

Zinc bromide Safety Handbook



INTRODUCTION

ICL INDUSTRIAL PRODUCTS (ICL-IP)

ICL Industrial Products is the industrial chemicals arm of ICL, a major chemical company active in the global markets of performance and specialty chemicals, fertilizers and metallurgy.

ICL Industrial Products produces and markets bromine and bromine based products, magnesia products, phosphorus products and chlorine-based salts. ICL-IP is divided into 6 business units: Flame Retardants (FR); Brominated Industrial Products (BIP); Biocides (BIO); Magnesia Products (MGP); Dead Sea Salts (DSS) and IMI Research Laboratories.

ICL-IP draws on the vast resources of the Dead Sea, one of the world's largest and most concentrated sources of bromine, magnesium and potassium salts.

ICL-IP services a wide range of industries such as plastics and polymers, intermediates for the pharmaceutical, agrochemical and cosmetics industries, oil completion chemicals, soil and space fumigation, flame retardants, paints and dyes, photographic materials, pesticides, food additives, and water treatment chemicals.

GLOBAL PRESENCE

ICL-IP's main manufacturing facilities are located in Israel, Holland, Germany, the U.S.A. and China. ICL-IP serves hundreds of customers worldwide through a global network of dedicated sales and marketing offices located in the commercial centers of the Far East, Europe and the U.S.A. The company is the largest producer of bromine containing derivatives in China, and is back-integrated into bromine production.

ICL-IP's customers are fully supported by an integrated supply chain which includes global logistics centers and a large fleet of unique transportation vessels especially designed for the shipment of bromine.

RESPONSIBLE CARE

ICL- Industrial Products (ICL-IP) is a member of the World Chemical Industry's Responsible Care program through the MAI (Manufacturers Association of Israel).

Through this program, ICL-IP is committed to responsibly manage the manufacture, distribution, use and disposal of chemicals in a safe, secure and environmentally responsible manner.

To achieve this, ICL-IP will regularly assess, continually improve and responsibly manage health, safety and environmental risks associated with products, processes and services throughout their life-cycles.

GLOSSARY OF COMMONLY USED ABBREVIATIONS

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road (Europe)
AISI	American Iron and Steel Institute (USA)
ANSI	American National Standards Institute (USA)
ASTM	American Society for Testing and Materials (USA)
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (USA)
CFR	Code of Federal Regulations (USA)
CHEMTREC	Chemical Transportation Emergency Center (USA)
DIN	Deutsches Institut für Normung (Germany)
DOT	Department of Transportation (USA)
DSL	Domestic Substance List (Canada)
EAC	Emergency Action Code (UK)
EINECS	European Inventory of Existing Commercial Substances
EMS	Emergency Schedule (IMO)
EPA	Environmental Protection Agency (USA)
EC	European Commission
EU	European Union
FM	Factory Mutual System (US)
FRP	Fiberglass Reinforced Plastic
HDPE	High Density Polyethylene
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICL	Israel Chemicals Limited
IMDGC	International Maritime Dangerous Goods Code
IMO	International Maritime Organization
MSDS	Material Safety Data Sheet
NIOSH	National Institute of Occupational Safety & Health (USA)
OSHA	Occupational Safety and Health Administration (US)
PE	Polyethylene
PPE	Personal Protection Equipment
PTFE	Polytetrafluoroethylene
RQ	Reportable Quantity
SARA	Superfund Amendments and Reauthorization Act (USA)
TSCA	Toxic Substances Control Act (USA)
UN	United Nations

1. PRODUCT DESCRIPTION

1.1 Zinc bromide PRODUCTS

Zinc bromide solution (UN 1760) is commonly supplied in liquid form as the following products:

Zinc bromide , 73-77 (wt) % solution in water

1.2 IDENTIFICATION

Chemical Abstract Service (CAS) number:	7699-45-8
Empirical Formula:	ZnBr ₂ in water
Synonyms:	Zinc dibromide solution in water
Chemical Family:	Inorganic Bromide
Appearance:	Clear Colorless Viscous liquid, Irritating, Causes burns

