

**SECTION 1: PRODUCT AND COMPANY IDENTIFICATION**

**PRODUCT NAME:** Thermofit Heat-Shrinkable Polymeric Products  
(excluding solder Sleeves see separate MSDS)

**MANUFACTURER:** Tyco Electronics Corporation  
**DIVISION:** All Divisions except Aerospace, Defence and Marine  
**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:** Not Applicable

**PRODUCT USE:** Typical uses of heat-shrinkable polymeric products include primary electrical insulation, EMI/RFI shielding, cable jacketing and repair, strain relief, waterproofing, cable/pipe identification, corrosion protection, environmental/mechanical protection, and cable joining, splicing, and termination in commercial and military/aerospace electronic applications.

This product is not hazardous when used as recommended or intended. If this product is overheated, charred, or burned the health and safety information presented in this MSDS may apply.

Thermal decomposition and combustion byproducts may be 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).

**SECTION 2: HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW:** In common with most organic materials, 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 will depend on the base polymer used, and may include, but are not limited to carbon monoxide, carbon dioxide, organic acids, aldehydes (including formaldehyde), acetic acid, low molecular weight hydrocarbons, silicon dioxide, hydrogen chloride, hydrogen fluoride, hydrogen bromide, fluoro-olefins, and oxides of nitrogen, phosphorus and sulfur.

**POTENTIAL HEALTH EFFECTS:**

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

**ACUTE HEALTH HAZARDS:**

**EYES:** 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. 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:** In common with most organic materials, thermal degradation and combustion byproducts may be toxic and should not be inhaled. (See Comments below and the Thermal Degradation and Combustion Byproducts Section for more specific information.)

**CHRONIC HEALTH HAZARDS:**

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 suspect carcinogens.

**MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:**

Overheating the product to charring or burning may produce vapors 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 vapors.

**SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS****INGREDIENTS (Chemical/Common Names):****CAS No.:****% by Wt:****EC No.:**

Not applicable – This product is a manufactured article.

Heat-Shrinkable Polymeric Products are not hazardous during proper installation, but the heat-shrinkable tubing may emit hazardous thermal decomposition and combustion byproducts if overheated to degradation. See “Thermal Degradation and Combustion Byproduct” section of this MSDS for more specific information. Base polymer materials include polyethylene and olefin copolymers. Heat-shrinkable products may be coated with or used in conjunction with adhesives/mastics, which are based on olefin copolymers or polyamides.

NA – Not applicable/NE – Not Established/ND – Not determined

**SECTION 4: FIRST AID MEASURES**

- EYE CONTACT:** If eye irritation occurs, flush with clean water for 15 minutes while holding eyelids apart. Seek medical attention.
- SKIN CONTACT:** First aid is normally not required. After handling product, it is good work practice to wash your hands. 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 victim to fresh air. If symptoms persist, seek medical attention. If breathing difficulties develop, qualified personnel should administer oxygen. Seek immediate medical attention. If victim is not breathing, immediately begin artificial respiration. Keep victim warm and quiet; seek immediate medical attention.

**SECTION 5: FIRE-FIGHTING MEASURES****FLAMMABLE PROPERTIES**

**FLASHPOINT:** Not applicable

**METHOD USED:** Not applicable

**FLAMMABLE LIMITS**

**UPPER FLAMMABILITY LIMIT (% BY VOLUME):** Not applicable

**LOWER FLAMMABILITY LIMIT (% BY VOLUME):** Not applicable

**AUTOIGNITION TEMPERATURE:** Not applicable

**SUITABLE EXTINGUISHING MEDIA:**

Use carbon dioxide, water, dry chemical or foam.

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. Use water spray to keep fire-exposed containers cool.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:**

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

Precautions.

**SPECIFIC HAZARDS IN CASE OF FIRE:**

None

**HAZARDOUS COMBUSTION PRODUCTS:**

In common with most organic materials, 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 will depend on the base polymer used, and may include, but are not limited to carbon monoxide, carbon dioxide, organic acids, aldehydes (including formaldehyde), acetic acid, low molecular weight hydrocarbons, silicon dioxide, hydrogen chloride, hydrogen fluoride, hydrogen bromide, fluoro-olefins, and oxides of nitrogen, phosphorus and sulfur.

**SECTION 6: ACCIDENTAL RELEASE MEASURES****PERSONAL PRECAUTIONS:**

See 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:** 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.

**Installation:** Follow appropriate Tyco installation instructions and application guides to ensure that installation is performed properly. Ensure that any local requirements/legislation concerning the use of hand-held electrical equipment are observed. When using IR (infrared) heating devices, observe specific instructions. Do not touch hot surfaces on installation equipment.

**Storage:** 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:**

None

**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 skin. Use heat resistant rated gloves to prevent skin contact, as appropriate to the given operation. 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.

**OTHER PROTECTIVE CLOTHING OR EQUIPMENT:**

**EXPOSURE GUIDELINES & LIMITS:**

There are no established exposure limits for polymer mixtures.

