, seek medical attention.

In Case of Skin Contact: No treatment necessary because non-irritating.

If Ingested: Swallowing less than one teaspoon will cause no harm to healthy adults. If larger amounts are swallowed, give two glasses of water to drink and seek medical attention.

Notes to Physician: Observations only is required for adult ingestion of a few grams of Sodium Tetraborate. For ingestion of larger amounts, maintain adequate kidney function and force fluids. Gastric lavage is recommended for symptomatic patients only. Hemodialysis should be reserved for massive acute ingestion or patients with renal failure. Boron analyses of urine or blood are only useful for documenting exposure and should not be used to evaluate severity of poisoning or to guide treatment. (Further information: Litovitz T.L., Norman, S.A., Veltri, J.C., Annual Report of the American Association of Poison Control Centers Data Collection System. Am. J. Emerg. Med. 1986; 4:427-458). 24-hour Medical consultation is available at (000) 000 0000 ext. 111.

----------HEALTH HAZARD INFORMATION----------

Primary Routes of Exposure: Inhalation is the most significant route of exposure in occupational and other settings. Dermal exposures is not usually a concern because Sodium Tetraborate is not absorbed through intact skin.

Signs, Symptoms and Effects of Exposure
Inhalation: Occasional mild irritation effects to nose and throat may occur from inhalation of Sodium Tetraborate dusts at levels greater than 10 mg/m3.

Eye Contact: Sodium Tetraborate may cause eye irritation. Avoid contact with eyes.

Skin Contact: Sodium Tetraborate does not cause irritation to intact

skin. Low acute dermal toxicity. Sodium Tetraborate is not absorbed through intact skin.

Ingestion: Products containing Sodium Tetraborate are NOT intended for ingestion. Sodium Tetraborate has a relatively low acute toxicity. Small amounts (e.g. teaspoonful) swallowed accidentally are not likely to cause effects; swallowing amounts larger than that may cause gastrointestinal symptoms.

Chronic Effects of Exposure: Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to Boric Acid dust and Sodium Borate dust.

Medical Conditions Aggravated by Exposure: N/D

Additional Information: Symptoms of accidental OVER-exposure to borate products have been associated with ingestion or absorption through large areas of damaged skin. These may include nausea, vomiting, and diarrhea, with delayed effects of skin redness and peeling.

----------TOXICITY DATA----------

LD50 Oral (rat): 2400 to 2600 mg/kg (Calculated based on experimental data from Sodium Tetraborate Decahydrate).
LD50 Dermal (rabbit): > 2000 mg/kg (Based on results from similar borate chemicals).
LC50 (species): N/D

NOTE: Sodium Tetraborate is chemically and toxicologically related to Boric Acid; the majority of the borate chronic toxicology studies were conducted using Boric Acid. Sodium Tetraborate is converted to Boric Acid in biological systems. The Boric Acid data discussed in this section can be converted to Sodium Tetraborate equivalent data by dividing by a factor of 1.2292.

Carcinogenicity: A Technical Report issued by the National Toxicology Program showed "no evidence of carcinogenicity" from a full 2-year bioassay on Boric Acid in mice at feed doses of 2500 and 5000 ppm in the diet. Sodium Tetraborate is not considered a carcinogen.

Sensitization: N/D

Irritancy: Primary Skin Irritation Index: Expected to be 0 (zero). Sodium Tetraborate is non-corrosive. Eye: Animal studies conducted with similar borate chemicals produced eye irritation effects. Years of occupational exposure history reflects no indication of human eye injury from exposure to borate chemicals.

Reproductive Effects: Long-term, high dose animal ingestion studies of similar inorganic borate chemicals have demonstrated reproductive effects in male animals. A human study of occupational exposure to borate dust showed no adverse effect to reproduction.

Reproductive/Developmental Toxicity: Animal studies indicate Boric Acid reduces or inhibits sperm production, causes testicular atrophy, and, when given to pregnant animals during gestation, may cause developmental changes. These feed studies were conducted under chronic exposure conditions leading to doses many times in excess of those that could occur through inhalation of dust in occupational settings.

