
SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name: HALAMID®
Chemical Name: Benzene sulfonamide, N-Chloro-4-methyl, sodium salt
Synonyms: Sodium *p*-Toluenesulfonchloramide ; Chloramine-T
C.A.S. Registry No.: 127-65-1 (anhydrous) / 7080-50-4 (trihydrate) [See additional information in Sections 3 and 15]
Chemical Formula: C₇ H₇ Cl N NaO₂ S (and hydrates)
Product Use: Oxidizing agent

Manufacturer / Supplier

Axcentive SARL
Chemin de Champouse
13320 Bouc Bel Air, France
Tel. (33) 442 694 090

Emergency Telephone Number: (011) 31 570 679211 (Akzo Nobel Chemicals, Deventer, The Netherlands)

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Revision Date: February 18, 2005 **Changes:** Sections 1, 2, 4, 11, 15

SECTION 2. HAZARDS INFORMATION

EMERGENCY OVERVIEW

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

DANGER!

- **Causes skin and eye burns.**
- **Harmful if swallowed.**
- **May cause sensitization by inhalation and skin contact.**
- **May cause respiratory tract irritation.**
- **Contact with acids liberates toxic gas.**
- **Avoid contact with eyes, skin and clothing.**
- **Wear appropriate personal protective equipment (see section 8 for additional information).**

Fire and Explosion Hazards: Potential for dust explosion may exist. This product is not defined as flammable or combustible but may decompose violently if heated above 266°F (130°C). This product will begin to lose water of crystallization at 122°F (60°C). Depending upon conditions, dust may be sensitive to static discharge. Avoid possibility of dry powder with friction causing static electricity in presence of flammables. (See NFPA-77, Chapter 6).

Appearance and odor: White crystalline powder with a weak chlorine odor.

POTENTIAL HEALTH EFFECTS [See Section 11 for additional information]

Primary Route(s) of Exposure: Skin contact, eye contact and inhalation.

Skin Contact: Considered corrosive to the skin. Contact may cause allergic reaction in sensitive individuals. However, years of use of Chloramine-T indicates that the risk of allergic skin reaction is limited.

Eye Contact: Considered corrosive to the eyes.

Inhalation: Inhalation of dust is irritating to mucous membranes and may cause asthma-like symptoms.

SECTION 2. HAZARDS IDENTIFICATION (CONTINUED)

Ingestion: Ingestion may cause irritation or burns of the mouth, throat, esophagus and stomach. Ingestion may cause nausea and vomiting.

Carcinogenicity: IARC, NTP, ACGIH or OSHA does not classify this material or its components as a carcinogen or suspect carcinogen.

Medical conditions aggravated: Persons with pre-existing skin and/or respiratory disease may be at increased risk if exposed to this material.

POTENTIAL ENVIRONMENTAL EFFECTS [See Section 12 for additional information]

This product is not expected to be harmful to aquatic life, based on available data.

SECTION 3. COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENTS [See section 8 for exposure limits]	% (w/w)	CAS Number
Benzene sulfonamide, N-Chloro-4-methyl, sodium salt	99.0-100.0	127-65-1 / 7080-50-4 ¹

¹ The anhydrous substance (CAS# 127-65-1) covers all hydrated forms of this product. The trihydrate substance (CAS# 7080-50-4) is the only commercially available and chemically stable form of Sodium p-Toluenesulfonchloramide.

SECTION 4. FIRST AID MEASURES

Skin Contact: Immediately remove contaminated clothing and shoes. Wash skin with soap and plenty of water for at least 15 minutes. Do not attempt to neutralize with chemical agents. Get medical attention. Wash contaminated clothing before reuse. Thoroughly clean or destroy contaminated shoes.

Eye Contact: Flush eyes with large quantities of running water for a minimum of 15 minutes. If the victim is wearing contact lenses, remove them. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eye and lids with water. DO NOT let victim rub eye(s). Do not attempt to neutralize with chemical agents. Oils or ointments should not be used at this time. Get medical attention if eye irritation occurs.

Inhalation: Remove victim to fresh air. If respiratory irritation occurs or if breathing is difficult, get medical attention. If breathing has stopped, give artificial respiration. Maintain airway and administer oxygen if available. Get medical attention immediately.