1.3 PHYSICAL PROPERTIES

Boiling Point: 136 °C (250 °F)

Freezing Point: ca -8 °C (18 °F)

Decomposition Temperature: 690 °C (1274 °F) (ZnBr₂ 100%)

Hazardous decomposition products: Hydrogen bromide and bromine

Molecular Weight: 225

Vapor pressure: 5.2 mm Hg (25 °C)

Solubility in Water: Soluble

Solubility in other solvents: Ethanol

Specific gravity: 2.3 - 2.5

Reactivity (materials to avoid): Metallic sodium and potassium and strong oxidants

2. PACKAGING SPECIFICATIONS

2.1 STEEL PE DRUMS (205 LITER)

Steel composite drum with an inner lining of HDPE (UN type 6HA1 - Plastic Receptacle in Steel Drum, Non-Removable Head).

The drum plugs or bungs are made of polypropylene with an approved sealing gasket. The drums are loaded on pallets and banded together with polypropylene bands.

The palletized drums are stacked in the container in a manner which prevents any movement of the contents during handling of the container.

These drums are especially designed for their corrosion resistance, strength, tightness of closure and ease in emptying.

NOTE: These drums are to be used only for Zinc bromide . Drums should be kept tightly closed except when being emptied.

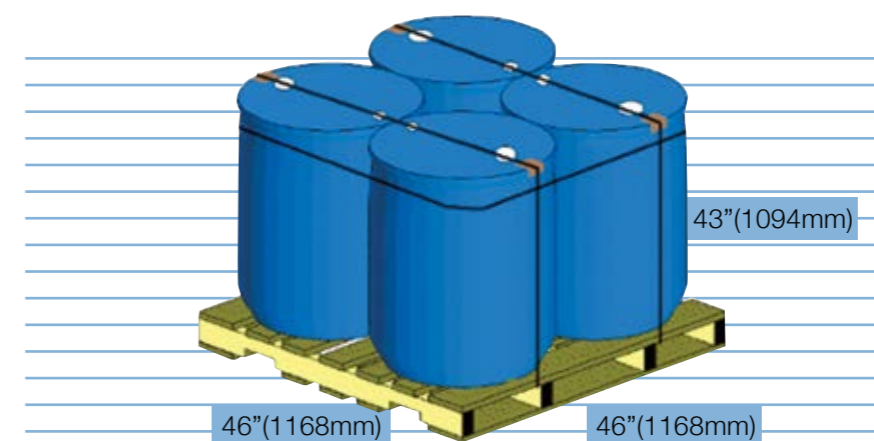


2. PACKAGING SPECIFICATIONS

Products marketed in steel PE drums:

• 205 Liter: Zinc bromide Solution

Nominal volume	205 Liter
Product	73-77% Zinc bromide
Color	Blue
Dimensions (cm)	59 x 88 dia.
Closure type	2"x 2" dia. bung
Tare wt. type 1 unit (kg)	24.5
Net wt. for 1 unit (kg)	400
No. of units per pallet	4
Tare wt. per pallet (kg)	120
Net wt. per pallet (kg)	1,600



PACKAGING UNIT ON PALLET PREPARATIONS - 4 DRUMS ON ONE PALLET:

The drums are tied circumferentially with plastic bands in addition to vertical strapping.

CONTAINERIZATION INSTRUCTIONS

The maximum number of pallets within a container varies depending on destination of the shipment and in view of the maximum permissible loads allowed in certain countries (USA for example). The maximum permissible weight of the container (M.G.W.) and the tare weight are checked prior to containerization.