Reproductive Toxicity (Fertility): Dietary Boric Acid levels of 6,700 ppm in chronic feeding studies in rats and dogs produced testicular atrophy, while dogs and rats receiving 2000 ppm did not develop testicular changes [(1)Weir, Fisher, 1972]*. In chronic feeding studies of mice on diets containing 5000 ppm (550 mg/kg/d) Boric Acid, testicular atrophy was present, while mice fed 2500 ppm (275 mg/kg/d) Boric Acid showed no significant increase in testicular atrophy [(2) NTP, 1987]*. In another Boric Acid chronic study, in mice given 4500 ppm (636 mg/kg/d), degeneration of seminiferous tubules was present together with a reduction of germ cells, while at 1000 ppm (152 mg/kg/d) no effect was seen [(3) Fail et al., 1991]*.

In a reproduction study on rats, 2000 ppm of dietary Boric Acid had no

adverse effect on lactation, litter size, weight and appearance [(1) Weir, Fisher, 1972]*. In a continuous breeding study in mice there was a reduction in fertility rates for males receiving 4500 ppm (636 mg/kg/d) Boric Acid, but not for females receiving 4500 ppm Boric Acid [(3) Fail et al., 1991]*.

Teratogenicity: High dose animal ingestion studies of similar inorganic borate chemicals have demonstrated developmental effects in fetuses of pregnant animals, including fetal weight loss.

Boric Acid at dietary levels of 1000 ppm (78 mg/kg/d) administered to pregnant female rats throughout gestation caused a slight reduction in fetal weight, but was considered to be close to the NOAEL. Doses of 2000 ppm (163 mg/kg/d) and above caused fetal malformations and maternal toxicity. In mice the no effect level for fetal weight reduction and maternal toxicity was 1000 ppm (248 mg/kg/d) Boric Acid. Fetal weight loss was noted at dietary Boric Acid levels of 2000 ppm (452 mg/kg/d) and above. Malformations (agenesis or shortening of the thirteenth rib) were seen at 4000 ppm (1003 mg/kg/d) [(4) Heindel et al., 1992]*.

Mutagenicity: No mutagenicity activity was observed for Boric Acid in a recent battery of four short-term mutagenicity assays.

Toxicologically Synergistic Products: N/D

Other Data: No target organ has been identified in humans. High dose animal ingestion studies on similar inorganic borate chemicals indicate the testes are the target organs in male animals.

Environmental Effects
Phytotoxicity: Although boron is an essential micronutrient for healthy growth of plants, it can be harmful to boron-sensitive plants in higher quantities. Plants and trees can easily be exposed by root absorption to toxic levels of boron in the form of water-soluble borate leached into nearby soil or waters. Care should be taken to minimize the amount of borate product released to the environment.

Fish Toxicity: Boron naturally occurs in seawater at an average concentration of 5 mg B/litre. In laboratory studies the acute toxicity (96-hr LC50) for under-yearly Coho salmon (Onchorhynchus kisutch) in seawater was determined as 40 mg B/L (added as sodium metaborate).

Boron concentrations in fresh surface waters are generally less than 1 mg B/L. Laboratory studies on the toxicity of freshwater fish were determined using early life (embryolarval) stages in natural water and Boric Acid as a test substance. The result were:

Rainbow trout (S. gairdneri)
24-day LC50 = 150 mg B/L
16-day NOEC-LOEC = 0.75-1 mg B/L

Goldfish (Carassius auratus)
7-day NOEC-LOEC = 26.50 mg B/L
3-day LC50 = 178 mg B/L

Invertebrate Toxicity: The acute toxicity (48-hour LC50) to Daphnids (Daphnia magna Straus) in natural water is reported to be 133 mg B/L (added as Boric Acid). Estimated chronic toxicity (21-day NOEC-LOEC) values of 6-13 mg B/L (added as Boric Acid) have also been reported.

Environmental Fate Date
Persistence/Degradation: Boron is naturally occurring and ubiquitous in the environment. Sodium Tetraborate decomposes in the environment to natural borate.

Soil Mobility: The product is soluble in water and is leachable through normal soil.

Note: Boron (B) is the element in Sodium Tetraborate which is used to characterize borate product ecological effects. To convert Sodium Tetraborate data to Boron (B), multiply by 0.2149.

*Toxicity Data references available on request.

----------PREVENTATIVE MEASURES----------

Ventilation (Engineering Controls): Use local exhaust ventilation to keep airborne concentrations of Sodium Tetraborate dust below permissible exposure levels.

Personal Protective Equipment
Respiratory: Where airborne concentrations are expected to exceed exposure limits, NIOSH/MSHA certified respirators must be used.
Eyes: Eye goggles are recommended, especially in excessively dusty environments.
Clothing: N/D
Footwear: N/D
Hands: Gloves are recommended, especially in excessively dusty environments.
Other Protective Measures: N/D

Action to Take for Spills or Leaks: General - Sodium Tetraborate is a water-soluble white powder that may cause damage to trees or vegetation by root absorption. (Refer to Ecological Information for specific information).