Ingestion: DO NOT induce vomiting. If victim is conscious and alert, rinse mouth and give plenty of water to drink. If vomiting occurs, keep head below hips to reduce risk of aspiration. Give fluids again. Activated charcoal may be administered (not during vomiting) preferably by a physician [See Note to Physician below]. Never give anything by mouth to a person who is unconscious or convulsing. If victim is unconscious, monitor pulse, breathing and airway. If breathing stops, begin artificial respiration immediately. If the heart has stopped, give cardiopulmonary resuscitation (CPR). Get medical attention immediately.

Note to Physician: Attending physician should treat exposed patients symptomatically. To prepare activated charcoal slurry, suspend 50 g of activated charcoal in 400 ml of water in a plastic bottle and shake well. Administer 5 ml/kg or 350 mL for an average adult. [A literature reference suggests that Chloramine-T can react with some amino acids in the gastrointestinal tract to form cyanogen compounds].

SECTION 5. FIRE FIGHTING MEASURES

Conditions of Flammability: not flammable or combustible
Flash Point (Method): 377.6°F (192°C) [Pensky-Martens Closed Cup]
Upper Flammable Limit (% by volume): not applicable
Lower Flammable Limit (% by volume): not applicable
Auto-Ignition Temperature: product decomposes prior to ignition

Extinguishing Media: Use water fog or spray, dry chemical, foam or carbon dioxide extinguishing agents.

Fire Fighting Procedures: As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate all non-essential personnel from the fire area. Fire fighters should wear full-face, self-contained breathing apparatus and impervious protective clothing. If not leaking, keep fire-exposed containers cool with a water spray to prevent rupture due to excessive heat.

Fire & Explosion Hazards: Potential for dust explosion may exist. This product is not defined as flammable or combustible. May decompose violently if heated above 266°F (130°C). This product will begin to lose water of crystallization at 122°F (60°C). Depending upon conditions, dust may be sensitive to static discharge. Avoid possibility of dry powder with friction causing static electricity in presence of flammables. (See NFPA-77, Chapter 6)

Other Fire & Explosion Hazards: This product has been reported as being explosive after azeotropic distillation of the total water content.

Hazardous Combustion Products: Thermal decomposition products may release toxic and/or hazardous fumes and gases, including sulfur oxides (SO_x), nitrogen oxides (NO_x), hydrochloric acid (HCl) and chlorine.

NFPA 704 Hazard Rating – Health: 3 Fire: 1 Instability: 1 Other: None

[0 – Minimal 1 - Slight 2 - Moderate 3 - High 4 - Extreme]

SECTION 6. ACCIDENTAL RELEASE MEASURES

Spill or Leak: Safely stop source of spill. Restrict non-essential personnel from area. All personnel involved in spill cleanup should avoid skin and eye contact by wearing appropriate personal protective equipment. Do not breathe dust.

Cleanup: Sweep up spilled solid material, being careful not to create dust. Return sweepings to stock or, if contaminated, place into a chemical waste container for disposal. Dispose of waste according to all regulations. Flush remainder with water. Do not allow to escape into sewage system or water courses.

SECTION 7. HANDLING AND STORAGE

Handling: Avoid inhalation of dust and prolonged and/or repeated skin and eye contact.

Storage: Store away from foodstuffs or animal feed. Containers should be kept tightly capped and stored in a cool, dry, well-ventilated area away from flammable, reducing or oxidizing materials and sources of heat or flame. Exercise due caution to prevent damage to or leakage from the container.

Maximum Storage Temperature: 140°F (60°C) – Storage at higher temperatures will cause loss of crystalline structure.

General Comments: Avoid generation of dust when handling this product. Follow good manufacturing and handling practices.