2. PACKAGING SPECIFICATIONS

2.2 PRODUCT LABEL FOR ZINC BROMIDE SOLUTION

ZINC BROMIDE SOLUTION		UN no: 1760 Class: 8 Packing group: II Classification code: C9 Hazard code: 80
CAS NO: 7699-45-8 EINECS: 231-718-4		
Proper shipping name: Corrosive liquid, N.O.S. (contains zinc bromide)		
FOR INDUSTRIAL USE ONLY		
DANGER Causes skin burns. May cause allergic skin reaction. May be harmful if swallowed.	Zinc Bromide Solution (NI) Verzinkt bij opname door de mond. Kan allergische huidreacties veroorzaken. Kan schadelijk zijn bij inademing. Kan in het algemeen irriterend zijn op slijmvliezen. Zijn opname kan tot ernstige gezondheidsproblemen leiden. Draag geschikte beschermende kleding, handschoenen en een beschermingsmasker. Bij inademen moet de ogen onmiddellijk met voldoende water afspoelen en de volgende medische aandacht inroepen. Bij contact met de huid moet de huid onmiddellijk met voldoende water afspoelen (zodra het mogelijk is) en de medische aandacht inroepen. Voorkom het vrijkomen in het milieu. Waag een speciale instructieweegwijzer.	
FIRST AID Eye contact Hold the eyelids apart, flush eyes promptly with copious flowing water for at least 20 minutes. Get medical attention immediately. Skin contact Flush skin with water directing a stream of water under the clothing while it is being removed. Wash skin thoroughly with mild soap and plenty of water for at least 15 minutes. Get medical attention before reuse. Get medical attention immediately. Inhalation In case of mild irritation or breathing fumes released in the workplace, remove person to fresh air. Keep him quiet and warm. Apply artificial respiration if necessary and get medical attention immediately. Ingestion If swallowed, wash mouth thoroughly with plenty of water and give water to drink. Get medical attention immediately. NOTE: Never give an unconscious person anything to drink. Notes to the physician Corrosive. In case of ingestion DO NOT induce vomiting and sympathetically and supportively. No specific antidote. Accidental release measures Absorb with sand or vermiculite and place in closed container for disposal. Wash spill area after material pick up is complete. Dispose of in accordance with local state & federal regulations.	Zinc Bromide Solution (EN) Kan tot huidirritatie of allergische reacties leiden. Kan tot ernstige gezondheidsproblemen leiden. Kan irriterend zijn op slijmvliezen. Kan in het algemeen irriterend zijn op slijmvliezen. Draag geschikte beschermende kleding, handschoenen en een beschermingsmasker. Bij inademen moet de ogen onmiddellijk met voldoende water afspoelen en de volgende medische aandacht inroepen. Bij contact met de huid moet de huid onmiddellijk met voldoende water afspoelen (zodra het mogelijk is) en de medische aandacht inroepen. Voorkom het vrijkomen in het milieu. Waag een speciale instructieweegwijzer.	
	Zinc Bromide Solution (FR) Irrite les yeux. Peut provoquer de graves problèmes de santé. Peut être irritant pour les muqueuses. Peut provoquer de graves problèmes de santé. Peut être irritant pour les muqueuses. Portez une tenue de protection appropriée, des gants et un appareil de protection des voies respiratoires. En cas de contact avec les yeux, rincez abondamment et consultez immédiatement un médecin (si possible, la notice de sécurité ou le MSDS). Evitez la contamination de l'environnement. Suivez les instructions spécialisées indiquées dans la notice de sécurité.	
	Zinc Bromide Solution (DE) Verursacht Verätzungen. Kann allergische Hautreaktionen verursachen. Kann bei Verschlucken zu schweren Gesundheitsschäden führen. Sensibilisierung ist auch Hautkontakt möglich. Bei der Arbeit geschützte Arbeitskleidung, Schutzhandschuhe und ein Atemschutzgerät tragen. Bei Einatmen mit dem Atemschutzgerät gründlich mit Wasser abspülen und Arzt konsultieren. Bei Hautkontakt sofort mit dem Wasser abspülen (sofern möglich, dieses fließend waschen). Vermeidung der Umweltverunreinigung. Besondere Anweisungen sind in der Sicherheitsdatenblatt-Footer zu finden.	
IN CASE OF EMERGENCY CONTACT:		For Australia & NZ For Australia & NZ Melsburn (03) 9516 7773
For Europe Emergency: +31 (0) 180 00 20 20 +31 (0) 180 00 20 20 (For emergency advice during road transport)	For the United States Chemical: 1-800-424-9300 (24 hours) Toll-free: 1-800-424-9300 (24 hours)	For Asia - Pacific: ALERT SGS Alert: 24 hours (24/7) 24-hour telephone number: 001 650 21 1970
053-904966, 9 - SAP no: 70282	CONSULT THE MATERIAL SAFETY DATA SHEET FOR FURTHER DETAILS. Website: www.id-ip.com	