Land Spill - Vacuum, shovel or sweep up Sodium Tetraborate and place in containers for disposal in accordance with applicable local regulations. Avoid contamination of water bodies during clean up and disposal. The use of eye goggles is recommended during the clean up of spills.

Water Spill - Sodium Tetraborate will cause localized contamination of surrounding waters depending on the quantity dissolved in these waters. At high concentrations some damage to local vegetation, fish, and other aquatic life may be expected.

Waste Disposal Method: Disposal Guidelines - Small quantities of Sodium Tetraborate can usually be disposed of at Municipal Landfill sites. No special disposal treatment is required, but refer to state and local regulations for applicable site-specific requirements. Tonnage quantities of product are not recommended to be sent to landfills. Such product should, if possible, be re-used for an appropriate application.

Storage and Handling Precautions and Equipment: Storage temperature - ambient. Storage pressure - atmospheric. Special sensitivity - moisture (caking). General - Avoid contact with eyes and wash thoroughly after handling. Dry indoor storage is recommended. To maintain package integrity and to minimize caking of the product, bags should be handled on a "first-in first-out" basis. Good housekeeping procedures should be followed to minimize dust generation and accumulation.

Special Shipping Information: N/D
Other Precautions: N/D

----------REGULATORY INFORMATION----------

TDG Classification
Shipping Name: Non-Regulated
UN: N/R
Class:
PKG:

WHMIS Classification: D.2A; D.2B

Listed on the Domestic Substances List (DSL): Yes

----------FOR PRODUCT AND SALES INFORMATION----------

Contact Your Local Van Waters & Rogers Ltd. Branch Office.

----------NOTICE----------

----------REVISION INFORMATION----------

Legend: N/AP - Not Applicable. N/D - No Data Available.

========== END OF MSDS ==========

VAN WATERS & ROGERS LTD. 9800 VAN HORNE WAY RICHMOND, B.C. V6X 1W5
SALES ORDER:
VAN WATERS & ROGERS PRODUCT: 59701
MSDS NUMBER: L0718 VERSION: 3
DATE PRINTED: 15/05/96

ECHO BAY MINES
ATTN: DAVE HOHNSTEIN

WHMIS CODES: D.2A

EMERGENCY ASSISTANCE

FOR EMERGENCY ASSISTANCE INVOLVING CHEMICALS CALL CHEMTREC (800) 424-9300.

----------FOR PRODUCT AND SALES INFORMATION----------

CONTACT YOUR LOCAL VAN WATERS & ROGERS BRANCH OFFICE

----------PRODUCT IDENTIFICATION----------

PRODUCT NAME: TAMSIL 15 CAS NO.: 1317-95-9
COMMON NAMES/SYNONYMS: MICROCRYSTALLINE SILICA; IMSIL VW&R CODE: L0718

FORMULA: Si O2
HAZARD RATING (NFPA 704 CRITERIA)
HEALTH: 2
FIRE: 0
REACTIVITY: 0
SPECIAL: NONE

DATE ISSUED: 01/95
SUPERCEDES: 10/90
HAZARD RATING SCALE:
0=MINIMAL 3=SERIOUS
1=SLIGHT 4=SEVERE
2=MODERATE

HMIS RATINGS:
HEALTH: *
FLAMMABILITY: 0
REACTIVITY: 0
PROTECTION: E

*WARNING - CHRONIC HEALTH EFFECTS POSSIBLE - INHALATION OF SILICA DUST MAY CAUSE DELAYED LUNG INJURY OR DISEASE (SILICOSIS). TAKE APPROPRIATE MEASURES TO AVOID BREATHING DUST.

----------HAZARDOUS INGREDIENTS----------

COMPONENT	CAS NO.	%	EXPOSURE LIMITS, MG/M3 OSHA PEL	ACGIH TLV	OTHER LIMIT	HAZARD
SILICON DIOXIDE	1317-95-9	<100	0.1	0.1	NONE	IRRITANT, CARCINOGEN

(R) TRADE MARK, TAMMSCO, INC.