SECTION 8. EXPOSURE CONTROL / PERSONAL PROTECTION

Applicable Exposure Limits: In addition to any exposure limits displayed below, exposures to this product should be controlled below limits established for "Particulates Not Otherwise Classified (PNOC)":

- OSHA – 15 mg/m³ (total dust) ; 5 mg/m³ (respirable fraction)

Chemical Name	OSHA – PELs (mg / m ³)		ACGIH – TLVs (mg / m ³)		NIOSH – RELs (mg / m ³)		SUPPLIER
	TWA	STEL / CEIL(C)	TWA	STEL / CEIL(C)	TWA	STEL / CEIL(C)	
Sodium <i>p</i> -Toluene sulfonchloramide	N/D	N/D	N/D	N/D	N/D	N/D	N/D

[Ref: ACGIH Guide to Occupational Exposure Values, 2004 Edition]

Legend :

CELL: Ceiling Exposure Limit
 STEL: Short Term Exposure Limit
 N/D: Not Determined

PEL: Permissible Exposure Limit
 TLV: Threshold Limit Value

REL: Recommended Exposure Limit
 TWA: Time-Weighted Average

Engineering Control - Ventilation: Special ventilation is usually not required under normal use conditions. Ensure that existing ventilation is sufficient to prevent the circulation and/or accumulation of dust in the air.

Personal Protective Equipment (PPE)

Respiratory Protection: If handling operations lead to dusting, wear a NIOSH-approved air-purifying full-face respirator with acid gas, dust, mist and fume filters. When using respirator cartridges or canisters, they must be changed frequently (following each use or at the end of the work shift) to assure breakthrough exposure does not occur.

Skin Protection: Skin contact with the product should be minimized through the use of suitable protective clothing, gloves and footwear selected with regard for use condition exposure potential.

Eye Protection: Indirect vented, dust-tight goggles are recommended if dust is generated when handling this product. Eye wash facility should be readily available.

Other Protection – General Hygiene Considerations: All food and smoking materials should be kept in a separate area away from the storage/use location. Eating, drinking and smoking should be prohibited in areas where there is a potential for significant exposure to this material. Before eating, drinking and smoking, hands and face should be thoroughly washed. Safety showers, with quick opening valves, which stay open, and eyewash fountains, or other means of washing the eyes with a gentle flow of cool to tepid tap water, should be readily available in all areas where this material is handled or stored. Water should be supplied through insulated and heat-traced lines to prevent freeze-up in cold weather. Long sleeved clothing may be used to minimize skin contact.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State / Appearance / Odor:	white crystalline powder with a weak chlorine odor
Boiling Point:	not determined
Bulk Density:	~ 590 kg/m ³
Cloud Point:	not determined
Evaporation Rate (Butyl Acetate=1):	not determined
Melting Point:	not determined (decomposes before melting)
Odor Threshold:	not determined
pH:	8 – 10.3 (5% solution)
Partition Coefficient [Octanol-Water]	log K _{ow} = - 1.3
Pour Point:	not determined
Solubility in water:	150 g/l @ 25°C
Solubility in other solvents:	75 g/l @ 20°C in 95% ethanol

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES (CONTINUED)

Specific Gravity (H₂O = 1):	1430 kg/m ³
Vapor Density (Air = 1):	not applicable
Vapor Pressure:	not determined
Viscosity:	not applicable
Volatiles (% by weight):	not determined
Conditions of Flammability:	not flammable or combustible
Flash Point (Method):	377.6°F (192°C) [Pensky-Martens Closed Cup]
Upper Flammable Limit (% by volume):	not applicable
Lower Flammable Limit (% by volume):	not applicable
Auto-Ignition Temperature:	product decomposes prior to ignition

< : less than > : greater than ~ : approximately

SECTION 10. STABILITY AND REACTIVITY

Stability: This product is stable under recommended storage and handling conditions (see section 7). However, it may decompose if exposed to elevated temperatures. It will become unstable in humid conditions.

Incompatibilities / Conditions to avoid: This product is incompatible with acids, reducing agents and strong oxidizers. Contact with acids liberates toxic gas. Avoid prolonged storage at elevated temperatures.

Polymerization: Hazardous polymerization is not expected to occur under normal temperatures and pressures.

Hazardous Combustion Products: Thermal decomposition products may release toxic and/or hazardous fumes and gases, including sulfur oxides (SO_x), nitrogen oxides (NO_x), hydrochloric acid (HCl) and chlorine.

SECTION 11. TOXICOLOGICAL INFORMATION
INHALATION

Acute exposure: The acute 4 hr. LC50 for this product in rats is greater than 0.275 mg/L (maximum attainable dust concentration).

