



Product Name: **Mercury and/or
Thallium Amalgam In Cannon-
Supplied Thermometers including Thermal Regulators**

Revision Date: *March 6, 2008*

Page 1 of 10
MSDS ref CII08-006

MATERIAL SAFETY DATA SHEET

SECTION 1	PRODUCT AND COMPANY IDENTIFICATION
------------------	---

PRODUCT

Product name: **Mercury and/ or thallium amalgam in Cannon-supplied thermometers including Thermal Regulators**

Alternate description/ brand: Thermometers manufactured by Ertco/ Ever Ready Thermometer Company or Miller & Weber, Inc. and supplied with Cannon instruments

Product description: Mercury and mercury/ thallium amalgam temperature indicating fluids

Synonyms for Mercury: Hg, quicksilver, hydragyrum, liquid silver

Note: *Thermometers with range extending below -36 °C contain thallium (8.6%)*

Product code for mercury: J.T. Baker: 2564, 2567, 2569
Mallinckrodt: 1278, 1280, 1288

Intended use: Thermometers supplied with instruments manufactured by Cannon

COMPANY IDENTIFICATION

Supplier: **Cannon Instrument Company**
2139 High Tech Road
State College, Pennsylvania 16803

Product Technical Information: (814) 353-8000

Product MSDS Information: (814) 353-8000

EMERGENCY TELEPHONE NUMBER:

24-Hour Transportation Emergency: (800) 255-3924 Domestic CHEM-TEL Inc.

24-Hour Health Emergency: +1 (813) 248-0585 Overseas CHEM-TEL Inc. (please call collect)

SECTION 2	COMPOSITION/INFORMATION ON INGREDIENTS
------------------	---

OSHA Hazardous Substance(s) or Complex Substance(s)

Ingredient	CAS No	Percent	Hazardous
Mercury	7439-97-6	91.4 - 100%	Yes
Thallium	7440-28-0	0 - 8.6%	Yes

SECTION 3	HAZARD IDENTIFICATION
------------------	------------------------------

The following is based on information as provided by suppliers

EMERGENCY OVERVIEW:

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. The information and recommendations contained herein is compiled from suppliers' MSDS and are accurate and reliable to the best of Cannon Instrument Company's knowledge and belief as of the indicated revision date. No representation, warranty or guarantee, however, is made with regards to accuracy, reliability or completeness. Conditions of use of the material are under the control of the user; therefore, it is the user's responsibility to determine the suitability and completeness of such information for any specific conditions/ use.



Product Name: **Mercury and/or
Thallium Amalgam In Cannon-
Supplied Thermometers including Thermal Regulators**

Revision Date: *March 6, 2008*

Page 2 of 10
MSDS ref CII08-006

DANGER! Corrosive. Causes burns to skin, eyes, and respiratory tract. May be fatal if swallowed or inhaled. Harmful if absorbed through skin. Affects the kidneys and central nervous system. May cause allergic skin reaction.

EFFECTS OF OVEREXPOSURE:

Acute effects

- Eye:** Causes irritation and burns to eyes. Symptoms include redness, pain, and blurred vision; may cause serious and permanent eye damage.
- Skin:** Causes irritation and burns to skin. Symptoms include redness and pain. May cause skin allergy and sensitization. Can be absorbed through the skin with symptoms to parallel ingestion.
- Inhalation:** Mercury vapor is highly toxic via this route. Causes severe respiratory tract damage. Symptoms include sore throat, coughing, pain, tightness in chest, breathing difficulties, shortness of breath, headache, muscle weakness, anorexia, gastrointestinal disturbance, ringing in the ear, liver changes, fever, bronchitis and pneumonitis. Can be absorbed through inhalation with symptoms similar to ingestion.
- Oral:** May cause burning of the mouth and pharynx, abdominal pain, vomiting, corrosive ulceration, bloody diarrhea. May be followed by a rapid and weak pulse, shallow breathing, paleness, exhaustion, tremors and collapse. Delayed death may occur from renal failure. Gastrointestinal uptake of mercury is less than 5% but its ability to penetrate tissues presents some hazard. Initial symptoms may be thirst, possible abdominal discomfort.

Prolonged/ repeated exposure effects

Chronic exposure through any route can produce central nervous system damage. May cause muscle tremors, personality and behavior changes, memory loss, metallic taste, loosening of the teeth, digestive disorders, skin rashes, brain damage and kidney damage. Can cause skin allergies and accumulate in the body. Repeated skin contact can cause the skin to turn gray in color. A suspected reproductive hazard; may damage the developing fetus and decrease fertility in males and females.