----------PHYSICAL PROPERTIES----------

BOILING POINT, DEG F: 4046
DEG C: 2230
MELTING POINT, DEG F: 2930
DEG C: 1610
SPECIFIC GRAVITY (WATER=1): 2.65
VAPOR PRESSURE, MM HG/20 DEG C: NOT APPLICABLE
VAPOR DENSITY (AIR=1): NOT APPLICABLE
WATER SOLUBILITY, %: INSOLUBLE
APPEARANCE AND ODOR: NO ODOR; FINE WHITE POWDER
EVAPORATION RATE (BUTYL ACETATE=1): NOT APPLICABLE

----------FIRST AID MEASURES----------

IF INHALED: REMOVE TO FRESH AIR. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET IMMEDIATE MEDICAL ATTENTION.

IN CASE OF EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LOTS OF RUNNING WATER FOR 15 MINUTES, LIFTING THE UPPER AND LOWER EYELIDS OCCASIONALLY. GET IMMEDIATE MEDICAL ATTENTION IF IRRITATION PERSISTS.

IN CASE OF SKIN CONTACT: IMMEDIATELY FLUSH SKIN WITH LOTS OF RUNNING WATER FOR 15 MINUTES. REMOVE CONTAMINATED CLOTHING AND SHOES; WASH BEFORE REUSE. GET IMMEDIATE MEDICAL ATTENTION IF IRRITATION DEVELOPS.

IF SWALLOWED: GIVE WATER TO DRINK. OBTAIN MEDICAL ATTENTION IF SYMPTOMS DEVELOP.

----------HEALTH HAZARD INFORMATION----------

PRIMARY ROUTES OF EXPOSURE: INHALATION, SKIN OR EYE CONTACT.

SIGNS AND SYMPTOMS OF EXPOSURE
INHALATION: BREATHING DUST MAY IRRITATE THE NOSE AND THROAT AND CAUSE COUGHING AND CHEST DISCOMFORT.

EYE CONTACT: DUSTS MAY IRRITATE THE EYES.

SKIN CONTACT: PROLONGED OR REPEATED CONTACT WITH THE DUST MAY IRRITATE THE SKIN.

SWALLOWED: NONE CURRENTLY KNOWN.

CHRONIC EFFECTS OF EXPOSURE: PROLONGED OR REPEATED EXPOSURE MAY CAUSE RESPIRATROY PROBLEMS.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: PRE-EXISTING RESPIRATORY OR EYE CONDITIONS.

----------TOXICITY DATA----------

ORAL: NO DATA FOUND

DERMAL: NO DATA FOUND

INHALATION: NO DATA FOUND

CARCINOGENICITY: EXCESSIVE INHALATION OF DUST MAY RESULT IN RESPIRATORY DISEASE INCLUDING PNEUMOCONIOSIS, SILICOSIS AND PULMONARY FIBROSIS. THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC) HAS EVALUATED IN VOLUME 42, MONOGRAPHS ON THE EVALUATION OF THE CARCINOGENICITY RISK OF CHEMICALS TO HUMANS, SILICA AND SOME SILICATES (1987), THAT THERE IS SUFFICIENT EVIDENCE FOR THE CARCINOGENICITY OF CRYSTALLINE SILICA TO EXPERIMENTAL ANIMALS AND LIMITED EVIDENCE WITH RESPECT TO HUMANS.
OTHER DATA: NONE

----------PERSONAL PROTECTION----------

VENTILATION: LOCAL MECHANICAL EXHAUST VENTILATION CAPABLE OF MAINTAINING EMISSIONS AT THE POINT OF USE BELOW THE PEL.

RESPIRATORY PROTECTION: WEAR A NIOSH-APPROVED RESPIRATOR APPROPRIATE FOR THE DUST CONCENTRATION AT THE POINT OF USE. APPROPRIATE RESPIRATORS MAY BE A FULL FACEPIECE OR A HALF MASK AIR-PURIFYING CARTRIDGE RESPIRATOR WITH PARTICULATE FILTERS, A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE, OR A SUPPLIED-AIR RESPIRATOR.

EYE PROTECTION: CHEMICAL GOGGLES UNLESS A FULL FACEPIECE RESPIRATOR IS ALSO WORN. IT IS GENERALLY RECOGNIZED THAT CONTACT LENSES SHOULD NOT BE WORN WHEN WORKING WITH CHEMICALS BECAUSE CONTACT LENSES MAY CONTRIBUTE TO THE SEVERITY OF AN EYE INJURY.

PROTECTIVE CLOTHING: LONG-SLEEVED SHIRT, TROUSERS, SAFETY SHOES, RUBBER GLOVES, AND RUBBER APRON.