3. LOGISTICS / SUPPLY CHAIN:

Zinc bromide solution is shipped to the USA in bulk shipments or standard 20 foot containers. to one of our storage depots located at strategic locations

3.1 PACKAGING AND TRANSPORTATION INFORMATION

UN No. 1760

US Department of Transportation (DOT)
Proper shipping name: Corrosive Liquid, n.o.s. (contains Zinc bromide)

Class: 8 - Corrosives

Label: CORROSIVE (8)

Marking: MARINE POLLUTANT

Packing Group: II

Emergency Response Guidebook 2012 - Guide number: 154

RQ - 454 kg (1000 lbs) of Zinc bromide

International Maritime Dangerous Goods Code (IMDGC)

IMO Proper shipping name: Corrosive Liquid, n.o.s. (contains Zinc bromide)

Class: 8 - Corrosives

Label: CORROSIVE (8)

Marking: MARINE POLLUTANT

Packing Group: II

The EMS (Emergency Schedule) in the IMDGC Supplement as follows:

Fire Schedule "F-A" Spillage Schedule "S-B"

ICAO/IATA Proper shipping name: Corrosive Liquid, n.o.s. (contains Zinc bromide)

Hazard Label (s): Corrosive

Class: 8

Packing group: II

Marking: Environmentally hazardous substance

Can be transported by air but quantities are limited to 1 liter on passenger aircraft and 30 liters on cargo aircraft

3. LOGISTICS / SUPPLY CHAIN:

3.2 DRIVER'S LOADING CHECKLIST

The following is a suggested checklist, based on European Agreement concerning the Carriage of Dangerous Goods by Road (ADR) regulations and good practice. The shipper should also ensure that all local regulations are complied with.

	Yes	No
1. Container to be marked clearly in front and rear with the UN No. (1760), Hazard Identification no. 80 and Hazard Placard no. 8, corrosive substances. Vehicles are to be marked on the sides and rear, containers on both sides and at each end.		
2. Vehicle is equipped with two suitable portable fire extinguishers or equivalent, of at least six and twelve kg capacity, checked within the past year. Do not use dry chemical powder extinguishers on Zinc bromide.		
3. The following equipment shall be carried on board the transport unit: <ul style="list-style-type: none"> • Wheel chocks • Two self-standing warning signs • Eye rinsing equipment 		
4. For each member of the crew: <ul style="list-style-type: none"> • Suitable warning vests • Potable lighting apparatus • A pair of protective gloves • Eye protection (Protective goggles) • Emergency escape mask • Emergency tools 		
5. Additional equipment: <ul style="list-style-type: none"> • A shovel • A drain seal • A collecting container 		

3. LOGISTICS / SUPPLY CHAIN:

DRIVER'S LOADING CHECKLIST (cont'd)

