



MATERIAL SAFETY DATA SHEET
RAY5104
(US, CN Version for International Trade)

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Heat-Shrinkable Interconnections With Solder for High Temperature Wire

MANUFACTURER: Tyco Electronics Corporation

DIVISION:

ADDRESS: 300 Constitution Drive
Menlo Park, CA 94025-1164 USA

SUPPLIERS

EMERGENCY TELEPHONE NUMBERS: US: CHEMTREC 1-800-424-9300
CN: CHEMTREC 1-800-424-9300
Outside North America: 1-703-527-3887
(Collect calls accepted)

NON-EMERGENCY HEALTH/SAFETY INFORMATION: North America: 1- 650-361-4907

CHEMICAL FAMILY:

PRODUCT USE: Typical uses of Interconnection Products include wire or cable joining, splicing and termination, electrical insulation, strain relief and protection from environmental effects.

This product contains a Hazardous Substance, Preparation that is regulated under US-OSHA; CAN-WHMIS; IOSH; ISO; UK-CHIP; or EU Directives (67/548/EEC-Dangerous Substance Labelling, 98/24/EC-Chemical Agents at Work, 99/45/EC-Preparation Labeling, 2001/58/EC-MSDS Content, and 1907/2006/EC-REACH), and an MSDS/SDS is required for this product considering that when used as recommended or intended, or under ordinary conditions, it may present a health and safety exposure or other hazard.

SECTION 2: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Interconnection Products are not hazardous during proper installation but the heat-shrinkable tubing may emit hazardous thermal decomposition and combustion byproducts if overheated to degradation. Thermal degradation and combustion byproducts may be toxic and should not be inhaled.

At temperatures higher than those recommended for proper installation, most significantly if the product burns, the thermal degradation and combustion byproducts may include, but are not limited to carbon monoxide, carbon dioxide, aldehydes (including formaldehyde), acetic acid, low molecular weight hydrocarbons, hydrogen fluoride, and fluoro-olefins,.

At temperatures that may be reached in the case of a fire, oxide fumes or particulates of lead, tin, antimony or silver may be released.

POTENTIAL HEALTH EFFECTS:

Proper installation of this product creates no known acute or chronic health hazards.

ACUTE HEALTH HAZARDS:

EYES: Flush with water for at least 15 minutes, holding eyelids open. Seek medical attention if irritation persists. Contact with molten material may cause thermal burns.

SKIN: This product is not expected to be a skin irritant. Contact with the molten material may cause thermal burns cool immediately with cold water. Do not attempt to remove material adhering to the skin. Treat as a burn.. No harmful effects are expected from skin absorption of this product.

INGESTION: Ingestion of this product is highly unlikely. There is insufficient information available on this material to predict the effects from ingestion. If swallowed and symptoms develop, seek medical attention.

INHALATION: Thermal degradation and combustion byproducts may be toxic and should not be inhaled. If exposed to vapours or fumes from overheated or burnt material, move the affected person to fresh air. Keep warm and at rest. If breathing problems develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

(See comments in the Thermal Degradation and Combustion Byproducts Section for more specific information.)

CHRONIC HEALTH HAZARDS:

Product testing has demonstrated that there is no exposure to metal fumes from the solder present in these products, even at temperatures where thermal degradation of the tubing occurs.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:

Overheating the product to charring or burning can produce vapours that may cause eye, skin, nose and throat irritation. Persons with pre-existing eye, skin, or respiratory disorders (e.g., asthma conditions) may be more susceptible to the effects of these vapours

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Base polymer materials include polyethylene, olefin copolymers, and fluoropolymers.

Solder may contain antimony, silver or tin, depending on type used.

<u>INGREDIENTS (Chemical/Common Names):</u>	<u>CAS No.:</u>	<u>% by Wt:</u>	<u>EC No.:</u>
Antimony	7440-36-0	0.05 - 0.12	231-146-5
Lead	7439-92-1	0.10 - 93	231-100-4
Silver	7440-22-4	0.05 - 4	231-131-3
Tin	7440-31-5	5.0 - 96	231-141-8
	NA – Not applicable	NE – Not Established	ND – Not determined

SECTION 4: FIRST AID MEASURES

EYE CONTACT: If eye irritation occurs, flush affected area(s) with clean water for 15 minutes while holding eyelids apart. Seek medical attention.