Signs and symptoms of overexposure:

As indicated above

Medical conditions aggravated by exposure

Persons with nervous disorders, or impaired kidney or respiratory function, or a history of allergies or a known sensitization to mercury may be more susceptible to the effects of the substance.



Product Name: **Mercury and/or
Thallium Amalgam In Cannon-
Supplied Thermometers including Thermal Regulators**

Revision Date: *March 6, 2008*

Page 3 of 10
MSDS ref CII08-006

NFPA HAZARD ID: Health: 3 Flammability: 0 Reactivity: 0
(National Fire Protection Association)

NOTE: J.T. Baker SAF-T-DATA^(tm) Ratings include a **Contact Rating: 3 - Severe (Life)**

SECTION 4 FIRST AID MEASURES

INHALATION Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

SKIN CONTACT Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.

EYE CONTACT Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately

INGESTION Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

SECTION 5 FIRE-FIGHTING MEASURES

FIRE:

Not considered to be a fire hazard.

EXPLOSION:

Not considered to be an explosion hazard.

FIRE EXTINGUISHING MEDIA:

Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.

SPECIAL INFORMATION/ HAZARDOUS COMBUSTION PRODUCTS:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Undergoes hazardous reactions in the presence of heat and sparks or ignition. Smoke may contain toxic mercury or mercuric oxide. Smoke may contain toxic mercury or mercuric oxide.

FLAMMABILITY PROPERTIES

Not applicable

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES: Report spills/releases to appropriate authorities as required.

SPILL CONTAINMENT/ CLEANUP

Ventilate area of leak or spill. Clean-up personnel require protective clothing and respiratory protection from vapor.



Product Name: **Mercury and/or
Thallium Amalgam In Cannon-
Supplied Thermometers including Thermal Regulators**

Revision Date: *March 6, 2008*

Page 4 of 10
MSDS ref CII08-006

Spills: Pick up and place in a suitable container for reclamation or disposal in a method that does not generate misting. Sprinkle area with sulfur or calcium polysulfide to suppress mercury. Do not flush to sewer. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker CINNASORB[®] and RESISORB[®] are recommended for spills of this product.

SECTION 7 HANDLING AND STORAGE

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Do not use or store on porous work surfaces (wood, unsealed concrete, etc.). Follow strict hygiene practices. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Airborne Exposure Limits:

- OSHA Permissible Exposure Limit (PEL):
Mercury and mercury compounds: 0.1 mg/m³ (TWA), skin
Thallium: 0.1 mg/m³ (TWA)
- ACGIH Threshold Limit Value (TLV):
Inorganic and metallic mercury, as Hg: 0.025 mg/m³ (TWA) skin
(A4 Not classifiable as a human carcinogen)
Thallium: 0.1 mg/m³ (TWA) skin
- NIOSH Recommended Exposure Limit (REL):
Inorganic and metallic mercury, as Hg: 0.025 mg/m³ (TWA) skin
(A4 Not classifiable as a human carcinogen)
Thallium: 0.1 mg/m³ (TWA) skin

Biological Exposure Indices (ACGIH):

- Total inorganic mercury in urine (preshift): 35 ug/g creatinine;
- Total inorganic mercury in blood (end of shift): 15 ug/l.

ENGINEERING CONTROLS

Mercury as contained in a closed apparatus/ system such as a thermometer does not present a health risk. However, if apparatus is broken and mercury spilled, or if mercury is otherwise used in the open for other purposes, ventilation as described below should be used

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please



Product Name: **Mercury and/or
Thallium Amalgam In Cannon-
Supplied Thermometers including Thermal Regulators**

Revision Date: *March 6, 2008*

Page 5 of 10
MSDS ref CII08-006

refer to the ACGIH document, Industrial Ventilation, A Manual of Recommended Practices, most recent edition, for details.

PERSONAL PROTECTION

Respiratory Protection:

If the exposure limit is exceeded and engineering controls are not feasible, a half-face respirator with a mercury vapor or chlorine gas cartridge may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with a mercury vapor or chlorine gas cartridge may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Hand/ skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Cannon Instrument Company as indicated in Section 1 for additional data.

