



Arch Chemicals, Inc.

**MATERIAL
SAFETY DATA**

FOR ANY EMERGENCY, CALL 24 HOURS/7 DAYS:	1-800-654-6911
FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC@:	1-800-424-9300
MSDS QUESTIONS & REQUESTS, CALL MSDS CONSULTATION LINE:	1-800-511-MSDS

PRODUCT NAME: HTH® CHLORINATING GRANULES

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

REVISION DATE: 02-01-2005 SUPERCEDES: 02-01-2005
MSDS NO: 05122-0001 - 21108

Manufacturer: Arch Chemicals, Inc. 501 Merritt 7 PO Box 5204 Norwalk, CT 06856-5204

SYNONYMS: None
CHEMICAL FAMILY: Hypochlorite Mixture
FORMULA: Not Applicable/Mixture
DESCRIPTION: Sanitizer and Oxidizer
OSHA HAZARD CLASSIFICATION: Toxic by inhalation, corrosive to eyes and skin, skin and eye hazard, lung toxin

SECTION 2 COMPONENT DATA

PRODUCT COMPOSITION

CAS or CHEMICAL NAME: Calcium hypochlorite
CAS NUMBER: 7778-54-3
PERCENTAGE RANGE: 40-55%
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS: 1 mg/cubic meter (15 min. STEL - TWA): Arch chemicals
Internal Exposure Standard

CAS or CHEMICAL NAME: Sodium chloride
CAS NUMBER: 7647-14-5
PERCENTAGE RANGE: 5-15%
HAZARDOUS PER 29 CFR 1910.1200: No
EXPOSURE STANDARDS: None Established

CAS or CHEMICAL NAME: Calcium chlorate
CAS NUMBER: 10137-74-3
PERCENTAGE RANGE: 0-4%
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS: None Established

CAS or CHEMICAL NAME: Calcium chloride
CAS NUMBER: 10043-52-4
PERCENTAGE RANGE: 0-4%
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS: None Established

CAS or CHEMICAL NAME: Calcium hydroxide

CAS NUMBER: 1305-62-0
PERCENTAGE RANGE: 0-5%
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS:

	OSHA(PEL)		ACGIH(TLV)	
	ppm	mg/cubic-meter	ppm	mg/cubic-meter
TWA:	None		5	
CEILING:	None		None	
STEL:	None		None	

CAS or CHEMICAL NAME: Calcium carbonate
CAS NUMBER: 471-34-1
PERCENTAGE RANGE: 0-4%
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS:

	OSHA(PEL)		ACGIH(TLV)	
	ppm	mg/cubic-meter	ppm	mg/cubic-meter
TWA:		15 (Total dust)		10
		5 (Respirable fraction)		
CEILING:	None		None	
STEL:	None		None	

CAS or CHEMICAL NAME: Magnesium sulfate heptahydrate
CAS NUMBER: 10034-99-8 (anhydrous 7487-88-9)
PERCENTAGE RANGE: 25-35%
HAZARDOUS PER 29 CFR 1910.1200: Yes
EXPOSURE STANDARDS: None Established

CAS or CHEMICAL NAME: Water
CAS NUMBER: 7732-18-5
PERCENTAGE RANGE: 17-22%
HAZARDOUS PER 29 CFR 1910.1200: No
EXPOSURE STANDARDS: None Established

SECTION 3 PRECAUTIONS FOR SAFE HANDLING AND STORAGE

DO NOT TAKE INTERNALLY. AVOID INHALATION OF DUST AND FUMES. AVOID CONTACT WITH EYES, SKIN OR CLOTHING. UPON CONTACT WITH SKIN OR EYES, WASH OFF WITH WATER. REMOVE AND WASH CONTAMINATED CLOTHING BEFORE REUSE.

STORAGE CONDITIONS: Keep product tightly sealed in original containers. Store product in a cool, dry, well-ventilated area. Store away from combustible or flammable products. Keep product packaging clean and free of all contamination, including, e.g., other pool treatment products, acids, organic materials, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, all corrosive liquids, flammable or combustible materials, etc.

DO NOT STORE AT TEMPERATURES ABOVE: 52 Deg.C (125 Deg.F)

In the event that the calcium hypochlorite were to separate from the blend, storage above this temperature may result in rapid decomposition, evolution of chlorine gas and heat sufficient to ignite combustible products. Also, the magnesium sulfate heptahydrate will begin to lose water of crystallization at approximately 150 Deg.C (302 Deg.F); Should all the water of crystallization be lost, the likelihood of rapid decomposition occurring, as above, would be increased.

