KING TECH

MATERIAL SAFETY DATA SHEET

FROG BAC PAC

Emergency Phone Number: 800-424-9300 CHEMTREC

THIS MATERIAL SAFETY DATA SHEET (MSDS) HAS BEEN PREPARED IN COMPLIANCE WITH THE FEDERAL OSHA HAZARD COMMUNICATION STANDARD, 29 CFR 1910.1200. THIS PRODUCT MAY BE CONSIDERED TO BE A HAZARDOUS CHEMICAL UNDER THAT STANDARD. (REFER TO THE OSHA CLASSIFICATION IN SECTION I.) THIS INFORMATION IS REQUIRED TO BE DISCLOSED FOR SAFETY IN THE WORKPLACE. THE EXPOSURE TO THE COMMUNITY, IF ANY, IS QUITE DIFFERENT.

I. PRODUCT IDENTIFICATION

REVISION NO	7
REVISION DATE	10/15/03
PRODUCT NAME	**FROG BAC PAC**
SYNONYMS	Trichloroisocyanuric Acid, TCCA, Trichlor, Trichloro- s-triazinetrione
CHEMICAL FAMILY	Chloroisocyanurates
FORMULA	$(CINCO)_3$
DESCRIPTION	Swimming Pool Sanitizer
OSHA HAZARD CLASSIFICATION	Oxidizer, skin corrosive, eye hazard, oral toxin, lung toxin

II. COMPONENT DATA

PRODUCT COMPOSITION

CAS or CHEMICAL NAME	Trichloro-s-triazinetrione
CAS NUMBER	87-90-1
PERCENTAGE RANGE	96-100
HAZARDOUS PER 29 CFR 1910.1200	Yes
EXPOSURE STANDARDS	None Established
CAS or CHEMICAL NAME	Dichloroisocyanuric acid
CAS NUMBER	2782-57-2
PERCENTAGE RANGE	0-4
HAZARDOUS PER 29 CFR 1910.1200	Yes
EXPOSURE STANDARDS	None Established

III. PRECAUTIONS FOR SAFE HANDLING AND STORAGE

DO NOT TAKE INTERNALLY, AVOID CONTACT WITH SKIN, EYES, AND CLOTHING. UPON CONTACT WITH SKIN OR EYES, WASH OFF WITH WATER.

STORAGE CONDITIONS	Store in a clean dry well ventilated area. Keep away from incompatible chemicals (see below).

DO NOT STORE AT TEMPERATURES ABOVE: 60 Degrees C (140 Degrees F)

PRODUCT STABILITY AND COMPATIBILITY

SHELF LIFE LIMITATIONS	Indefinite. Available chlorine loss can be as little as 0.1% per year at ambient temperatures.
INCOMPATIBLE MATERIALS FOR PACKAGING	Paper, cardboard
INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT	Organic materials, reducing agents, nitrogen containing materials, other oxidizers, acids, bases

IV. PHYSICAL DATA

APPEARANCE	White granular solid or tablet-form product
FREEZING POINT	Not Applicable
BOILING POINT	Not Applicable
DECOMPOSITION TEMPERATURE	225 Deg. C (437 Deg. F)
SPECIFIC GRAVITY	>1.0 @ 20 Deg. C
BULK DENSITY	Granular-0.89 to 1.1 g/cc Tablets-1.16 to 1.90 g/cc
pH OF 1% SOLUTION	2.7-2.9
VAPOR PRESSURE @ 25 DEG. C	Not Available
SOLUBILITY IN WATER	1.2% @ 25 Deg. C
VOLATILES, PERCENT BY VOLUME	Not Applicable
EVAPORATION RATE	Not Applicable
VAPOR DENSITY	Not Applicable
MOLECULAR WEIGHT	232.5
ODOR	Sharp, chlorine-like, bleach odor
COEFFICIENT OF OIL/WATER DISTRIBUTION	Not Available

V. PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

PERSONAL PROTECTION FOR ROUTINE USE OF PRODUCT:

RESPIRATORY PROTECTION	Wear a NIOSH/MSHA approved respirator equipped with chemical cartridge for protection against chlorine gas and a dust/mist type prefilter. A respirator protection program meeting OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. When dusty conditions are encountered, wear a NIOSH/MSHA approved full face respirator equipped with chemical cartridge for protection against chlorine gas and a dust type pre-filter.
VENTILATION	Use local exhaust ventilation to minimize dust levels.
SKIN PROTECTIVE EQUIPMENT	Wear gloves, boots, chemical safety goggles, aprons or impermeable suit to avoid skin and eye contact. Eyewash station should be provided in the immediate work area.
EYE PROTECTION	Use chemical safety glasses (ANSI Z87.1) to avoid eye contact. Where industrial use occurs, chemical goggles may be required.

EQUIPMENT SPECIFICATIONS

RESPIRATOR TYPE	Half-face mask worn with chemical safety goggles or full face respirator worn without. Either respirator must be equipped with chemical cartridges for protection against chlorine gas and dust/mist prefilters.
GLOVE TYPE	Neoprene
BOOT TYPE	Neoprene
APRON TYPE	Neoprene
FACE SHIELD	Not normally required
PROTECTIVE SUIT	Neoprene or other impermeable suite

VI. FIRE AND EXPLOSION HAZARD INFORMATION

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)	Not Applicable

NFPA RATINGS

Health	3
Flammability	0
Reactivity	2
Special Hazard Warning	OXIDIZER

HMIS RATINGS

Health	3
Flammability	0
Reactivity	2

EXTINGUISHING MEDIA — Not Applicable

FIRE FIGHTING TECHNIQUES AND COMMENTS:

Use water to cool containers exposed to fire. On small fires, use water spray or fog. On large fires, use heavy deluge or fog streams. Flooding amounts of water may be required before extinguishment can be accomplished. Do not use dry chemical extinguishers containing ammonia compounds.

VII. REACTIVITY INFORMATION

CONDITIONS UNDER WHICH THIS PRODUCT MAY BE UNSTABLE

TEMPERATURES ABOVE	225 Degrees C (437 Degrees F)
MECHANICAL SHOCK OR IMPACT	No
ELECTRICAL (STATIC) DISCHARGE	No
OTHER	Contact with small amounts of water may result in an exothermic reaction with the liberation of toxic fumes.
HAZARDOUS POLYMERIZATION	Will Not Occur

INCOMPATIBLE MATERIALS	Organic materials, oils, grease, sawdust, reducing agents, nitrogen containing compounds, other oxidizers, acids, bases, dry fire extinguishers containing ammonium compounds
HAZARDOUS DECOMPOSITION PRODUCTS	Nitrogen trichloride, chlorine, nitrous oxides, cyanates, carbon monoxide, carbon dioxide
OTHER CONDITIONS TO AVOID	Damp or slightly wet product (will evolve nitrogen trichloride)

SUMMARY OF REACTIVITY	
OXIDIZER	Yes
PYROPHORIC	No
ORGANIC PEROXIDE	No
WATER REACTIVE	No

VIII. FIRST AID

EYES	Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
SKIN	Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
INGESTION	Call poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by the mouth to an unconscious person. Have the product container or label with you when calling a poison control center or doctor or going for treatment.
INHALATION	Move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably by mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

IX. TOXICOLOGY AND HEALTH INFORMATION

ROUTES OF ABSORPTION	Inhalation, Skin, Eye, Ingestion
HARMFUL	IF INHALED OR INGESTED
HARMFUL	IF EXPOSED TO SKIN OR EYES
ODOR THRESHOLD	No Available Data There is no data for irritation threshold. TCCA has the potential to be immediately dangerous to life and health.