OTHER PROTECTIVE MEASURES: AN EYEWASH AND SAFETY SHOWER SHOULD BE NEARBY AND READY FOR USE.

FIRE AND EXPLOSION INFORMATION

FLASH POINT, DEG F: NONE
METHOD USED: NOT APPLICABLE

FLAMMABLE LIMITS IN AIR, %
LOWER: NOT APPLICABLE UPPER: NOT APPLICABLE

EXTINGUISHING MEDIA: THIS MATERIAL IS NOT COMBUSTIBLE. USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE FIGHTING PROCEDURES: NONE.

UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE.

HAZARDOUS REACTIVITY

STABILITY: STABLE
POLYMERIZATION: WILL NOT OCCUR
CONDITIONS TO AVOID: DEVELOPMENT OF DUST.

MATERIALS TO AVOID: HYDROFLUORIC ACID. ON CONTACT IT WILL PRODUCE A CORROSIVE GAS, SILICONE TETRAFLUORIDE.

HAZARDOUS DECOMPOSITION PRODUCTS: NONE.

SPILL, LEAK, AND DISPOSAL PROCEDURES

ACTION TO TAKE FOR SPILLS OR LEAKS: WEAR PROTECTIVE EQUIPMENT INCLUDING RUBBER BOOTS, RUBBER GLOVES, RUBBER APRON, AND A SELF-CONTAINED BREATHING APPARATUS IN THE PRESSURE DEMAND MODE OR A SUPPLIED-AIR RESPIRATOR. IF THE SPILL OR LEAK IS SMALL, A FULL FACEPIECE AIR-PURIFYING CARTRIDGE RESPIRATOR EQUIPPED WITH PARTICULATE FILTERS MAY BE SATISFACTORY. IN ANY EVENT, ALWAYS WEAR EYE PROTECTION. FOR SMALL SPILLS, SWEEP UP AND DISPOSE OF IN DOT-APPROVED WASTE CONTAINERS. FOR LARGE SPILLS, SHOVEL INTO DOT-APPROVED WASTE CONTAINERS. KEEP OUT OF SEWERS, STORM DRAINS, SURFACE WATERS, AND SOIL.
COMPLY WITH ALL APPLICABLE GOVERNMENTAL REGULATIONS ON SPILL REPORTING, AND HANDLING AND DISPOSAL OF WASTE AND MINIMIZE DEVELOPMENT OF DUST.

DISPOSAL METHODS: DISPOSE OF CONTAMINATED PRODUCT AND MATERIALS USED IN CLEANING UP SPILLS OR LEAKS IN A MANNER APPROVED FOR THIS MATERIAL. CONSULT APPROPRIATE FEDERAL, STATE AND LOCAL REGULATORY AGENCIES TO ASCERTAIN PROPER DISPOSAL PROCEDURES.
NOTE: EMPTY CONTAINERS CAN HAVE RESIDUES, GASES AND MISTS AND ARE subject to proper waste disposal, as above.

SPECIAL PRECAUTIONS

STORAGE AND HANDLING PRECAUTIONS: STORE IN A COOL, DRY, WELL-VENTILATED PLACE AWAY FROM INCOMPATIBLE MATERIALS. KEEP BAGS OR FIBER DRUMS DRY AT ALL TIMES. WASH THOROUGHLY AFTER HANDLING. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING.

REPAIR AND MAINTENANCE PRECAUTIONS: NONE.

OTHER PRECAUTIONS: CONTAINERS, EVEN THOSE THAT HAVE BEEN EMPTIED, WILL RETAIN PRODUCT RESIDUE AND VAPORS. ALWAYS OBEY HAZARD WARNINGS AND HANDLE EMPTY CONTAINERS AS IF THEY WERE FULL.

PREPARATION INFORMATION

CONTACT MSDS CO-ORDINATOR, VAN WATERS & ROGERS LTD.
DURING BUSINESS HOURS, PACIFIC TIME (604)-273-1441.

NOTICE

VAN WATERS & ROGERS LTD. EXPRESSLY DISCLAIMS ALL EXPRESSED OR IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE PRODUCT PROVIDED.

REVISION

10/90: REVISED PRODUCE NAME.
01/95: ADDED- HMIS RATING, SYNONYM.
REVISED - CHRONIC EFFECTS.

