1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	**Thallium**
Chemical Formula	Tl
Molecular Weight	204.38 g/mol
CAS No.	7440-28-0
EC No.	231-138-1
Synonyms	Thallium metal
Supplier Address*	ISOFLEX USA PO Box 472615 San Francisco CA 94147 United States
Telephone	+1 415-440-4433
Fax	+1 415-563-4433
Emergency Phone Number (both supplier and manufacturer)	Infotrac/ +1 800-535-5053 *May include subsidiaries or affiliate companies/divisions
Email	iusa@isoflex.com
Website	www.isoflex.com
Preparation Information	ISOFLEX USA Product Safety +1 415-440-4433

2. HAZARDS IDENTIFICATION

GHS Classification in Accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 2), H300
Acute toxicity, Inhalation (Category 2), H330
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this section, see section 16.

GHS Label Elements, Including Precautionary Statements

Pictogram

Signal Word Danger

Hazard Statement(s)

H300 + H330	Fatal if swallowed or if inhaled
H412	Harmful to aquatic life, with long-lasting effects

Precautionary Statement(s)

P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P284	Wear respiratory protection.
P301 + 310 + 330	If swallowed: Immediately call a poison center or physician. Rinse mouth.
P304 + 340 + 310	If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a poison center or physician.
P403 + 233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/container to an approved waste disposal plant.

Hazards not otherwise classified (HNOC) or not covered by GHS: None

NFPA Ratings: (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health Hazard = 4 **Flammability = 0** **Reactivity = 0**

HMIS Ratings: (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)

Health Hazard = 4 **Flammability = 0** **Physical Hazard = 0**

HEALTH HAZARD	4
FLAMMABILITY	0
PHYSICAL HAZARD	0

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name: Thallium

Chemical Formula: Tl

Molecular Weight: 204.38 g/mol

CAS No.: 7440-28-0

EC No.: 231-138-1

Component	Classification	Concentration
Thallium		
	Acute Toxicity 2 Chronic Aquatic Toxicity 3 H300 + H330, H412	≤100%

For the full text of the H-Statements mentioned in this section, see section 16.

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4. FIRST AID MEASURES

Oral Exposure If swallowed, wash out mouth with water, provided person is conscious. Call a physician immediately. Never give anything by mouth to an unconscious person.

Inhalation Exposure If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult a physician.

Eye Exposure Flush eyes with water as a precaution.

Dermal Exposure Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

Information for Physician For thallium antidote, see *Eur. J. Pharmacol.,* 6, 340 (1969).

Most Important Symptoms The most important known symptoms and effects are described in sections 2 and/or 11.

5. FIREFIGHTING MEASURES

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special Hazards Arising from the Substance Thallium oxides

Firefighting

Protective Equipment Wear self-contained breathing apparatus if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Wear respiratory protection. Avoid dust formation. Avoid breathing dust, vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental Precautions Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods for Containment Pick up and arrange disposal without creating dust. Keep in suitable closed containers for disposal.

Disposal See section 13.

7. HANDLING AND STORAGE

Handling Avoid contact with skin and eyes. Avoid formation of dust or aerosols. Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs. Provide appropriate exhaust ventilation at places where dust is formed. For additional precautions, see section 2.

Storage Keep tightly closed. Store in a cool, dry and well-ventilated place. Storage class: (TRGS 510) - Non-combustible, acute toxic Category 1 and 2 (very toxic hazardous materials).

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control Parameters

Components with Workplace Control Parameters

Component	CAS No.	Value	Control Parameters	Basis
Thallium	7440-28-0	TWA	0.100000 mg/m^3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Alopecia Adopted values or notations enclosed are those for which changes are proposed in the NIC 2010 Revision or addition to the notice of intended changes (see Notice of Intended Changes – NIC) Danger of cutaneous absorption		
		TWA	0.020000 mg/m^3	USA. ACGIH Threshold Limit Values (TLV)
		Peripheral neuropathy Gastrointestinal damage 2014 Adoption Danger of cutaneous absorption		
		TWA	0.020000 mg/m^3	USA. ACGIH Threshold Limit Values (TLV)
		Peripheral neuropathy Gastrointestinal damage Danger of cutaneous absorption varies		

Exposure Controls

Appropriate Engineering Controls

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal Protective Equipment

Eye/Face Protection

Face shield and safety glasses. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin Protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Complete suit protecting against chemicals. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory Protection
Where risk assessment shows air-purifying respirators are appropriate, use a full-face particle respirator type N100 (US) or type P3 (EN 143) as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of Environmental Exposure
Prevent further leakage or spillage, if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical State	Solid
Form	Powder or ingot
Color	Silver/gray
Odor	No data available