PRODUCT STABILITY AND COMPATIBILITY

SHELF LIFE LIMITATIONS: Shelf life (that is, the period of time before the product goes below stated label strength) is determined by storage time and temperatures. Do not store product at temperatures above 52

Deg.C (125 Deg.F). When stored under moderate temperature conditions, product will maintain stated label strength for approximately two years. Prolonged storage at 35 Deg.C (95 Deg.F) or above will significantly shorten the shelf life. Storage in a climate-controlled storage area or building is recommended in those areas where extremes of high temperature occur.

INCOMPATIBLE MATERIALS FOR PACKAGING: Product packaging must be clean and free of contamination by other materials, including, e.g., other pool treatment products, acids, organic materials, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, all corrosive liquids, flammable or combustible materials, etc.

INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT: Do not allow product to come in contact with other materials, including, e.g., other pool treatment products, acids, organic materials, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, all corrosive liquids, flammable or combustible materials, etc.

SECTION 4 PHYSICAL DATA

APPEARANCE: White granules or caplets

FREEZING POINT: Not Applicable

BOILING POINT: Not Applicable

DECOMPOSITION TEMPERATURE: Onset - Approx. 170-180 Deg.C (338-356 Deg.F)

SPECIFIC GRAVITY: Not Applicable

BULK DENSITY: 0.8 g/cc, loose

pH @ 25 DEG.C: 10.0-10.8 (1% soln.)

SOLUBILITY IN WATER: Approximately 18% @ 25 Deg.C. (Product contains calcium hydroxide and calcium carbonate which will leave a residue.)

VAPOR PRESSURE @ 25 DEG.C: Not Applicable

VOLATILES, PERCENT BY VOLUME: Not Applicable

EVAPORATION RATE: Not Applicable

VAPOR DENSITY: Not Applicable

MOLECULAR WEIGHT: 143 (Active ingredient)

ODOR: Chlorine-like

COEFFICIENT OF OIL/WATER DISTRIBUTION: Not Applicable

SECTION 5 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

PERSONAL PROTECTION FOR ROUTINE USE OF PRODUCT:

RESPIRATORY PROTECTION: Wear a NIOSH approved respirator if dusts are created.

VENTILATION: Use local exhaust ventilation to minimize dust and chlorine level where industrial use occurs. Otherwise, ensure good general ventilation.

SKIN AND EYE PROTECTIVE EQUIPMENT: Wear gloves and safety glasses to avoid skin and eye contact. Where industrial use occurs, chemical goggles or full impermeable suit may be required.

EQUIPMENT SPECIFICATIONS (WHEN APPLICABLE):

RESPIRATOR TYPE: NIOSH approved full face piece air-purifying respirator with chlorine cartridges and dust/mist prefilter. Air purifying respirators should not be used in oxygen deficient or IDLH atmospheres or in exposure levels which exceed 10X the PEL.

PROTECTIVE CLOTHING TYPE: Neoprene, Nitrile, Natural rubber
(This includes: gloves, boots, apron
protective suit)

SECTION 6 FIRE AND EXPLOSION HAZARD INFORMATION

This product contains an ingredient (calcium hypochlorite) which is both a strong oxidizer and is chemically reactive with many substances. Strong oxidizers are capable of intensifying a fire once started. Because of this, any contamination of the product with other substances by spill or otherwise should be avoided. Also see section 3.

FLAMMABILITY DATA:

FLAMMABLE: No
COMBUSTIBLE: No
PYROPHORIC: No
FLASH POINT: Not Applicable
AUTOIGNITION TEMPERATURE: Not Applicable
FLAMMABLE LIMITS AT NORMAL ATMOSPHERIC TEMPERATURE AND PRESSURE (PERCENT VOLUME IN AIR): UEL - Not Applicable LEL - Not Applicable

NFPA RATINGS:

NFPA Oxidizer Class: Meets the criteria of an NFPA Class 1 Oxidizer

HMIS RATINGS:

Health: 3
Flammability: 0
Reactivity: 1

EXTINGUISHING MEDIA:

Water only

FIRE FIGHTING TECHNIQUES AND COMMENTS:

Use water to cool containers exposed to fire. Also see Section 11.
OTHER: Do not use dry extinguishers containing ammonium compounds