SKIN CONTACT: First Aid is normally not required. Wash hands after handling product. If molten material contacts skin, cool area immediately in water. DO NOT attempt to remove material from the skin. Treat as a burn, and seek medical attention.

INGESTION: Not a normal route of exposure. However, if swallowed and symptoms develop, seek medical attention.

INHALATION: If respiratory symptoms or other symptoms of exposure develop, move individual to fresh air. If symptoms persist, seek medical attention. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention. If individual is not breathing move them to fresh air, immediately begin artificial respiration. Keep individual warm and quiet seek immediate medical attention

SECTION 5: FIRE-FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASHPOINT: Not determined

METHOD USED: Not applicable

FLAMMABLE LIMITS

UPPER FLAMMABILITY LIMIT (% BY VOLUME): Not applicable

LOWER FLAMMABILITY LIMIT (% BY VOLUME): Not applicable

AUTOIGNITION TEMPERATURE: Not determined

SUITABLE EXTINGUISHING MEDIA:

Use carbon dioxide, water, dry chemical, foam and dry powder.

Use water spray to keep fire-exposed containers cool.

Selection of extinguishing media should be based upon the size of the fire, the firefighting training/experience of the individual attempting to extinguish or control the fire, and the packaging materials exposed to the fire.

SPECIAL FIRE FIGHTING PROCEDURES & PROTECTIVE EQUIPMENT:

Firefighters should wear self-contained breathing apparatus with a full-face piece operated in the positive pressure demand mode when fighting fires.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Toxic fumes may be given off in a fire. See also sections on Thermal Degradation and Combustion Byproducts and Other Precaution

SPECIFIC HAZARDS IN CASE OF FIRE:

At temperatures that may be reached in the case of a fire, oxide fumes or particulates of metals may be released from solder.

HAZARDOUS COMBUSTION PRODUCTS:

Thermal degradation and combustion byproducts may be toxic and should not be inhaled. Thermal degradation is not significant at temperatures achieved during proper installation, as directed by product installation guides.

At temperatures higher than those recommended for proper installation, most significantly if the product burns, the thermal degradation and combustion byproducts may include, but are not limited to carbon monoxide, carbon dioxide, aldehydes (including formaldehyde), acetic acid, low molecular weight hydrocarbons, hydrogen fluoride, and fluoro-olefins,.

At temperatures that may be reached in the case of a fire, oxide fumes or particulates of lead, tin, antimony or silver may be released.

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Wear appropriate personal protection when responding, as specified under Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

ENVIRONMENTAL PRECATIONS:

Prevent spilled material from entering sewers and waterways.

SPILL CONTAINMENT & CLEANUP METHODS/MATERIALS:

Sweep up and collect in a suitable container for disposal or reuse.

SECTION 7: HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING AND STORAGE:

Handling: Refer to Tyco product installation instructions. For products containing a thermochromic temperature indicator, discontinue heating after the color changes from red to colorless. Avoid any vapors given off if the product is heated to decomposition, as shown by a darkening and browning of the sleeve. Avoid contact with molten material. Heat-resistant gloves are required if hot products are handled after installation. Do not consume food, beverages or tobacco in the immediate work area. Wash hands before eating, drinking or smoking.

Storage: Refer to Tyco product instructions. This product is stable under normal conditions.

OTHER PRECAUTIONS (e.g.; Incompatibilities):

Avoid heating products beyond temperatures required for normal installation. See installation instructions for proper installation procedures. If product chars or burns, immediately stop heating. Avoid inhaling any fumes which may be given off under such circumstances. Allow any vapors to disperse and ventilate before continuing work in the area.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS/SYSTEM DESIGN INFORMATION:

Ensure adequate ventilation during installation.

VENTILATION:

Provide general or local exhaust ventilation systems

RESPIRATORY PROTECTION:

If installation occurs in a confined, unventilated area, NIOSH/MSHA-approved respirators are recommended.