OSHA	Permissible Exposure Limit (PEL/TWA)	NE
ACGIH	Threshold Limit Value (TLV)	NE
Quebec	Permissible Exposure Value (PEV)	NE
Ontario	Occupational Exposure Level (OEL)	NE
Germany	Maximale Arbeitsplatzkonzentrationen (MAK)	NE
United Kingdom	Occupational Exposure Standard (OES)	NE

TWA – 8-Hour Time Weighted Average      NE – Not Established

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

<b>APPEARANCE:</b>	Plastic tubing and molded parts in a variety of shapes, sizes and colors.
<b>ODOR:</b>	No odor
<b>ODOR THRESHOLD:</b>	Not applicable
<b>PHYSICAL STATE:</b>	Solid
<b>pH:</b>	Not applicable
<b>BOILING POINT:</b>	Not applicable
<b>MELTING POINT:</b>	Not Determines
<b>FREEZING POINT:</b>	Not applicable
<b>VAPOR PRESSURE (mmHg @ 20°C):</b>	Not applicable
<b>VAPOR DENSITY (AIR = 1):</b>	Not applicable
<b>SPECIFIC GRAVITY (H2O = 1):</b>	Not applicable
<b>EVAPORATION RATE (Butyl acetate=1):</b>	Not applicable
<b>SOLUBILITY IN WATER:</b>	Insoluble
<b>FLASH POINT:</b>	Not applicable
<b>AUTO-IGNITION TEMPERATURE:</b>	Not applicable
<b>LOWER EXPLOSIVE LIMIT (LEL):</b>	Not applicable
<b>UPPER EXPLOSIVE LIMIT (UEL):</b>	Not applicable
<b>PARTITION COEFFICIENT:</b>	Not applicable
<b>VISCOSITY (centipoise @ 25° C):</b>	Not applicable
<b>DECOMPOSITION TEMPERATURE:</b>	Note Determined

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

HEALTH:                      FLAMMABILITY:                      REACTIVITY:

**SECTION 10: STABILITY AND REACTIVITY**

<b>STABILITY:</b>	This product is stable under normal conditions, at ambient temperature.
<b>INCOMPATIBILITY (MATERIAL TO AVOID):</b>	None known.
<b>HAZARDOUS DECOMPOSITION OR BY-PRODUCTS:</b>	See Section 5: FIRE FIGHTING MEASURES (Hazardous Combustion Products).
<b>HAZARDOUS POLYMERIZATION:</b>	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):**

LD<sub>50</sub> (Oral, Rat): Not determined

LC<sub>50</sub> (Inhalation, Rat): Not determined

**ROUTES OF ENTRY/EFFECTS OF ACUTE OVEREXPOSURE:**

**Eye Contact:** Contact with the molten material may cause thermal burns.

**Skin Contact:** This product is not expected to be a skin irritant. Contact with the molten material may cause thermal burns. No harmful effects are expected from skin absorption of this product.

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

**Inhalation (Breathing):** In common with most organic materials, 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:** See above

**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:** None known.

**TERATOGENICITY:** None known.

**MUTAGENICITY:** None known.

**TOXICOLOGICALLY SYNERGISTIC PRODUCTS:** None known

**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 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>
None	NA

**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>
None	NA

**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>
None	NA	NA

**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	No

**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>
-----------------	--------------	-------------



# MATERIAL SAFETY DATA SHEET

RAY3122

(US, CN Version for International Trade)

None

NA

NA

## INTERNATIONAL REGULATIONS (Non-US):

### Canadian Domestic Substance List (DSL)

Not applicable.

## WHMIS Classifications

Not applicable.

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:

Chemical

None

CAS #

% Wt

## 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.

R-Phrases

None

S-Phrases

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

DATE OF ISSUE: **April 3, 2009**

SUPERCEDES: **March 10, 2009**

### DISCLAIMER:

*Tyco Electronics makes no warranties as to the accuracy or completeness of this information and disclaims any liability in connection with its use. Tyco Electronics' obligation shall be only as set forth in Tyco Electronics' standard terms and conditions of sale for this product. In no case will Tyco Electronics be liable for any incidental, indirect or consequential damages arising out of the sale, resale, use or misuse of the product.*

*The information presented herein was prepared at Tyco Electronics by qualified technical personnel, and to our knowledge it is true and accurate. The information and recommendations are furnished for this product with the understanding that the purchaser/user will independently determine the suitability of the product for this purpose. The data do not constitute a warranty, expressed or implied, statutory or otherwise, nor are they a representation for which Tyco Electronics assumes legal responsibility. The data are submitted for the user's information and consideration only. Any use of this product must be determined by the user to be in accordance with the applicable federal, State/Provincial, and local laws and regulations.*

*Users are advised that they may have additional disclosure obligations under other national and local laws. Users are advised to ensure that this information is brought to the attention of all employees, agents, and contractors handling this product. Users of Tyco Electronics products should make their own evaluation to determine the suitability of each such product for the specific application and to establish safe handling and installation procedures. Distributors of this product are advised to forward this document, or the information contained herein, to every purchaser of this product.*

**END**