



SAFETY DATA SHEET
RAY4566
 (US, CN, EU Version for International Trade)

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Heat Shrinkable Polymeric Products (excluding solder sleeves) RAY4566
PRODUCT CODES: Ray4566

MANUFACTURER: Tyco Electronics Corporation, a TE Connectivity Ltd. company
DIVISION: Tyco Electronics Energy Division
ADDRESS: 2901 Fulling Mill Road
 Middletown, PA 17057-3163

SUPPLIERS

Tyco Electronics Canada Ltd. 20 Esna Park Drive Markham, Ontario L3R 1E1	Tyco Electronics Corporation 8000 Purfoy Road Fuquay-Varina, NC 27526
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EMERGENCY TELEPHONE NUMBERS:

	U.S.: 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: 1-800-327-6996
EMERGENCY TELEPHONE NUMBERS:	U.S.: CHEMTREC 1-800-424-9300
	CN: CHEMTREC 1-800-424-9300
	Outside North America: 1-703-527-3887 (Collect calls accepted)

CHEMICAL FAMILY: Mixture of non-hazardous heat-shrinkable polymers.

PRODUCT USE: This product is heat-shrinkable polymeric used primarily for electronic insulation, EMI/RFI shielding, cable jacketing and repair, strain relief, component encapsulation, waterproofing, cable identification, corrosion protection, environmental/mechanical protection, and cable joining, splicing, and termination in applications ranging from electrical power generation and distribution to electrical equipment manufacture.

This product is considered an Article thus it is not regulated under US-OSHA; CAN-WHMIS; IOSH; ISO; UK-CHIP; or EU Directives (1272/2008/EC-Classification, Labelling and Packaging of Substances and Mixtures, 98/24/EC-Chemical Agents at Work, 2001/58/EC-MSDS Content, and 1907/2006/EC-REACH), and an MSDS is not required for this product considering that when used as recommended or intended, or under ordinary conditions, it does not emit detectable levels of hazardous substances during heat-shrinking, and should not present a health and safety exposure or other hazard. If overheated, charred, burned, or shredded the health and safety information presented below may apply.

Additional Information

This product is not intended for solvent-containing or extreme temperature or pressure environments. Please request information if considering use beyond current product labelling or not covered in the Product Installation Guide.

SECTION 2: HAZARDS IDENTIFICATION

GHS Classification: Not applicable to articles

Health Hazards Acute Toxicity – NL Skin Corrosion/Irritation – NL Eye Corrosion/Irritation - NL Respiratory or Skin Sensitization – NL Mutagenicity – NL Carcinogenicity – NL	Reproductive/Developmental – NL Target Organ Toxicity – NL Physical Hazards Flammability -- NL (Not flammable or combustible)	Environmental Hazards Aquatic Toxicity – NL
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NL – Not listed. No GHS category corresponds to the low level of hazard anticipated.



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Note: The Globally Harmonised System (GHS) for Classification had not been fully implemented in Canada at the time that this safety data sheet was developed.

GHS Label: As required for Finished Goods according to End-Use Products Regulations

Symbols: Not Applicable to Articles	
Hazard Statements Contact with molten material can cause burns. Contact with residues from fires can cause irritation of mucous membranes.	Precautionary Statements Avoid Contact with Mucous Membranes, Eyes, or Oral Cavity. Do Not Inhale Vapours/Fumes or Particulates if overheated.

EMERGENCY OVERVIEW:	Product is not hazardous during proper installation. Heat-shrink tubing may emit hazardous thermal decomposition and combustion by-products if overheated to degradation or if burned. Thermal degradation and combustion by-products may include but are not limited to: carbon monoxide, carbon dioxide, aldehydes, acetic acid, low molecular weight hydrocarbons, silicon dioxide, hydrogen chloride, hydrogen fluoride, hydrogen bromide, fluoro-olefins, and oxides of nitrogen, phosphorous, and sulfur. See Section 10.
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POTENTIAL HEALTH EFFECTS:

- EYES:** Contact with molten material may cause thermal burns to the eyes and skin. If eye irritation occurs, hold eyelids apart and flush affected area(s) with clean water. Seek medical attention.
- SKIN:** This product is not expected to be a skin irritant. 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.)