Safety Data

Odor Threshold:	N/A	Molecular Weight:	204.38 g/mol
pH:	N/A	Boiling Point:	1457 °C (2655 °F)
Vapor Pressure:	N/A	Melting/Freezing Point:	303 °C (577 °F)
Vapor Density:	N/A	Saturated Vapor Concentration:	N/A
SG/Density:	N/A	Bulk Density:	N/A
Volatile%:	N/A	Solubility:	N/A
VOC Content:	N/A	Water Content:	N/A
Solvent Content:	N/A	Evaporation Rate:	N/A
Viscosity:	N/A	Surface Tension:	N/A
Partition Coefficient:	N/A	Decomposition Temperature:	N/A
Flash Point:	N/A	Explosion Limits:	N/A
Flammability:	N/A	Autoignition Temperature:	N/A
Refractive Index:	N/A	Optical Rotation:	N/A

N/A = not available

10. STABILITY AND REACTIVITY

Reactivity	No data available
Chemical Stability	Stable under recommended storage conditions
Possibility of Hazardous Reactions	No data available
Conditions to Avoid	Air-sensitive
Incompatible Materials	Strong acids, strong oxidizing agents
Hazardous Decomposition Products	Other decomposition products: No data available. In the event of fire: See section 5.

11. TOXICOLOGICAL INFORMATION

Information on Toxicological Effects

Acute Toxicity	No data available
Dermal Toxicity	No data available
Skin Corrosion/Irritation	No data available
Serious Eye Damage/Irritation	No data available
Respiratory or Skin Sensitization	No data available

Carcinogenicity

IARC	No component of this product present at levels greater than or equal to 0.1% is identified as a probable, possible or confirmed human carcinogen by IARC.
ACGIH	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
Reproductive Toxicity	Possible risk of congenital malformation in the fetus
Specific Target Organ Toxicity / Single Exposure	No data available
Specific Target Organ Toxicity / Repeated Exposure	No data available
Aspiration Hazard	No data available

Additional Information

RTECS: XG3425000

The most characteristic symptom of thallium exposure is *alopecia* (loss of hair). Cutaneous effects may include dry, scaly skin and impairment of nail growth, often resulting in the appearance of crescent-shaped strips across fingernails and toenails (“Mees’ line”). Other symptoms in acute poisoning relate chiefly to the gastrointestinal tract, nervous system, skin, eyes and cardiovascular system. Acute poisoning results in swelling of the feet and legs, arthralgia, vomiting, insomnia, hyperesthesia and paresthesia of the hands and feet, mental confusion, polyneuritis with severe pain in the legs and loins, partial paralysis of the legs, angina-like pains, nephritis, wasting and weakness, lymphocytosis and eosinophilia. In chronic poisoning, central and peripheral nervous system abnormalities may persist: ataxia, tremor, incoordination, paralysis of extremities, endocrine disorders, memory loss and psychoses may develop. To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.

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12. ECOLOGICAL INFORMATION

Toxicity to fish	LC50 – *Cyprinodon variegatus* (sheepshead minnow) – 21.0 mg/l – 96 h Mortality NOEC - *Cyprinodon variegatus* (sheepshead minnow) – 14.0 mg/l – 96 h
Persistence and Degradability	No data available
Bioaccumulative Potential	No data available

Mobility in Soil	No data available
Results of PBT/ vPvB Assessment	PBT/vPvB assessment not available; chemical safety assessment and not required/not conducted
Other Adverse Effects	An environmental hazard cannot be excluded in the event of unprofessional handling or disposal. Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS

Product	Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.
Contaminated Packaging	Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

Proper Shipping Name	Toxic solid, inorganic, n.o.s. (Thallium)
UN No.	3288
Class	6.1
Packing Group	II
Reportable Quantity (RQ)	1000 lbs
Poison Inhalation Hazard	No

IATA

Proper Shipping Name	Toxic solid, inorganic, n.o.s. (Thallium)
UN No.	3288
Class	6.1
Packing Group	II

IMDG

Proper Shipping Name	TOXIC SOLID, INORGANIC, N.O.S. (Thallium)
UN No.	3288
Class	6.1
Packing Group	II
EMS No.	F-A, S-A