	Yes	No
6. Zinc bromide Transport Emergency Card (TREM CARD) may be required in certain countries.		
7. Hazardous transport unit does not consist of more than one trailer.		
8. The vehicle is not carrying any materials incompatible with Zinc bromide at the same time (Explosives, flammables, radio-active materials, organic peroxides and oxidizing substances, infectious substances, or strong bases and metals).		
9. Zinc bromide will be kept apart from food stuffs and animal feed.		
10. Shipping papers include <ul style="list-style-type: none"> • Shipping name: Zinc bromide • UN Identification Number: 1760 • Permit to transport Zinc bromide • Quantity being shipped • Name and address of the consignor and the consignee • Certificate of approval for the transport unit • The driver's training certificate 		
11. All papers concerning the transport of the hazardous material are kept in a holder on the inside of the door on the driver's side of the vehicle.		
12. Driver has approved route to destination with specified stops. No alternative routes will be used or unauthorized stops made.		
13. Vehicle has a full fuel tank before loading the Zinc bromide.		
14. Containers have been fastened with all the twist lock corner fittings.		

4. USER GUIDE

4.1 SAFE HANDLING GUIDE

THE HAZARDS

Like all chemicals, Zinc bromide can be hazardous to your health if not handled properly.

EFFECTS OF EXPOSURE AND FIRST AID

- **Skin contact** - Zinc bromide solution is corrosive to the skin. May cause skin sensitization. Wash skin with water directing a stream of water under the clothing while it is being removed. Wash skin thoroughly with mild soap and plenty of water for at least 15 minutes. Wash clothing before reuse. Get medical attention immediately.
- **Eye contact** - Zinc bromide solution is corrosive and severely irritating to the eyes. Hold the eyelids apart, flush eyes promptly with copious amounts of flowing water, for at least 20 minutes. Get medical attention immediately.
- **Inhalation** - Inhalation of Zinc bromide mist or spray can be irritating to the mucous membranes of the nose, mouth and throat. In case of mist inhalation of breathing fumes released from heated material, remove person to fresh air, and keep quiet and warm. Apply artificial respiration if necessary and get medical attention immediately.
- **Ingestion** - Swallowing Zinc bromide solution May cause severe burns to the mucous membranes of the mouth, esophagus and stomach. Abdominal pain, nausea and vomiting. May cause drowsiness, muscular incoordination and respiratory depression. If swallowed, wash mouth thoroughly with plenty of water. Get medical attention immediately.

PROTECTING YOURSELF

Read and follow the instructions in the MSDS (Material Safety Data Sheet) and always have it available on location.

Use the correct Personal Protective Equipment (PPE)

The following equipment is necessary for handling Zinc bromide:

- **Eyes** - Wear chemical splash goggles designed to seal against the skin around both eyes and give protection against splashes from any angle. A full face shield may be used in addition to goggles to protect the face.
- **Body** - Wear slicker suits in areas where exposure is likely.
- **Hands** - Wear leak-proof gloves made of natural or synthetic-rubber material. Glove cuffs should be worn inside of slicker suit sleeves to prevent brine from running off sleeves into gloves. Do not use leather gloves.
- **Feet** - Wear leak-proof rubber steel-toe boots. Do not use leather boots.

Respiratory - Use a NIOSH-approved P95 half-mask disposable or reusable particulate mask for mist/aerosol. All respiratory protection equipment should be used within a comprehensive respiratory protection program that meets the requirements of 29 CFR 1910.134 (OSHA Respiratory Protection Standard), or local equivalent.

Practice good skin care

Protection - Before contact with brines apply a barrier cream to areas that are not easily covered by some other form of PPE. Use a barrier cream specifically designed to protect against water-based hazards. Barrier creams should be used in addition to the PPE mentioned above, not as a substitute for it.

4. USER GUIDE

Cleaning - Wash frequently; use hand soap, not harsh industrial cleaners.

Reconditioning - Contact with Zinc bromide and frequent washing of the skin can result in loss of the skin's natural oils and moisture. To prevent dry, chafed, and irritated skin, apply a reconditioning skin lotion after work and as needed.

Safety equipment

Emergency eye washes and showers should be installed and made easily accessible in all areas where Zinc bromide is used. Eye washes and showers should be plainly marked with signs and workers should be trained in their location and proper use.