EYE PROTECTION:

Use safety glasses with side shield or goggles to prevent contact with eyes, as appropriate to the given operation.

SKIN PROTECTION:

Avoid contact with molten material. Heat-resistant gloves are required if hot products are handled after installation. . If it is necessary to handle grossly overheated or fire-damaged products, wear natural rubber gloves to prevent possible contact with potentially corrosive inorganic acid residues operation.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

OSHA, ANSI, or NIOSH guidelines should be followed. If there is a danger of molten material contacting the skin or eyes, use eye/face protection and heat resistant gloves.

EXPOSURE GUIDELINES & LIMITS:

Antimony

OSHA	Permissible Exposure Limit (PEL/TWA)	TWA	0.5 mg/m ³
Quebec	Permissible Exposure Value (PEV)		0.5 mg.m ⁻³
		8-hour TWA	0.5 mg.m ⁻³
Ontario	Occupational Exposure Level (OEL)	Short Term (15 Min.)	-----
Germany	Maximale Arbeitsplatzkonzentrationen (MAK)		-----
United Kingdom	Occupational Exposure Standard (OES)	8-hour TWA	0.5 mg.m ⁻³
		Short Term (15 Min.)	-----

Lead

OSHA	Permissible Exposure Limit (PEL/TWA)	TWA	0.050 mg/m ³
Quebec	Permissible Exposure Value (PEV)		0.050 mg.m ⁻³
Ontario	Occupational Exposure Level (OEL)		-----
Germany	Maximale Arbeitsplatzkonzentrationen (MAK)		-----
United Kingdom	Occupational Exposure Standard (OES)	8-hour TWA	-----
		Short Term (15 Min.)	-----

Silver

OSHA	Permissible Exposure Limit (PEL/TWA)	TWA metal dust	0.01 mg.m ⁻³
Quebec	Permissible Exposure Value (PEV)		0.1 mg.m ⁻³
Ontario	Occupational Exposure Level (OEL)		-----
Germany	Maximale Arbeitsplatzkonzentrationen (MAK)		0.1 mg.m ⁻³
United Kingdom	Occupational Exposure Standard (OES)	8-hour TWA	-----
		Short Term (15 Min.)	-----

Tin

OSHA	Permissible Exposure Limit (PEL/TWA)	TWA	2 mg/m ³
Quebec	Permissible Exposure Value (PEV)		2 mg/m ⁻³
		8-hour TWA	2 mg/m ⁻³
Ontario	Occupational Exposure Level (OEL)	Short Term (15 Min.)	4 mg/m ⁻³

Germany	Maximale Arbeitsplatzkonzentrationen (MAK)		2 mg/m ⁻³
United Kingdom	Occupational Exposure Standard (OES)	8-hour TWA	2 mg/m ⁻³
		Short Term (15 Min.)	4 mg/m ⁻³
		TWA – 8-Hour Time Weighted Average	NE – Not Established

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Clear or blue transparent plastic sleeves with a ring of solder insert.
ODOR:	No odor
ODOR THRESHOLD:	Not Applicable
PHYSICAL STATE:	Not Applicable
pH:	Not Applicable
BOILING POINT:	Not Applicable
MELTING POINT:	Not Applicable
FREEZING POINT:	Not Applicable
VAPOR PRESSURE (mmHg @ 20°C):	Not Applicable
VAPOR DENSITY (AIR = 1):	Not Applicable
VOLATILITY (% by Volume)	Not Applicable
SPECIFIC GRAVITY (H2O = 1):	Not Applicable
EVAPORATION RATE (Butyl acetate=1):	Not Applicable
SOLUBILITY IN WATER:	Insoluble
FLASH POINT:	Not Applicable
AUTO-IGNITION TEMPERATURE:	Not Applicable
LOWER EXPLOSIVE LIMIT (LEL):	Not Applicable
UPPER EXPLOSIVE LIMIT (UEL):	Not Applicable
PARTITION COEFFICIENT:	Not Applicable
VISCOSITY (centipoise @ 25° C):	Not Applicable
DECOMPOSITION TEMPERATURE:	> 250°C (482°F)