Chronic exposure: This product may cause asthma-like symptoms based on limited human data.

SKIN

Acute contact: Dermal toxicity (LD50) is greater than 2,000 mg/kg in rabbits (8% solution). The pure powder form of Halamid is corrosive to rabbit skin following a 4 hour exposure period while an 8% solution is not irritating to skin.

Chronic contact: No data available.

EYES: This product is corrosive to rabbit eyes.

INGESTION

Acute exposure: The oral LD50 for this material is approximately 1,000 mg/kg (rat/mice).

Chronic exposure: In a 90 day feeding study, the NOEL (No Observed Effect Level) in albino rats was approximately 15 mg/kg.

SENSITIZATION: This product was a strong skin sensitizer in the guinea pig maximization test and local lymph node assay. However, years of use of Chloramine-T indicates that the risk of allergic skin reaction is limited.

SECTION 11. TOXICOLOGICAL INFORMATION (CONTINUED)

CARCINOGENICITY: IARC, NTP, ACGIH or OSHA does not classify this material or its components as a carcinogen or suspect carcinogen.

MUTAGENICITY: This product gave negative results in the Ames test, mouse lymphoma forward mutation assay, DNA repair test, and in vivo mouse micronucleus assay at doses up to 1200 mg/kg.

REPRODUCTIVE TOXICITY / TERATOGENICITY / NEUROTOXICITY: No data are currently available.

OTHER TOXICOLOGICAL EFFECTS: None known

TARGET ORGANS: Skin, eyes and respiratory system.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity: This product is not expected to be harmful to aquatic life, based on the following ecotoxicity data:

Test	Exposure / Duration	Test Results
Guppies (<i>Poecilia Reticulata</i>)	96-h	LC ₅₀ = 31 mg/L
Fathead Minnow	35 days	NOEC = 1.1 mg/L (early life stage study)
Saltwater Brine Shrimp	72-h	EC ₅₀ = 24.6 mg/L ; NOEC = 10.4 mg/L
Daphnia magna	48-h	LC ₅₀ = 4.5 mg/L (static conditions)
	21 days (chronic study)	EC ₅₀ = > 23 mg/L (flow through conditions) NOEC = 1.1 mg/L ; LOEC = 3.5 mg/L
Freshwater Algal Growth Inhibition	96-h	E _p C ₅₀ (reduction in growth) = 4.5 mg/L E _r C ₅₀ (reduction in specific growth rate) = 13 mg/L LOEC = 0.6 mg/L NOEC = 0.2 mg/L
Algae (<i>Chlorella pyrenoidosa</i>)	96-h	EC ₅₀ = 80 mg/L, as PTSA (para-Toluenesulfonamide)
Activated Sludge Bacteria	None specified	EC ₅₀ = 5 mg/L (Aerobic saprophytic bacteria) EC ₅₀ = 700 mg/L (Nitrifying bacteria) EC ₅₀ = 1000 mg/L (Methanogenic bacteria)
<i>Pseudomonas Putida</i> Bacteria	None specified	EC ₁₀ = 10 ppm (mg/L)
Earthworms (<i>Eisenia fetida</i>)	7 days	LC ₅₀ = 527 mg/kg

Bioaccumulation: The high solubility in water of this product, its low adsorption to soil and sludge and its speedy biodegradability indicate a low bioaccumulation potential.

Chemical Fate / Biodegradation: This product is readily biodegradable if it is in sufficiently low concentrations in water. The hydrolysis product is also readily biodegradable. This product hydrolyses to *p*-toluene sulfonamide that biodegraded 90% in 28 days in the Repetitive Die Away Test.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal: In its unused condition, this product is not considered to be a RCRA defined hazardous waste by characteristics or listings. It is the responsibility of the waste generator to evaluate whether his wastes are hazardous by characteristic or listing. Dispose in accordance with all local, state and federal regulations.

Container Disposal: Containers should be cleaned of residual product before disposal or return. Since emptied containers retain product residue, follow label warnings even after container is emptied. Empty containers should be disposed of or shipped in accordance with all applicable laws and regulations.