ACUTE HEALTH HAZARDS:

Repeated or prolonged contact may cause mild skin irritation.

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 products 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.

Additional Information

None.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

<u>INGREDIENTS (Chemical/Common Names):</u>	<u>CAS No.:</u>	<u>% by Wt:</u>	<u>EC No.:</u>
Non-hazardous heat shrinkable polymers	ND	>99	ND
NA – Not applicable/ND – Not determined			

Additional Information

These ingredients reflect components of the finished product related to performance of the product as distributed into commerce.

SECTION 4: FIRST AID MEASURES

- EYE CONTACT:** If eye irritation occurs, hold eyelids apart and flush affected area(s) with clean water. Seek medical attention.



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- 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, oxygen should be administered by qualified personnel. Seek immediate medical attention. If victim is not breathing, immediately begin artificial respiration. Keep victim warm and quiet; seek immediate medical attention.

Additional Information

None.

SECTION 5: FIRE-FIGHTING MEASURES

SUITABLE/UNSUITABLE EXTINGUISHING MEDIA:

Dry chemical, carbon dioxide, water, foam.

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 cool nearby containers and structures exposed to fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Do not use water spray on live electrical parts.

SPECIFIC HAZARDS IN CASE OF FIRE:

See Section 10 for thermal decomposition products.

Additional Information

None.

SECTION 6: ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS:

Wear appropriate personal protection when responding, then sweep up and collect in a suitable container for disposal or reuse. Avoid Contact with Skin if material has been overheated.

ENVIRONMENTAL PRECAUTIONS:

Prevent spilled material from entering sewers and waterways.

SPILL CONTAINMENT & CLEANUP METHODS/MATERIALS:

Add absorbent to spill area. Sweep or shovel spilled material and absorbent and place in approved container.

Additional Information

None.

SECTION 7: HANDLING AND STORAGE

PRECAUTIONS FOR SAFE HANDLING AND STORAGE:

For products containing a thermochromic temperature indicator, discontinue heating after the color changes from red to colorless. Avoid any vapours given off if the product is overheated 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.

OTHER PRECAUTIONS (e.g.; Incompatibilities):

Additional Information

None.



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SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS/SYSTEM DESIGN INFORMATION:

Design installation systems to guard against burns and ensure adequate ventilation.

VENTILATION:

In accordance with good industrial hygiene practice, use adequate mechanical ventilation during installation. If products are likely to be overheated during installation, consult an industrial ventilation professional or industrial hygienist.

RESPIRATORY PROTECTION:

Not required for normal conditions of use. See also special firefighting procedures (Section 5).

EYE PROTECTION:

Wear protective glasses or goggles.

SKIN PROTECTION:

Wear chemical resistant gloves as a standard procedure to prevent skin contact.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

None required under normal use conditions.

EXPOSURE GUIDELINES & LIMITS:

OSHA	Permissible Exposure Limit (PEL/TWA)	Total particulate	15 mg/m ³
ACGIH	Threshold Limit Value (TLV)	Total particulate	NE
			(See Additional Information)
Quebec	Permissible Exposure Value (PEV)	Total particulate	10 mg/m ³
Ontario	Occupational Exposure Level (OEL)	Total Inhalable particulate	10 mg/m ³
Germany	Maximale Arbeitsplatzkonzentrationen (MAK)	Total particulate	10 mg/m ³
United Kingdom	Occupational Exposure Standard (OES)	Total particulate, inhalable fraction	10 mg/m ³