SECTION 7 REACTIVITY INFORMATION

CONDITIONS UNDER WHICH THIS PRODUCT MAY BE UNSTABLE:

TEMPERATURES ABOVE: 170 Deg.C (338 Deg.F)
MECHANICAL SHOCK OR IMPACT: No
ELECTRICAL (STATIC) DISCHARGE: No
HAZARDOUS POLYMERIZATION: Will not occur
INCOMPATIBLE MATERIALS: This product is chemically reactive with many substances, including, e.g., other pool treatment products, acids, organics, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, corrosive, flammable or combustible materials.
HAZARDOUS DECOMPOSITION PRODUCTS: Chlorine gas
OTHER CONDITIONS TO AVOID: Storage at temperatures >125 Deg.F (52 Deg.C)
Prevent ingress of humidity and moisture into container or package.
Always close the lid.

SUMMARY OF REACTIVITY: (See also Section 6)

OXIDIZER: Not considered to be an OSHA oxidizer per 29CFR 1910.1200.
Not an Oxidizer according to the criteria established by the 49 CFR DOT regulations
Meets the criteria of a Class 1 Oxidizer as established by the National Fire Protection Association (NFPA)
Product contains an oxidizer - calcium hypochlorite
PYROPHORIC: No
ORGANIC PEROXIDE: No
WATER REACTIVE: No
OTHER: Arch calcium hypochlorite products meet the specifications

of ASTM method E-487-74 as set forth in 49 C. F. R. Sec. 173.21,
Title 49-Code of Federal Regs.(DOT Regs.)

SECTION 8 FIRST AID

EYES: Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Call a physician at once.

SKIN: Immediately flush with water for at least 15 minutes. Call a physician. If clothing comes in contact with the product, the clothing should be removed immediately and should be laundered before re-use.

INGESTION: Immediately drink large quantities of water. DO NOT induce vomiting. Call a physician at once. DO NOT give anything by mouth if the person is unconscious or if having convulsions.

INHALATION: Remove victim to fresh air. Support respiration if needed. Call a physician.

SECTION 9 TOXICOLOGY AND HEALTH INFORMATION

ROUTES OF ABSORPTION

Inhalation, skin and eye contact, ingestion

WARNING STATEMENT AND WARNING PROPERTIES

MODERATELY TOXIC IF SWALLOWED. AVOID BREATHING DUST OR FUMES. HARMFUL IF PRODUCT IS INHALED IN HIGH CONCENTRATIONS. CAUSES EYE, DIGESTIVE TRACT AND RESPIRATORY TRACT BURNS. DRY MATERIAL CAUSES MODERATE SKIN IRRITATION. WET MATERIAL CAUSES SKIN BURNS

HUMAN RESPONSE DATA

ODOR THRESHOLD: Approximately 2.0 mg/cubic-meter, based on odor threshold of chlorine.

IRRITATION THRESHOLD: Approximately 18-31 mg/cubic meter, based on the irritation threshold of chlorine.

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH: Approximately 63 mg/cubic-meter, based on IDLH concentration of chlorine.

SIGNS, SYMPTOMS, AND EFFECTS OF EXPOSURE

INHALATION

ACUTE:

Inhalation of dust or vapor from this product can be irritating to the nose, mouth, throat and lungs. In confined areas, mechanical agitation can result in high levels of dust, and reaction with incompatible materials (as listed in Section VII) can result in high concentrations of chlorine vapor, either of which may result in burns to the respiratory tract, producing lung edema, shortness of breath, wheezing, choking, chest pains, impairment of lung function and possible permanent lung damage.

CHRONIC:

Chronic (repeated) inhalation exposure may cause impairment of lung function and permanent lung damage.

EYE

Severe irritation and/or burns can occur following eye exposure. Contact may cause impairment of vision and corneal damage.

SKIN

ACUTE:

Dermal exposure to dry material causes moderate skin irritation characterized by redness and swelling. Dermal exposure to wet material

can cause severe irritation and/or burns characterized by redness, swelling and scab formation. Prolonged skin exposure may cause permanent damage.

CHRONIC:

Effects from chronic skin exposure would be similar to those from single exposure. In addition, chronic exposure to wet material may cause effects secondary to tissue destruction.

INGESTION

ACUTE:

Irritation and/or burns can occur to the entire gastrointestinal tract, including the stomach and intestines, characterized by nausea, vomiting, diarrhea, abdominal pain, bleeding and/or tissue ulceration. Significant exposure to this material can lead to serious health effects and/or death.