GENERAL INFORMATION

Physical state:	Heavy, mobile, liquid metal
Form:	Liquid
Color:	Silver-white
Odor:	Odorless
Odor threshold:	Not applicable

IMPORTANT HEALTH, SAFETY AND ENVIRONMENTAL INFORMATION

Specific Gravity @ 25°C:	13.55
Bulk density g/cc:	not determined
Density, kg/m³ (lbs./gal.):	not determined
Flash point °C (°F) [method]:	Not applicable
Flammable limits (approx. Volume % in air) -	Not applicable
Ignition temperature (polymers) °C (°F):	not applicable
Autoignition temperature °C (°F):	Not applicable
Boiling point/range °C (°F):	356.7 °C (675 °F)

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. The information and recommendations contained herein is compiled from suppliers' MSDS and are accurate and reliable to the best of Cannon Instrument Company's knowledge and belief as of the indicated revision date. No representation, warranty or guarantee, however, is made with regards to accuracy, reliability or completeness. Conditions of use of the material are under the control of the user; therefore, it is the user's responsibility to determine the suitability and completeness of such information for any specific conditions/ use.



Product Name: **Mercury and/or
Thallium Amalgam In Cannon-
Supplied Thermometers including Thermal Regulators**

Revision Date: *March 6, 2008*

Page 6 of 10
MSDS ref CII08-006

Vapor density @ 101 kPa (air =1): 7
Vapor pressure @ 25°C (77°F), kPa (mm Hg): 0.0018
Evaporation rate (n-butyl acetate =1): not determined
pH: not applicable
Log Pow (n-Octanol/water partition coefficient): not determined
Solubility in water (20 °C): insoluble
Viscosity: Not determined

OTHER INFORMATION

Freezing point °C (°F): -38.87°C (-38°F)
Melting Point °C (F): -38.87°C (-38°F)
Pour point °C (°F): not determined
Molecular weight: 200.59
Hygroscopic: no
Coefficient of thermal expansion: not provided

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Stable under ordinary conditions of use and storage.

CONDITIONS TO AVOID: Heat, flames, ignition sources, metal surfaces and incompatible materials.

MATERIALS TO AVOID: Acetylenes, ammonia, ethylene oxide, chlorine dioxide, azides, metal oxides, methyl silane, lithium, rubidium, oxygen, strong oxidants, metal carbonyls.

HAZARDOUS DECOMPOSITION PRODUCTS: Product does not decompose at ambient temperatures. At high temperatures, vaporizes to form extremely toxic fumes

HAZARDOUS POLYMERIZATION: Not applicable

SECTION 11 TOXICOLOGICAL INFORMATION

Toxicological Data:

Investigated as a tumorigen, mutagen, and reproductive effector.

Reproductive Toxicity:

All forms of mercury can cross the placenta to the fetus, but most of what is known has been learned from experimental animals. See Chronic Health Hazards.

Carcinogenicity:

EPA / IRIS classification: Group D1 - Not classifiable as a human carcinogen.

SECTION 12 ECOLOGICAL INFORMATION

Environmental fate and distribution

Air: This product has a low vapor pressure. As a result, it is unlikely to become an atmospheric

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. The information and recommendations contained herein is compiled from suppliers' MSDS and are accurate and reliable to the best of Cannon Instrument Company's knowledge and belief as of the indicated revision date. No representation, warranty or guarantee, however, is made with regards to accuracy, reliability or completeness. Conditions of use of the material are under the control of the user; therefore, it is the user's responsibility to determine the suitability and completeness of such information for any specific conditions/ use.



Product Name: **Mercury and/or
Thallium Amalgam In Cannon-
Supplied Thermometers including Thermal Regulators**

Revision Date: *March 6, 2008*

Page 7 of 10
MSDS ref CII08-006

contaminant under recommended conditions of use
Environmental Fate: This material has an experimentally-determined bioconcentration factor (BCF) of greater than 100. This material is expected to significantly bioaccumulate.
Environmental Toxicity: This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are less than 1 mg/l.
Bioaccumulation: This material is expected to significantly bioaccumulate

SECTION 13 DISPOSAL CONSIDERATIONS

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

SECTION 14 TRANSPORT INFORMATION

Note: The information provided below may not apply to all shipping situations. Consult appropriate Dangerous Goods Regulations for additional requirements and mode-specific, material-specific, or quantity-specific shipping requirements.

United States Department of Transportation (US DOT):

UN/ID#	Proper Shipping Name	Class/Division	Hazard Label(s)	Packing Group
UN2809	Mercury Contained in Manufactured Articles	8	Corrosive	III

International Air Transport Association (IATA):

UN/ID#	Proper Shipping Name	Class/Division	Hazard Label(s)	Packing Group
UN2809	Mercury Contained in Manufactured Articles	8	Corrosive	III

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: This material is classified as hazardous according to OSHA 29 CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: This product, and/ or its constituents, is listed on the US EPA/ TSCA (Toxic Substances Control Act) Inventory

COMMUNITY RTK:

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. The information and recommendations contained herein is compiled from suppliers' MSDS and are accurate and reliable to the best of Cannon Instrument Company's knowledge and belief as of the indicated revision date. No representation, warranty or guarantee, however, is made with regards to accuracy, reliability or completeness. Conditions of use of the material are under the control of the user; therefore, it is the user's responsibility to determine the suitability and completeness of such information for any specific conditions/ use.