4.2 GENERAL SITE RECOMMENDATIONS

This guide provides some standard precautions to be taken at an installation. The storage areas can be supplier distribution warehouses, third party distribution houses or user storage areas.

STORAGE FACILITIES

The following is a general guide for choosing and supervising a storage area, especially for storage of quantities of 10 tons or more. Note that all local laws and regulations and codes must be strictly followed; the precautions listed below are in **addition to those specified in local codes**

If required by local regulations, low curbs or walls, called dikes, about 200 mm high, should enclose the worksite, to protect the area from external flooding and to minimize the dispersal of Zinc bromide. The minimum diked volume should be equivalent to the largest storage tank plus 10%.

The diked area can have a sewer connection if it is provided with a quick closing device, to prevent the entry of Zinc bromide into the sewer system in case of emergency.

Provide an adequate size sump in the diked area for collecting Zinc bromide spills and pumping away collected contaminated rain water or fire fighting water.

Drums containing Zinc bromide should be stored at least 1.2 meters (4 feet) from a wall or ceiling. Minimize areas where Zinc bromide liquid can accumulate, such as pits or confined spaces.

SAFETY AND SECURITY MEASURES

Any area where Zinc bromide is used or stored should be enclosed so that unauthorized persons and animals are prevented from entering the area. Adequate lighting should be provided to allow sufficient night surveillance.

Provide an adequate supply of clean water for washing and showers.

Provide telephone for reporting accidents, made freely available and accessibly located to permit emergency notifications.

Emergency equipment cabinets should be installed close to the storage area.

Non freeze safety showers and eyewash fountains should be provided, clearly marked and with unobstructed access. They should be located close to the Zinc bromide storage area.

Provide an alternate supply of clean water.

HANDLING

All management and operating personnel involved in the use or handling of Zinc bromide, should undergo safety training in addition to the specific task training.

Only experienced well-trained operators should be allowed to receive and unload Zinc bromide receptacles.

Any handling of Zinc bromide should be carried out with a high standard of housekeeping and personal hygiene.

Goggles, rubber gauntlets, boots and full body covering clothing should be worn while unloading and handling drums containing Zinc bromide.

When the Zinc bromide drums are not in use, the closures should be in place to prevent any accidental spillage. They should be kept dry and tightly closed.

5. EMERGENCY RESPONSE

4.3 HANDLING ZINC BROMIDE PACKAGES

Drums

- Empty drums completely.
- Ensure that drums are kept dry and tightly closed.
- It is recommended to store empty drums in a cool place.
- Before disposing of empty drums, wash them with 10% bicarbonate solution and rinse with water.

4.4 MATERIALS OF CONSTRUCTION GUIDE

STORAGE TANKS

Storage tanks for Zinc bromide should be constructed from AISI 316 Stainless Steel or Carbon Steel protected by an epoxy lining. It is also possible to use FRP (Fibreglass Reinforced Plastic) tanks.

PIPEWORK

Stainless steel or plastic polypropylene piping can be used.

Stainless steel

Piping between 1/2" and 6" should be schedule 10 S, stainless steel seamed, to ASTM A-312-TP-316L. Piping fittings of 1 1/2" and above should be butt welded or flanged forged carbon steel ASTM 150 pound, with stainless steel stub end. Under 1" through 1/2", fittings should be socket welded, 3000 pound rating.

Flange gaskets should be 3 mm thick PTFE sandwich with non-asbestos filler. Ball, plug or diaphragm valves can be used. Hoses should be flexible metal with all wetted parts in 316 L stainless steel, annular corrugated.

Polypropylene

Piping between 20 mm (1/2") and 110 mm (4") diameter should be solid black polypropylene pipe, stress relieved, with plain ends for fusion socket welding connection PN-10, as per DIN 8077. Piping between 160 mm (6") and 315 mm (12") diameters should be according to PN 6, for butt welding connection.