SIGNS, SYMPTOMS, AND EFFECTS OF EXPOSURE:

INHALATION:

Inhalation of this material is irritating to the nose, mouth, throat, and lungs. It may also cause burns to the respiratory tract with the production of lung edema which can result in shortness of breath, wheezing, choking, chest pain, and impairment of lung function. Inhalation of high concentrations can result in permanent lung damage. 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:

Dermal exposure can cause severe irritation and/or burns characterized by redness, swelling, and scab formation. Prolonged skin exposure may cause destruction of the dermis with impairment of the skin at side of contact to regenerate. Effects from chronic skin exposure would be similar to those from single exposure except for effects secondary to tissue destruction.

INGESTION:

Irritation and/or burns can occur to the gastrointestinal tract, including the stomach and intestines, characterized by nausea, vomiting, diarrhea, abdominal pain, bleeding, and/or tissue ulceration.

There are no known or reported effects from chronic exposure.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:

Asthma and respiratory and cardiovascular disease.

INTERACTIONS WITH OTHER CHEMICALS WHICH ENHANCE TOXICITY:

None known or reported.

ANIMAL TOXICOLOGY

Acute Toxicity:

Inhalation LC 50 - > 50 mg/1 (rats, one hour exposure)
Oral LD 50 - 490 mg/kg (rat)
Dermal LD 50 - greater than 2 g/kg (rabbit)
Causes burns to eyes and skin.

Toxicity to Wildlife:

LC 50

Rainbow Trout	96 hrs. exposure	.32 ppm
Bluegill sunfish	96 hrs. exposure	.30 ppm
Daphnia magna	48 hrs. Exposure	.21 mg/1
Mallard duck	8 day dietary exposure >10,000 ppm	1.6 g/kg
Bobwhite quail	8 day dietary exposure	7422 ppm

Chronic Toxicity:

There are no known or reported effects from repeated exposure. Toxicological investigation indicates it does not produce significant effects from chronic exposure.

Reproductive Toxicity:
There are no known or reported effects on reproductive function or fetal development. Toxicological investigation indicates it does not effect reproductive function of fetal development.

Carcinogenicity:
This product is not known or reported to be carcinogenic by any reference source including IARC, OSHA, NTP, or EPA.

Mutagenicity:
This product is not known or reported to be mutagenic.

X. TRANSPORTATION INFORMATION

THIS MATERIAL IS REGULATED AS A DOT HAZARDOUS MATERIAL.

DOT DESCRIPTION FROM THE HAZARDOUS MATERIALS TABLE 49 CFR 172.101:

LAND	Trichloroisocyanuric Acid Dry, 5.1, UN 2468, PGII, ERG No. 141
WATER	Trichloroisocyanuric Acid Dry, 5.1, UN 2468, PGII, IMDG Pg. No. 5190, EmS No. 5.1-05
AIR	Same as LAND

HAZARD LABEL / PLACARD: OXIDIZER

REPORTABLE QUANTITY: Not applicable (Per 49 CFR 172.101, Appendix)

DOT EMERGENCY GUIDE NUMBER: 42

XI. SPILL AND LEAKAGE PROCEDURES

FOR ALL TRANSPORTATION ACCIDENTS, CALL CHEMTREC AT 800-424-9300.

REPORTABLE QUANTITY: Not Applicable (Per 40 CFR 302.4)

SPILL MITIGATION PROCEDURES: Hazardous concentrations in air may be found in local spill area and immediately downwind.

If spill material is still dry, do not put water directly on this product as a gas evolution may occur. If material is wet, contact the OCEAN network for proper stabilization procedures.

AIR RELEASE - vapors may be suppressed by the use of a water fog.

WATER RELEASE - this material is heavier than water. This material is soluble in water. Stop flow of material into water source as soon as possible. Begin monitoring for available chlorine and pH immediately.

LAND SPILL - Do not contaminate spill material with any organic materials, ammonia, ammonium salts or urea. Clean up all spill material with clean, dry dedicated equipment and place in a clean dry container.