15. REGULATORY INFORMATION

SARA 302 Components	No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 311/312 Hazards	Acute Health Hazard, Chronic Health Hazard
SARA 313 Components	The following components are subject to reporting levels established by SARA Title III, Section 313: Thallium (CAS No. 7440-28-0, Revision Date 2007-07-01).
Massachusetts Right to Know Components	Thallium / *CAS No.* 7440-28-0 / *Revision Date* 2007-07-01
Pennsylvania Right to Know Components	Thallium / *CAS No.* 7440-28-0 / *Revision Date* 2007-07-01
New Jersey Right to Know Components	Thallium / *CAS No.* 7440-28-0 / *Revision Date* 2007-07-01
California Prop. 65	This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full Text of H-Statements Referred to under Sections 2 and 3

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H300	Fatal if swallowed
H300 + H330	Fatal if swallowed or if inhaled
H412	Harmful to aquatic life, with long-lasting effects

Prepared By	ISOFLEX USA PO Box 472615 San Francisco CA 94147 United States
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Revision Number	3
Revision Note	Update supplier address

ISOFLEX USA's Commonly Used Abbreviations and Acronyms*

ACGIH	American Conference of Governmental Industrial Hygienists
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
AICS	Australian Inventory of Chemical Substances
ALARA	As Low As Is Reasonably Achievable
AMU	Atomic Mass Unit
ANSI	American National Standards Institute
BLS	Basic Life Support
BOD5	Biochemical Oxygen Demand
CAM	Continuous Air Monitor
CAS	Chemical Abstracts Service (division of the American Chemical Society)
CEN	European Committee for Standardization
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLP	Classification, Labelling and Packaging (European Union)
COD	Chemical Oxygen Demand
CPR	Controlled Products Regulations (Canada)
CWA	Clean Water Act (USA)
DAC	Derived Air Concentration (USA)
DOE	United States Department of Energy (USA)
DOT	United States Department of Transportation (USA)
DSL	Domestic Substances List (Canada)
EC50	Half Maximal Effective Concentration
ECL	Korean Existing Chemicals List
EINECS	European Inventory of Existing Commercial Chemical Substances
EHS	Environmentally Hazardous Substance
ELINCS	European List of Notified Chemical Substances
EMS	Emergency Response Procedures for Ships Carrying Dangerous Goods
EPA	Environmental Protection Agency (USA)
EPCRA	Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986
GHS	Globally Harmonized System
HMIS	Hazardous Materials Identification System (USA)
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IBC	Intermediate Bulk Containers
ICAO	International Civil Aviation Organization
IDLH	Immediately Dangerous to Life or Health

IECSC	Inventory of Existing Chemical Substances Produced or Imported in China
IMDG	International Maritime Code for Dangerous Goods
LC50	Lethal concentration, 50 percent
LD50	Lethal dose, 50 percent
LDLO	Lethal Dose Low
LOEC	Lowest-Observed-Effective Concentration
MARPOL	International Convention for the Prevention of Pollution from Ships
MSHA	Mine Safety and Health Administration (USA)
NCRP	National Council on Radiation Protection & Measurements (USA)
NDSL	Non-Domestic Substances List (Canada)
NFPA	National Fire Protection Association (USA)
NIOSH	National Institute for Occupational Safety and Health (USA)
NOEC	No Observed Effect Concentration
N.O.S.	Not Otherwise Specified
NRC	Nuclear Regulatory Commission (USA)
NTP	National Toxicology Program (USA)
OSHA	Occupational Safety and Health Administration (USA)
PBT	Persistent Bioaccumulative and Toxic Chemical
PEL	Permissible Exposure Limit
PICCS	Philippines Inventory of Chemicals and Chemical Substances
PIH	Poisonous by Inhalation Hazard
RCRA	Resource Conservation and Recovery Act (USA)
RCT	Radiation Control Technician
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (Europe)
RID	Regulations Concerning the International Transport of Dangerous Goods by Rail
RQ	Reportable Quantity
RTECS	Registry of Toxic Effects of Chemical Substances
SARA	Superfund Amendments and Reauthorization Act (USA)
SNUR	Significant New Use Rule (TSCA)
TDG	Transportation of Dangerous Goods (Canada)
TIH	Toxic by Inhalation Hazard
TLV	Threshold Limit Value
TPQ	Threshold Planning Quantity
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
UN	United Nations (Number)
VOC	Volatile Organic Compound
vPvB	Very Persistent Very Bioaccumulative Chemical
WGK	Wassergefährdungsklassen (Germany: Water Hazard Classes)
WHMIS	Workplace Hazardous Materials Information System

*One or more of the above-listed items may not appear in this document.

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