CHRONIC:

There are no known or reported effects from chronic exposure except for effects similar to those experienced from single exposure. The acute corrosivity of this product makes chronic ingestion of significant amounts unlikely

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Asthma, respiratory and cardiovascular disease

INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY

None known or reported

ANIMAL TOXICOLOGY

ACUTE TOXICITY:

Inhalation LC 50: >2.04 mg/l (1hr., rat); > 0.51 mg/l (4 hr., rat) - extrapolated from inhalation toxicity studies using calcium hypochlorite
Oral LD 50: Approximately 1200 mg/kg. (rat) based on extrapolation from oral toxicity studies using calcium hypochlorite
Dermal LD 50: > 2 g/kg. (rabbit)

Irritation: Causes burns to eyes. Dry material causes skin irritation, wet material causes skin burns.

ACUTE TARGET ORGAN TOXICITY: This product is corrosive to the eyes and upon inhalation may cause irritation to mucous membranes and respiratory tract. The dry material is irritating to the skin. However when wet, it will produce burns to the skin

CHRONIC TOXICITY:

There are no known or reported effects from repeated exposure except those secondary to burns.

REPRODUCTIVE TOXICITY:

Calcium hypochlorite has been tested for teratogenicity in laboratory animals. Results of this study have shown that calcium hypochlorite is not a teratogen.

CARCINOGENICITY:

This product is not known or reported to be carcinogenic by any reference source, including: IARC, OSHA, NTP or EPA. One hundred mice were exposed dermally 3 times a week for 18 months to a solution of calcium hypochlorite. Histopathological examination failed to show an increased incidence of tumors. IARC (International Agency for Research on Cancer) reviewed studies conducted with several hypochlorite salts. IARC has classified hypochlorite salts as having inadequate evidence for carcinogenicity to humans and animals. IARC therefore considers hypochlorite salts to be not classifiable as to their carcinogenicity to humans. (Group 3

substance).

MUTAGENICITY:

Calcium hypochlorite has been tested in the dominant lethal assay in male mice, and it did not induce a dominant lethal response. Calcium hypochlorite has been reported to produce mutagenic activity in two in vitro assays. It has, however, been shown to lack the capability to produce mutations in animals based on results from the micronucleus assay. In vitro assays frequently are inappropriate to judge the mutagenic potential of bactericidal chemicals due to a high degree of cellular toxicity. The concentration which produces mutations in these in vitro assays is significantly greater than the concentrations used for disinfection. Based on high cellular toxicity in in vitro assays and the lack of mutagenicity in animals, the risk of genetic damage to humans is judged not significant.

AQUATIC TOXICITY:

Bluegill, 96 hr. LC50: Approximately 0.12 mg/l (nominal, static) based on extrapolation from studies using calcium hypochlorite
Rainbow trout, 96 hr. LC50: 0.22 mg/l (nominal, static) based on extrapolation from studies using calcium hypochlorite
Daphnia magna, 48 hr. LC50: 0.15 mg/l (nominal, static) based on extrapolation from studies using calcium hypochlorite

TOXICITY TO WILDLIFE:

Bobwhite quail, dietary LC50: > 7,000 ppm based on extrapolation from studies using calcium hypochlorite
Mallard ducklings, dietary LC50: > 7,000 ppm based on extrapolation from studies using calcium hypochlorite
Bobwhite quail, oral LD50: Approximately 4800 mg/kg. based on extrapolation from studies using calcium hypochlorite

SECTION 10 TRANSPORTATION INFORMATION

This product is regulated in transport under U.S. DOT 49 CFR 172.101.

LAND (U.S. DOT): RQ, Other Regulated Substances, Solid, NOS (Calcium Hypochlorite), 9, NA 3077, III
Hazardous Substance as defined in 49 CFR 172.101, Appendix A: Yes
REPORTABLE QUANTITY: 10 lbs
LABEL/PLACARD: Hazaed Class 9
EMERGENCY GUIDE NO: 171

WATER (IMDG): Not Regulated in Transport

AIR (IATA/ICAO): Not Regulated in Transport

SECTION 11 SPILL AND LEAKAGE PROCEDURES

FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC AT 800-424-9300.
REPORTABLE QUANTITY: 10 lbs. (as Calcium hypochlorite) Per 40 CFR 302.4

SPILL MITIGATION PROCEDURES:

Hazardous concentrations in air may be found in local spill area and immediately downwind. Remove all sources of ignition. Stop source of spill as soon as possible and notify appropriate personnel.