END OF MSDS

VAN WATERS & ROGERS LTD. 9800 VAN HORNE WAY RICHMOND, B.C. V6X 1W5

SALES ORDER:

VAN WATERS & ROGERS PRODUCT: 62225

MSDS NUMBER: L1349 VERSION: 4

DATE PRINTED: 15/05/96

ECHO BAY MINES
ATTN: DAVE HOHNSTEIN

WHMIS CODES: D.2B

EMERGENCY ASSISTANCE

For Emergency Assistance Involving Chemicals
Call CHEMTREC (800) 424-9300

PRODUCT INFORMATION

Product Name: SODA ASH VW&R Code: L1349

Common Name/Synonym: Sodium Carbonate
CAS Registry Number: 497-19-8
Chemical Name: Sodium Carbonate
Chemical Family: N/D
Formula: Na_2CO_3
Molecular Weight: 105.99
Product Use: Soda salts; glass; soap, cleaners and water softeners; pulp and paper; photographical agent.

PREPARATION INFORMATION

Date Issued: 06/93
Supercedes: 11/90 (P1120)
Prepared By: MSDS Coordinator. Contact during business hours, Pacific Time (604)-273-1441.

HAZARDOUS INGREDIENTS

Component(s)/CAS No.	% wt.	Exposure Limits, mg/m3 OSHA PEL	ACGIH TLV	ONTARIO TWAEV
Sodium Carbonate (497-19-8)	100	15* 5**	10*	10*

* Nuisance particulates, total dust.
**Nuisance particulates, respirable fraction.
Local regulated limits may vary.

PHYSICAL PROPERTIES

Boiling Point: N/D
Freezing/Melting Point: 854 C
Specific Gravity (Water=1): 2.533 g/cc at 25 C
Vapour Pressure: N/AP
Vapour Density (air=1): N/AP
pH 1% solution: 11.3
Solubility in Water: 17% solution at 20 C
% Volatile: N/AP
Evaporation Rate (Ether=1): N/AP
Odour Threshold: N/AP
Coefficient of Water/Oil Distribution: N/D
Appearance and Odour: Odourless, white powder.
Physical State: Solid.

FIRE AND EXPLOSION INFORMATION

Flash Point/Method: N/AP
Lower Flammable Limit: N/AP
Upper Flammable Limit: N/AP
Autoignition Temperature: N/AP

Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Special Fire Fighting Procedures: For fire fighting wear NIOSH-approved, self-contained breathing apparatus.

Unusual Fire and Explosion Hazards: N/D

Hazardous Combustion Products: Heating soda ash liberates CO2.
$Na_2CO_3(solid) = Na_2O(solid) + CO_2(gas)$

Explosion Data
Sensitivity to Mechanical Impact: N/AP
Sensitivity to Static Discharge: N/AP
Conditions of Flammability: N/AP

HAZARDOUS REACTIVITY

Stability: Stable.
Hazardous Polymerization: Will not occur.

Conditions to Avoid: Simultaneous exposure to soda ash and lime dusts (CaO). In the presence of moisture (i.e. perspiration) the two materials combine to form corrosive caustic soda (NaOH) which may cause burns.

Materials to Avoid: Contact with acids will release carbon dioxide gas. Can react violently with red hot aluminum metal; fluorine gas; lithium; and 2,4,6-trinitrotoluene.

Hazardous Decomposition Products: Heating soda ash liberates CO2.
$Na_2CO_3(solid) = Na_2O(solid) + CO_2(gas)$

Conditions of Reactivity: N/D

FIRST AID MEASURES

If Inhaled: Promptly remove to fresh air. Restore and/or support breathing. Consult a physician for observation and treatment.

In Case of Eye Contact: Flush eyes promptly with plenty of running water for at least 15 minutes and get medical attention.

In Case of Skin Contact: Remove contaminated clothing. Wash affected area of skin with soap and water. Get medical attention if irritation persists.

If Ingested: If conscious, give 2 to 3 glasses of water to drink to dilute the material. DO NOT INDUCE VOMITING. Contact a physician.

Notes to Physician: N/D

HEALTH HAZARD INFORMATION

Primary Routes of Exposure: Inhalation, skin and eye contact, ingestion.

Signs, Symptoms and Effects of Exposure:
Inhalation: Inhalation of product may irritate nose, throat and lungs.
Eye Contact: May irritate or burn eyes.
Skin Contact: May cause skin irritation from prolonged contact, especially in hot weather.
Ingestion: Although low in toxicity, ingestion can be harmful. May cause nausea, vomiting, stomach ache, and diarrhea.

Chronic Effects of Exposure: Excessive contact may produce "soda ulcers" on hands and perforation of the nasal septum.