Product Name: **Mercury and/or
Thallium Amalgam In Cannon-
Supplied Thermometers including Thermal Regulators**

Revision Date: *March 6, 2008*

Page 8 of 10
MSDS ref CII08-006

Chemical Name	CAS Number	Typical Value
Mercury	7439-97-6	91.4 - 100%
Thallium	7440-28-0	0 - 8.6%

Section 304 CERCLA HAZARDOUS SUBSTANCES:

This product contains chemicals that are classified as hazardous under CERCLA

SARA (311/312) REPORTABLE HAZARD CATEGORIES:

This product contains chemicals that are classified as hazardous under SARA 312

SARA (313) TOXIC RELEASE INVENTORY:

This product contains chemicals that are regulated under SARA 313

California Proposition 65:

WARNING: This product contains chemical(s) known to the state of California to cause birth defects or other reproductive harm.

International chemical inventories and hazard classifications

This product and/ or its components are on the Canadian Domestic Substance List

WHMIS Classifications (Canada):

- D1A - Poisonous and infectious material - Immediate and serious effects - Very toxic
- D2A - Poisonous and infectious material - Other effects - Very toxic
- D2B - Poisonous and infectious material - Other effects - Toxic
- E - Corrosive material

WHMIS Health Effects Criteria Met by this Chemical:

- D1A - Acute lethality - very toxic - immediate
- D2A - Chronic toxicity - very toxic - other
- D2A - Teratogenicity and embryotoxicity - very toxic - other
- D2B - Skin sensitization - toxic - other
- E - TDG class 8 - corrosive substance

WHMIS Ingredient Disclosure List:

Included for disclosure at 0.1% or greater.

This product and/ or its components are on EINECS (European Inventory of Existing Chemical Substances) and/ or ELINCS (European Library of Notified Chemical Substances)

EU Hazard Classification, risk and safety phrases (Europe):

For devices containing mercury only:

Product Name: **Mercury and/or
Thallium Amalgam In Cannon-
Supplied Thermometers including Thermal Regulators**

Revision Date: *March 6, 2008*

Page 9 of 10
MSDS ref CII08-006



T
Toxic



N
Dangerous
for the environment

- R23: Toxic by inhalation
R33: Danger of cumulative effects
R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
S1/2: Keep locked up and out of the reach of children
S7: Keep container tightly closed
S45: In case of accident or if you feel unwell, seek medical advice immediately (show label where possible)
S60: This material and/or its container must be disposed of as hazardous waste
S61: Avoid release to the environment. Refer to special instructions/safety data sheet

For devices containing mercury/ thallium amalgam:



T+
Very
Toxic



N
Dangerous
for the environment

- R26/28: Very toxic by inhalation and if swallowed
R33: Danger of cumulative effects
R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
S1/2: Keep locked up and out of the reach of children
S7: Keep container tightly closed
S13: Keep away from food, drink and animal feeding stuffs
S28: After contact with skin, wash immediately with soap and plenty of water
S45: In case of accident or if you feel unwell, seek medical advice immediately (show label where possible)
S60: This material and/or its container must be disposed of as hazardous waste
S61: Avoid release to the environment. Refer to special instructions/safety data sheet

SECTION 16

OTHER INFORMATION

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Revision Summary:

- **October 15, 2005 -- This MSDS has been fully reviewed and reformatted to conform to changes in standard format**
- **March 5, 2007: Added Canadian and European classification and labeling information, based on current regulations and/or recommendations from suppliers (see Section 15). Classifications/ labeling are based on the EU Dangerous Substances Directive (Annex 1) and Canadian WHMIS regulations/ listings**
- **May 10, 2007: Updated and standardized format for Transport Information (see Section 14)**



Product Name: **Mercury and/or
Thallium Amalgam In Cannon-
Supplied Thermometers including Thermal Regulators**

Revision Date: *March 6, 2008*

Page 10 of 10
MSDS ref CII08-006

- **March 6, 2008: Clarified wording of Section 304/CERCLA chemical classification in Regulatory Information (see Section 15)**

NOTES: This MSDS is based on information from Mallinckrodt Baker MSDS for mercury (dated 8/2004) and Johnson Matthey Company MSDS for mercury-thallium amalgam. It is also consistent with the Hazardous Substance Fact Sheet for Thallium (dated 11/2004), as published by the New Jersey Department of Health and Senior Services