AIR RELEASE: Vapors may be suppressed by the use of a water fog. All water utilized to assist in fume suppression, decontamination or fire suppression may be contaminated and must be contained before disposal and/or treatment.

WATER RELEASE: This material is heavier than water. This material is

soluble in water. Monitor all exit water for available chlorine and pH. Advise local authorities of any contaminated water release.

LAND SPILL: Contact at 1-800-6546-911 immediately.

DANGER: All spills of this product should be treated as contaminated. Contaminated product may initiate a chemical reaction which may spontaneously ignite any combustible material present, resulting in a fire of great intensity. In case of a spill, separate all spilled product from packaging, debris and other material. Using a clean broom or shovel, place all spilled product into plastic bags, and place those bags into a clean, dry disposal container, properly marked and labeled. Disposal containers made of plastic or metal are recommended. Do not seal disposal containers tightly. Immediately remove all product in disposal containers to an isolated area outdoors. Place all damaged packaging material in a disposal container of water to assure decontamination (i.e. removal of all product) before disposal. Place all undamaged packaging in a clean, dry container properly marked and labeled. Call for disposal procedures.

SPILL RESIDUES:

Dispose of per guidelines under Section 12, WASTE DISPOSAL.

This material may be neutralized for disposal; you are requested to contact ACEAN at 800-6546-911 before beginning any such operation.

PERSONAL PROTECTION FOR EMERGENCY SPILL AND FIRE-FIGHTING SITUATIONS:

Response to a large quantity spill (100 pounds or greater) or when dusting or decomposition gas exposure could occur requires the use of a positive pressure full face supplied air respirator or self contained breathing apparatus (SCBA), chemical resistant gloves, coveralls and boots. In case of fire, this personal protective equipment should be used in addition to normal fire fighter equipment.

SECTION 12 WASTE DISPOSAL

If this product becomes a waste, it DOES NOT meet the criteria of a hazardous waste as defined under 40 CFR 261, in that it does not exhibit the characteristics of hazardous waste of Subpart C, nor is it listed as a hazardous waste under Subpart D.

As a nonhazardous waste, it should be disposed of in accordance with local, state and federal regulations.

CARE MUST BE TAKEN TO PREVENT ENVIRONMENTAL CONTAMINATION FROM THE USE OF THIS MATERIAL. THE USER OF THIS MATERIAL HAS THE RESPONSIBILITY TO DISPOSE OF UNUSED MATERIAL, RESIDUES AND CONTAINERS IN COMPLIANCE WITH ALL RELEVANT LOCAL, STATE AND FEDERAL LAWS AND REGULATIONS REGARDING TREATMENT, STORAGE AND DISPOSAL FOR HAZARDOUS AND NONHAZARDOUS WASTES.

SECTION 13 ADDITIONAL REGULATORY STATUS INFORMATION

TOXIC SUBSTANCES CONTROL ACT:

This substance is listed on the Toxic Substances Control Act inventory.

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT TITLE 3:

HAZARD CATEGORIES, PER 40 CFR 370.2:

HEALTH:

Immediate (Acute)

PHYSICAL:

None

EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW, PER 40 CFR 355, APP.A:
EXTREME HAZARDOUS SUBSTANCE - THRESHOLD PLANNING QUANTITY:
None Established
SUPPLIER NOTIFICATION REQUIREMENTS, PER 40 CFR 372.45:
None Established