SPILL RESIDUES: Dispose of per guidelines under Section XII, WASTE DISPOSAL. This material may be neutralized for disposal; you are requested to contact OCEAN at 800-Olin-911 before beginning any such operation.

PERSONAL PROTECTION FOR EMERGENCY SPILL AND FIRE-FIGHTING SITUATIONS:
Additional respiratory protection is necessary when a small spill involving this product occurs. You are recommended to use a half mask cartridge type NIOSH approved respirator, with chlorine cartridges.
All other responses to this material require the use of a self-contained breathing apparatus (SCBA).

Additional protective clothing must be worn to prevent personal contact with this material. Those items include but are not limited to boots, gloves (see below for compatible materials), hard hat, splash-proof goggles, and impervious clothing, i.e., chemically impermeable suit.

Compatible materials for response to this material are Neoprene, Chlorinated Polyethylene, Butyl Rubber, and Saranex.

Protection concerns must also address the following:
If this material becomes damp/wet or contaminated in a container the formation of nitrogen trichloride gas may occur and an explosive condition may exist.

XII. WASTE DISPOSAL

If this product becomes a waste, it meets the criteria of a hazardous waste as defined under 40 CFR 261 and would have the following EPA hazardous waste number: D001.

If this product becomes a waste, it will be a hazardous waste which is subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly.

As a hazardous solid waste, it must be disposed of in accordance with local, state, and federal regulations in a permitted hazardous waste treatment, storage and disposal facility by treatment.

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.

XIII. ADDITIONAL REGULATORY STATUS INFORMATION

TOXIC SUBSTANCES CONTROL ACT: This substance is listed on the Toxic Substances Control Act Inventory.

SUPERFUND AMENDMENT AND REAUTHORIZATION ACT TITLE III:

HAZARD CATEGORIES, PER 40 CFR 370.2:
HEALTH: Immediate (Acute)
PHYSICAL: Fire and Reactivity

EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW, PER 40 CFR 355, APP.A:

EXTREMELY HAZARDOUS SUBSTANCE - THRESHOLD PLANNING QUANTITY:
None Established

SUPPLIER NOTIFICATION REQUIREMENTS, PER 40 CFR 372.45:
None Established

XV. MAJOR REFERENCES

1. ACGIH Guide to Protective Clothing. Cincinnati, OH: American Conference of Government Industrial Hygienists, 1987.
2. ANSI Z88.2. Recommended Practice for Respiratory Protection. American National Standards Institute, New York, NY.
3. Baker, C. J., The Fire Fighter's Handbook of Hazardous Materials, 4th Ed., Indiana: Maltese Enterprises, Inc., 1984.
4. Bretherick, L., Handbook of Reactive Chemical Hazards, 3rd Ed., Boston, MA: Butterworths, 1985.
5. Cassarett, L. and J. Doull, Eds., Toxicology: The Basic Science of Poisons, 3rd Ed., New York: Macmillan Publishing Co., Inc. 1986.
6. CERIS (Chemical Emergency Response Information System) On Line Database. Association of American Railroads.
7. Chemical Degradation and Permeation Database and Selection guide for Resistant Protective Materials. Austin, TX.
8. Clayton, G. and F. Clayton, Eds., Patty's Industrial Hygiene and Toxicology, Vol. 2A-C 3rd Ed., New York: John Wiley & Sons, 1981-1982.
9. Code of Federal Regulations, Titles 21, 29, 40 and 49. Washington, DC: U.S. Government Printing Office.
10. Emergency Response Guide (D.O.T.). Washington, DC: U.S. Government Printing Office, 1988.
11. Fire Protection Guide on Hazardous Materials, 9th Ed., National Fire Protection Association, Batterymarch Park, Quincy, MA, 1986.
12. Gosselin, R., et al., Gosselin-Clinical Toxicology of Commercial Products, 5th Ed., Baltimore: Williams and Wilkins, 1984.
13. Hazardline, Occupational Health Services Inc., New York, NY.
14. IARC Monogram on the Evaluation of Carcinogenic Risk of Chemicals to Man., Geneva: World Health Organization, International Agency for Research on Cancer.
15. Lenga, R., The Sigma-Aldrich Library of Chemical Safety Data, 1st Ed., Milwaukee, WI: Sigma-Aldrich Corporation, 1985.
16. Lewis, R. and D. Sweet, Eds., Registry of Toxic Effects of Chemical Substances, 1985-1986, Washington, DC: U.S. Government Printing Office, 1987.
17. Medline, U.S. National Library of Medicine, Bethesda, MD.
18. NIOSH Pocket Guide to Chemical Hazards. Washington, DC: U.S. Government Printing Office, 1985.
19. Olin Respiratory Protection Manual.
20. Sax, N. Irving, Dangerous Properties of Hazardous Materials 6th Ed., New York: Van Nostrand Reinhold Company, 1984.
21. Threshold Limit Values and Biological Exposure Indices for 1988-89. Cincinnati, OH: American Conference of Government Industrial Hygienists, 1987.
22. Toxic Substances Control Act Inventory, Washington, DC: U.S. Government Printing Office, 1986.
23. Hammond, B., et al., A Review of Toxicology Studies on Cyanurate and its Chlorinated Derivatives, Environmental Health Perspectives, Vol. 69, pp. 287-292, 1986.
24. 28-Day Dosing Study in Rats (Extended to a 59-Day Dosing Study), s-Triazinetriol, Monosodium Slat; Sodium Dichloro-s-triaizinetrione dihydrate and Trichloro-s-triazinetrione, International Research and Development Corporation, Mattawan, MI, Study No. 167-150, September 12, 1980.
25. Eight-Day Dietary LC 50 - Bobwhite Quail, ACL 85, Final Report, Truslow Farms Inc., Wildlife Research Division, Sterling, VA. Project No. 139-112, July 15, 1975.
26. Eight-Day Dietary LC 50 - Mallard Duck, ACL 85, Final Report, Truslow Farms Inc., Wildlife Research Division, Sterling, VA, Project No. 139-113, July 15, 1975.
27. Acute Oral LD 50 - Mallard Duck, ACL-85, Final Report, Truslow Farms Inc., Wildlife International Ltd., Chestertown, MD, Project No. 139-120, October 18, 1976.
28. Acute Toxicity of ACL-85 to Daphnia magna, Bioassay Report, E G & G, Bionomics, Aquatic Toxicology Laboratory, Wareham, MA, November, 1976.

29. Four-Day Static Aquatic Toxicity Studies with ACL-85, LOT No. 5/8/75 GDN in Rainbow Trout and Bluegills, Industrial BIO-TEST Laboratories, Inc., Northbrook, IL, BTL No. 75-39, IBT No. 621-07227, September 5, 1975.
30. Acute Toxicity Studies with Trichloroisocyanuric acid, Industrial BIO-TEST Laboratories, Inc., Northbrook, IL, P.O. No. RC-34355, IBT No. 8530-08303, April 20, 1976.
31. Inhalation LC 50 (Rat), Trichloroisocyanuric Acid (Trichloro-S-Triazinetrione), Final Report, Consumer Product Testing, Fairfield, NJ, Study No. 78272-1, Reference No. P.O. RC-42380, April 9, 1979.

THE INFORMATION IN THIS MATERIAL SAFETY SHEET 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 PERSON WORKING WITH OR HANDLING THIS PRODUCT. KING TECHNOLOGY BELIEVES THIS INFORMATION TO BE RELIABLE AND UP TO DATE AS OF THE DATE OF PUBLICATION, BUT MAKES NO WARRANTY THAT IT IS.

KING TECHNOLOGY, INC.
530 11th Avenue S.
Hopkins, MN 55343

Phone Number (952) 933-6118