FLAMMABILITY/HMIS HAZARD CLASSIFICATIONS (US/CN/EU):

HEALTH: 1 FLAMMABILITY: 0 REACTIVITY: 0

SECTION 10: STABILITY AND REACTIVITY

STABILITY:	This product is stable under normal conditions, at ambient temperature.
INCOMPATIBILITY (MATERIAL TO AVOID):	None known.
HAZARDOUS DECOMPOSITION OR BY-PRODUCTS:	See Section 5: FIRE FIGHTING MEASURES (Hazardous Combustion Products).
HAZARDOUS POLYMERIZATION:	Will not occur. No known polymerization conditions to avoid.
CONDITIONS TO AVOID:	Avoid overheating of product.

SECTION 11: TOXICOLOGICAL INFORMATION

ACUTE TOXICITY (Test Results Basis and Comments):

LD₅₀ (Oral, Rat): Not determined.

LC₅₀ (Inhalation, Rat): Not determined.

ROUTES OF ENTRY/EFFECTS OF ACUTE OVEREXPOSURE:

EYE CONTACT: Contact with the molten material may cause thermal burns.

SKIN CONTACT: Contact with the molten material may cause thermal burns. No harmful effects are expected from skin absorption of this product.

INGESTION: Ingestion of this product is highly unlikely. There is insufficient information available on this material to predict the effects from ingestion.

INHALATION: Thermal degradation and combustion byproducts may be toxic and should not be inhaled. (See the Thermal Degradation and Combustion Byproducts Section for more specific information.)

SUBCHRONIC/CHRONIC TOXICITY (Test Results and Comments):

IRRITANCY OF PRODUCT: This product is not expected to be a skin irritant. Overheating the product to charring or burning can produce vapours that may cause eye, skin, nose and throat irritation

SENSITIZATION TO MATERIAL: Not known.

CARCINOGENICITY: None of the ingredients to which users may be exposed and which are present at equal to or greater than 0.1% of the product, are listed by OSHA, NTP, or IARC as carcinogens.

REPRODUCTIVE TOXICITY: Not determined.

TERATOGENICITY: Not determined.

MUTAGENICITY: Not determined.

TOXICOLOGICALLY SYNERGISTIC PRODUCTS: Not determined.

SECTION 12: ECOLOGICAL INFORMATION**PERSISTENCE & DEGRADABILITY:**

No data available on biodegradation.

BIO-ACCUMULATIVE POTENTIAL (Including Mobility):

No data available on bioaccumulation.

AQUATIC TOXICITY (Test Results & Comments):

No data available on aquatic toxicity.

Additional Information

- No known effects on stratospheric ozone depletion.
- Water Endangering Class (WGK): NA

SECTION 13: DISPOSAL CONSIDERATIONS**WASTE DISPOSAL METHOD:**

Treatment, storage, and disposal must be in accordance with applicable, federal, state, provincial, and local regulations.

HAZARDOUS WASTE

Solder may contain antimony, bismuth, lead, silver or tin, depending on the type used. Heat-shrinkable plastic sleeves may contain halogenated materials. Refer to the product literature for identification of halogen-containing products. Dispose of in accordance with national and local regulations.

CLASS/CODE:

US - Not applicable to material as manufactured for distribution into commerce.

CN – Not applicable to material as manufactured for distribution into commerce.

EWC – Not applicable to material as manufactured for distribution into commerce.

Additional Information

Not Included – Dispose/Recycle as allowed by local jurisdiction for the end-of-life characteristics as-disposed.

SECTION 14: TRANSPORT INFORMATION

GROUND – US-DOT/CAN-TDG/EU-ADR/APEC-ADR:

Proper Shipping Name	Not Subject to HMR		
Hazard Class	NA	ID Number	NA
Packing Group	NA	Labels	NA

AIRCRAFT – ICAO-IATA:

Proper Shipping Name	Not Subject to DGR		
Hazard Class	NA	ID Number	NA
Packing Group	NA	Labels	NA

VESSEL – IMO-IMDG:

Proper Shipping Name	Not Subject to IMDG		
Hazard Class	NA	ID Number	NA
Packing Group	NA	Labels	NA

Additional Information

- Transportation must be in accordance with applicable, federal, state, provincial, and local regulations.
- Transport requires proper packaging and paperwork, including the Nature and Quantity of goods, per applicable origin/destination/customs points as-shipped. Statement of Jurisdictional/Modal Special Provision(s) required.
- Not restricted for any mode of international transport as finished goods.
- Not a Marine Pollutant as-shipped per IMO/IMDG.