Flanges should have a backing ring fabricated from carbon steel, drilled to ANSI 150 pounds rating, painted with epoxy 240 μ. Flange gaskets should be a PTFE sandwich, 3 mm thick with non-asbestos filler. Teflon lined flanged plug or diaphragm valves are preferred. Hoses should be PTFE with stainless steel braid covering and carbon steel flanges. Screwed fittings are not used

PUMPS

Pumps are usually constructed of 316 stainless steel contact parts

5.1 FACILITY EMERGENCY ACTION PLANNING

USA and CANADA

- OSHA (29 CFR 1910.119n and 29 CFR 1910.120q)
- Emergency Action plans must be established and submitted to state and local authorities for any facility where Threshold Quantities (TQ) of hazardous substances are handled.
- Zinc bromide is Reported in the EPA TSCA Inventory
- SARA 313 This substance is subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR372.
- SARA (312,311) Under the provisions of Section 311 of the Clean Water Act, this substance is designated a hazardous substance if discharged in navigable waters. The reportable Quantity (RQ) for notification is 1,000 lb/454 kg

Massachusetts right-to-know list - Listed

Pennsylvania right to know list - Listed

Waste Classifications CERCLA - Reportable Quantity: 1,000 lbs

Canada - Listed in DSL

EUROPE

- EU Reported in EINECS
- EC No. 231-718-4

5. EMERGENCY RESPONSE

5.2 TRANSPORT EMERGENCY RESPONSE

The driver of a vehicle involved in an accident while transporting a hazardous material should immediately leave the vehicle, taking with him the shipping papers, and take reasonable measures to extinguish any small fires. The driver should call for help, and furnish the following information about the hazardous material involved:

- UN number: 1760 (Zinc bromide).
- Hazard Class Placard.
- Hazardous response markings (e.g. EAC Code, NFPA diamond numbers).
- Quantity of hazardous material involved.
- Emergency contact phone number.

The first responder is generally the local fire department, which should act to:

- Protect persons, property and environment.
- Contain the release from a safe distance.
- Do not get involved in stopping the release.
- Ensure that a qualified responder has been called.

The Hazardous Material Specialist is called by the shipper, the first responder or the qualified responder when additional information or procedures are required.

Emergency Response Telephone Number should be clearly identified as "EMERGENCY CONTACT" on labels and shipping papers.

- **USA** : CHEMTREC 1-800-424-9300
National Response Center 1-800-424-8802
- **UK** : National Chemical Emergency Center
"CHARECHEM 24" 44-1270-502891
- **Material Suppliers** : ICL-IP Terneuzen, Holland : 31-115-689-000
Clearon, USA 1-304-746-3000
ICL-IP, Beer-Sheva, Israel 972-8-623-0393

5.3 Actions in the event of an accident or emergency

1. Apply the braking system, stop the engine and isolate the battery.
2. Avoid sources of ignition, in particular, do not smoke or switch on any electrical equipment.
3. Inform the emergency services and give as much information about the incident or accident.
4. Put on the warning vest and place the self-standing warning signs.
5. Keep the transport documents readily available for responders on arrival.
6. Do not walk into or touch spilled substances.
7. Avoid inhalation of fumes or dust by staying upwind.
8. Where appropriate and safe to do so, use the fire extinguishers to put out small fires in the tires, brakes and engine compartments.
9. Where appropriate and safe to do so, use on-board equipment to prevent leakages into the aquatic environment or the sewage system.
10. Move away from the vicinity of the accident or emergency, advise other persons to move away and follow the advice of the emergency services.
11. Remove any contaminated clothing and contaminated equipment for disposal.