SECTION 14 ADDITIONAL INFORMATION

REGULATED UNDER FIFRA, USDA & FDA
MSDS REVISION STATUS: Section 11 revised
SECTION 15 MAJOR REFERENCES

1. Ishidate, M. et al. (1984). Primary mutagenicity screening of food additives currently used in Japan. *Fd. Chem. Toxicol.* 22:623-636.
2. Hayashi, M. et al. (1988). Micronucleus tests in mice on 39 food additives and eight miscellaneous chemicals. *Fd. Chem. Toxicol.* 26:487-500.
3. Report on the Acute Inhalation in Rats, Acute Oral LD50 in Rats, Eye Irritation in Rabbits, Dermal Irritation in Rabbits, and Acute Dermal Toxicity in Rabbits of HTH. Biometric Testing Laboratories, Inc., Whippany, NJ. Experiment Reference #A-1490 (RC-30406), February 9, 1975.
4. Report on the Teratogenic Study with Calcium Hypochlorite in Albino Rats. Industrial Bio-Test Laboratories, Inc., Northbrook, IL. IBT #B758b, April 18, 1972.
5. Report on the Mutagenic Study with Monosodium Cyanurate and Calcium Hypochlorite (HTH) in Albino Mice. Industrial Bio-Test Laboratories, Inc., Northbrook, IL. IBT #E756. April 18, 1972.
6. Chemical Hazard Summary No. 20: Calcium Hypochlorite. Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada L8N 1H6. December 1986.
7. Report on 18-Month Dermal Carcinogenicity Study with Monosodium Cyanuric Acid and HTH in Swiss White Mice. Industrial Bio-Test Laboratories, Inc., Northbrook, IL, IBT #651-00751, April 9, 1974.
8. Report to PPG Industries, Inc. on the Acute Toxicity Studies with PITTCHLOR (Granular Calcium Hypochlorite). Industrial Bio-Test Laboratories, Inc., Northbrook, IL, IBT #601-06659, May 7, 1975.
9. Report on the Acute Toxicity of HTH to Bluegill, Rainbow Trout and the Water Flea. E G & G, Bionomics Aquatic Toxicology Laboratory, Wareham, MA, July 1977.
10. Report on the 8-Day Dietary LD50 Study with HTH in Mallard Ducklings. Industrial Bio-Test Laboratories, Inc., Northbrook, IL, IBT #651-06184, May 15, 1975.
11. Report on the 8-Day Dietary LC50 with HTH in Bobwhite Quail. Industrial Bio-Test Laboratories, Inc., Northbrook, IL, IBT #651-06183.
12. Final Report on the Acute Oral LD50 of Calcium Hypochlorite in Bobwhite Quail. Wildlife International, LTD., Easton, MD, Project #133-107, July 15, 1977.
13. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Vol. 52: Chlorinated Drinking Water; Chlorination By-Products; Some Other Halogenated Compounds; Cobalt and Cobalt Compounds. World Health Organization, International Agency for Research on Cancer (IARC), Lyon, France, 1991.
14. Sittig, Marshall, Handbook of Toxic and Hazardous Chemicals and Carcinogens, 2nd Ed., Noyes Publications, Park Ridge, NJ, 1985.
15. Chemical Hazard Response Information System (CHRIS), Vol. II, U.S. Coast Guard, Washington, D.C., 1984.
16. Chlorine and Your Health. The Chlorine Institute, Inc., Washington, D.C., August 1988.

17. ACGIH Documentation of the Threshold Limit Values and Biological Exposure Indices, Seventh Edition, 2001. American Conference of Governmental Industrial Hygienists, Inc., Cincinnati, OH.
18. Amoores, John E. and Earl Hautala, Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatiles for 214 Industrial Chemicals in Air and Water Dilution. Journal of Applied Toxicology, Vol. 3, No. 6, pp. 272-290, 1983.
19. Forsberg, K., and S.Z. Mansdorf, Quick Selection Guide to Chemical Protective Clothing, Second Edition, Van Nostrand Reinhold, N.Y., 1993.
20. Report on Acute Dermal Irritation/Corrosivity Study in Albino Rabbits with IG/MgSO₄·7H₂O 70:30 Blend. Ricerca Toxicology and Pharmacology Laboratory, LLC, Concord, OH. Document # 013977-1. December 13, 2001.

Additional references are available upon request.

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THE INFORMATION IN THIS MSDS SHOULD BE PROVIDED TO ALL WHO WILL USE, HANDLE, STORE, TRANSPORT, OR OTHERWISE BE EXPOSED TO THIS PRODUCT. THIS INFORMATION HAS BEEN PREPARED FOR THE GUIDANCE OF PLANT ENGINEERING, OPERATIONS AND MANAGEMENT AND FOR PERSONS WORKING WITH OR HANDLING THIS PRODUCT. ARCH CHEMICALS BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION BUT, MAKES NO WARRANTY THAT IT IS. ADDITIONALLY, IF THIS MSDS IS MORE THAN THREE YEARS OLD, YOU SHOULD CONTACT ARCH CHEMICALS MSDS CONTROL AT THE PHONE NUMBER ON THE FRONT PAGE TO MAKE CERTAIN THAT THIS DOCUMENT IS CURRENT.

Arch Chemicals, Inc.
MSDS Control
501 Merritt 7
PO Box 5204
Norwalk, CT 06856-5204