SECTION 15: REGULATORY INFORMATION

INVENTORY STATUS:

All components are listed on the TSCA; EINECS/ELINCS; and DSL, unless noted otherwise below.

U.S. FEDERAL REGULATIONS:

TSCA Section 8b – Inventory Status: All chemicals comprising this product are either exempt or listed on the TSCA Inventory.

TSCA Section 12b – Export Notification: If the product contains chemicals subject to TSCA Section 12b export notification they are listed below:

<u>Chemical</u>	<u>CAS #</u>
Lead	7439-92-1

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT)

Chemicals present in the product which could require reporting under the statute:

<u>Chemical</u>	<u>CAS #</u>
Lead	7439-92-1

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

If the product contains chemicals subject to the reporting requirements of Section 313 of SARA Title III, they are listed below.

<u>Chemical</u>	<u>CAS #</u>	<u>% wt</u>
Lead	7439-92-1	0.10 - 93.5
Silver	7440-22-4	0.05 - 4.0
Antimony	7440-36-0	0.05 - 0.12

CERCLA SECTION 311/312 HAZARD CATEGORIES: Note that this product is exempt from these regulations.

Fire Hazard	No
Pressure Hazard	No
Reactivity Hazard	No

Immediate Hazard No
 Delayed Hazard Yes

STATE REGULATIONS (US):

California Proposition 65

The following chemicals identified to exist in the product as distributed into commerce are known to the State of California to cause cancer, birth defects, or other reproductive harm:

<u>Chemical</u>	<u>CAS #</u>	<u>% Wt</u>
Lead	7439-92-1	0.10 - 93.5
Antimony	7440-36-0	0.05 - 0.12

INTERNATIONAL REGULATIONS (Non-US):

Canadian Domestic Substance List (DSL)

All ingredients remaining in the product as distributed into commerce are included on the Domestic Substances List.

WHMIS Classifications

Lead - D2A Very Toxic Material Causing Other Toxic Effects

carcinogenicity: IARC group 2B; chronic toxic effect: saturnism; embryotoxicity in animals; injury during the postnatal period in humans; reproductive toxicity in humans

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

NPRI and Ontario Regulation 127/01

This product contains the following chemicals subject to the reporting requirements of Canada NPRI and/or Ont. Reg. 127/01:

<u>Chemical</u>	<u>CAS #</u>	<u>% Wt</u>
Lead	7439-92-1	0.9 – 93.5
Tin	7440-31-5	5.0 - 96.0
Antimony	7440-36-0	0.05 - 0.12

European Inventory of Existing Commercial Chemical Substances (EINECS)

All ingredients remaining in the product as distributed into commerce are exempt from, or included on, the European Inventory of Existing Commercial Chemical Substances.

European Communities (EC) Hazard Classification according to directives 67/548/EEC and 1999/45/EC.

<u>R-Phrases</u>	<u>S-Phrases</u>
None	None

Additional Information

This product may be regulated under additional regulations and laws not identified above, such as for uses other than described or as-designed/as-intended by the manufacturer, or for distribution into specific domestic destinations.

SECTION 16: OTHER INFORMATION

OTHER INFORMATION:

Distribution into Quebec to follow Canadian Controlled Product Regulations (CPR) 24(1) and 24(2).

Distribution into the EU to follow applicable Directives to the Use, Import/Export of the product as-sold.

MSDS/SDS PREPARATION INFORMATION:

Department Issuing MSDS: Tyco Electronics, Menlo Park

Contact: Robin Adair, EHS Programs Manager

Tel: 1-650-361-3022

Fax: 1-650-361-3696

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MATERIAL SAFETY DATA SHEET
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