5. EMERGENCY RESPONSE

5.4 OPERATOR / DRIVER SAFETY TRAINING

The installation management should be aware of the potential dangers of Zinc bromide. Management personnel should undergo training in Zinc bromide specific safety inspections and safety auditing. Workers involved with Zinc bromide must have special safety training regarding the precautions to observe in accordance with local regulations. This applies to personnel of operations where Zinc bromide is used, stored, filled or unloaded. The safety training for handling Zinc bromide has to include both theoretical classroom courses and practical hands-on and observation exercises, appropriate to the level of likely exposure of the individual worker to Zinc bromide. Records should be kept of each person's participation in initial training and refresher courses.

Subjects to be covered:

- The main types of hazards
- Packaging details
- Labelling and marking to indicate hazards
- Precautions during loading and unloading
- Environmental protection
- First-aid
- Fire-fighting
- Selection and use of personal protection equipment
- Respiratory protection
- Emergency procedures

Refresher training courses should be taken regularly, at least every year, and should include new technical and substance-related developments.

Quality Specification

CAS:	7699-45-8 100%;	
Chemical:	0053	Zinc bromide
Grade:	041	BATTERY GRADE
Source:	4500	B.C.T. ICL-IP
Commercial Name:	Zinc bromide solution	
Business Unit:	Br Industrial	

Specification

Specification	Value
Specific gravity 20°C	2.3 - 2.5
Zinc bromide (ZnBr₂)%	73.0 - 77.0
pH of a 1:10 aqueous solution	5.0 - 6.0
Heavy metals as Pb ppm	10.0 max
Cadmium ppm	5 max
Appearance	Clear

Packing

Code	Name	Unit	BU	Remarks
0056	STEEL PE DRUM 400 KG	KG	Br Industrial	

ICL - INDUSTRIAL PRODUCTS

HEAD OFFICE

ICL-IP Ltd.
Makleff House, 12 Kroitzer St., P.O.B. 180
Beer Sheva 84101, Israel
Tel: +972 8 629 7356 Fax: +972 8 629 7807
E-mail: merinfo@icl-ip.com

EUROPE

ICL-IP Europe B.V.
Fosfaatweg 48, 1013 BM Amsterdam
The Netherlands, or P.O. Box 465
1000 AL Amsterdam, The Netherlands
Tel: +31 20 800 5800 Fax: +31 20 800 5805

NORTH AMERICA AND MEXICO

ICL-IP America Inc.
622 Emerson Road, Suite 500
St. Louis, Missouri 63141, USA
Tel: +1 877 661 4272 Fax: +1 314 983 7610

Synergy Fluids
16800 Imperial Valley Drive, Suite 310, Houston, Texas
77060, USA
Tel: + 1 281 445 0676 Fax: + 1 281 445 2284
E-mail: btaff@synergyfluids.com

SOUTH AMERICA

ICL Brasil Ltda.
Av. Major Sylvio de Magalhaes Padilha, 5200
Ed. Dallas Cj.22, 05693-000 Sao Paulo SP, Brazil
Tel: +55 11 2155 4539 Fax: +55 11 2155 4507

ASIA PACIFIC

CHINA

ICL CHINA
Room 908 Times Square Office Tower
No 93 Middle Huai Hai Road
Shanghai 200021, China

Tel: +86 21 5386 3322 Fax: +86 21 5386 3336

JAPAN

ICL-IP Japan Ltd.
Izumi Shinkawa Building, 7th floor, 5-18, 1-chome
Shinkawa, Chuo-ku, Tokyo 104-0033, Japan

Tel: +81 3 3552 1611 Fax: +81 3 3552 1616

OTHER ASIA PACIFIC

ICL Asia Ltd.
Room 2301, 23/F, Allied Kajima Building,
138 Gloucester Road, Wanchai, Hong Kong

Tel: +852 2827 7761 Fax: +852 2824 1502

OTHER PARTS OF THE WORLD

ICL-IP Israel Sales Office
Makleff House, 12 Kroitzer St., P.O.B. 180
Beer Sheva 84101, Israel

Tel: +972 8 629 7356 Fax: +972 8 629 7878

VISIT OUR WEBSITE: WWW.ICL-IP.COM

GLOBAL PRESENCE