SECTION 14. TRANSPORT INFORMATION

Shipping Information: This product is regulated for shipping by all modes [per US DOT, Canada TDG, IMDG, ICAO/IATA] as follows:

Corrosive solid, basic, organic, n.o.s. [*Sodium p-toluenesulfonchloramide*]
8, UN3263, PG III

2004 Emergency Response Guidebook No.: 154

Required Labels: Corrosive

Environmentally Hazardous Substance [per 49 CFR 172.101, Appendix A or B]: None

SECTION 15. REGULATORY INFORMATION

The component is subject to the following environmental regulatory lists:

<i>Substance Name</i>	<i>CAA</i>	<i>CERCLA</i>	<i>IARC</i>	<i>US STATE RIGHT-TO-KNOW LISTS</i>	<i>PROP 65</i>	<i>SARA</i>
Sodium <i>p</i> -Toluene sulfonchloramide	N/R	N/R	N/R	N/R	N/R	N/R

National Chemical Inventories Status:

<i>Substance Name</i>	<i>US TSCA</i>	<i>Canada</i>		<i>EU EINECS</i>	<i>Australia AICS</i>	<i>Japan ENCS</i>	<i>Korea KECL</i>	<i>Philippines PICCS</i>	<i>China</i>
		<i>DSL</i>	<i>NDSL</i>						
Sodium <i>p</i> -Toluene-sulfonchloramide (see note below)	X	X		X	X	X	X	X	X

N/R = Non Regulated

X = Listed

Other Regulatory Information: For inventory reporting purposes, listing of the anhydrous substance [CAS# 127-65-1] covers all hydrated forms of this product. The trihydrate substance (CAS# 7080-50-4) is the only commercially available and chemically stable form of Sodium *p*-Toluenesulfonchloramide.

Legend

AICS	Australian Inventory of Chemical Substances
CA List	California – Directors List of Hazardous Substances
CAA	Clean Air Act, Section 112
CERCLA	CERCLA Hazardous Substances
DSL	Domestic Substances List – Canada
EINECS	European Inventory of Existing Commercial Chemical Substances
ENCS	Japan Existing and New Chemical Substances
FL List	Florida – Substance List
IARC	International Agency for Research on Cancer – Carcinogens – Groups 1, 2A or 2B
KECL	Korea Existing and Evaluated Chemical Substances
MA List	Massachusetts – R-T-K Substance List
MN List	Minnesota – Hazardous Substance List
NDSL	Non-Domestic Substances List – Canada
NJ R-T-K	New Jersey – R-T-K Hazard List
PA List	Pennsylvania Hazardous Substance List
PICCS	Philippines Inventory of Chemicals and Chemical Substances
Prop 65	California Proposition 65
RI List	Rhode Island – Hazardous Substance List
SARA	SARA Title III, Section 302 / 313
TSCA	Toxic Substances Control Act – USA

WHMIS (Workplace Hazardous Materials Information System - Canada)

- **Class D2A, D2B** [Other toxic effects]
- **Class E** [Corrosive]

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* (CPR) and the MSDS contains all the information required by the CPR.

HMIS Rating – Health: 3

[0 – Minimal 1 - Slight

Flammability: 1

2 - Moderate 3 - High

Reactivity: 1

4 - Extreme

Other: none

* - Chronic Health Hazard (see Section 11)]

SECTION 16. OTHER INFORMATION

Other Information: None available.

Prepared by: ANCI Regulatory Toxicology Dept. [M. Morin – Tel. (613) 273-8095]

The information in this Material Safety Data Sheet should be provided to all who will use, handle, store, transport or otherwise be exposed to this product. All information concerning this product and/or all suggestions for handling and use contained herein are offered in good faith and are believed to be reliable as of the date of publication. Supplier, however, makes no warranty as to the accuracy of and/or sufficiency of such information and/or suggestions, as to the product's merchantability or fitness for any particular purpose, or that any suggested use will not infringe any patent. Nothing contained herein shall be construed as granting or extending any license under any patent. Buyer shall determine for himself, by preliminary tests or otherwise, the suitability of this product for his purposes, including mixing with other products. The information contained herein supersedes all previously issued bulletins on the subject matter covered. If the date of this document is more than three years old, please call to ensure that this sheet is current.