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

Additional Information

The ACGIH rescinded its TLV for particulate, not otherwise specified. Appendix B of the 2013 TLV booklet provides a recommendation of 10 mg/m³ as inhalable dust or 3 mg/m³ for respirable dust.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	Plastic tubing and moulded parts in a variety of shapes, sizes and colors.
ODOR:	Odourless
ODOR THRESHOLD:	NA
PHYSICAL STATE:	Solid
pH:	NA
BOILING POINT:	NA
MELTING POINT:	ND
FREEZING POINT:	Solid at most temperatures
VAPOR PRESSURE:	Nil
VAPOR DENSITY (AIR = 1):	NA
SPECIFIC GRAVITY (H₂O = 1):	ND
EVAPORATION RATE (n-BuAc=1):	NA
SOLUBILITY IN WATER:	Insoluble
FLASH POINT:	NA
AUTO-IGNITION TEMPERATURE:	NA
LOWER EXPLOSIVE LIMIT (LEL):	NA
UPPER EXPLOSIVE LIMIT (UEL):	NA
PARTITION COEFFICIENT:	NA
VISCOSITY (poise @ 25° C):	NA
DECOMPOSITION TEMPERATURE:	ND



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

HEALTH: 0 FLAMMABILITY: 0 REACTIVITY: 0

Additional Information

None.

SECTION 10: STABILITY AND REACTIVITY

STABILITY:
INCOMPATIBILITY (MATERIAL TO AVOID):
HAZARDOUS DECOMPOSITION OR BY-PRODUCTS:

This product is stable under normal conditions at ambient temperature.

None known.

At temperatures higher than those recommended for proper installation, most significantly if the product burns, the thermal degradation and combustion by-products will depend on the base polymer used. These may include but are not limited to: carbon monoxide, carbon dioxide, aldehydes, acetic acid, low molecular weight hydrocarbons, silicon dioxide, hydrogen chloride, hydrogen fluoride, hydrogen bromide, fluoro-olefins, and oxides of nitrogen, phosphorous, and sulphur.

HAZARDOUS POLYMERIZATION:
CONDITIONS TO AVOID:

Will not occur

Avoid overheating product.

Additional Information

None.

SECTION 11: TOXICOLOGICAL INFORMATION

ACUTE TOXICITY (Test Results Basis and Comments):

Primary route of entry would be inhalation of vapours/fumes that may be given off when product is overheated. Heating these products may generate small amounts of isocyanates that may cause skin and eye irritation. Other decomposition products resulting from overheating or burning product can also result in skin and eye irritation. Degradation and combustion by-products may be toxic and should not be inhaled.

SUBCHRONIC/CHRONIC TOXICITY (Test Results and Comments):

Overheating the product to charring or burning may 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.

Additional Information

- Heating or burning this product may generate small amounts of aromatic isocyanates, which are sensitizers that can produce asthma-like conditions in sensitized individuals. This condition can be delayed up to several hours after exposure. Hypersensitive persons may suffer respiratory problems (shortness of breath, wheezing, or cough) even at low isocyanate concentrations.
- The ingredients in this product, present at equal to or greater than 0.1% of the product, are not listed by OSHA, NTP, or IARC as suspect carcinogens.
- No known reproductive or mutagenic effects.

SECTION 12: ECOLOGICAL INFORMATION

PERSISTENCE & DEGRADABILITY:

No data available on biodegradation of this product.

BIO-ACCUMULATIVE POTENTIAL (Including Mobility):

No data available on bioaccumulation. Bioaccumulation is expected to be low based on insolubility in water.

AQUATIC TOXICITY (Test Results & Comments):

No data available on this product. Toxicity is expected to be low based on insolubility in water.

Additional Information

- No known effects on stratospheric ozone depletion.
- Volatile organic compounds: 0% (by Volume)



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- Water Endangering Class (WGK): NA

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Dispose in accordance with all local, province, and national regulations. If there are local regulations covering the controlled incineration of halogenated materials, then all halogen-containing products will be subject to such regulations. Refer to the product literature for identification of halogen-containing materials.

HAZARDOUS WASTE CLASS/CODE: U.S. - Not applicable to finished product as manufactured for distribution into commerce.
 CN - Not applicable to finished product as manufactured for distribution into commerce.
 EWC - Not applicable to finished product 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 Regulated as Dangerous Goods under Canadian TDG regulations.		
Hazard Class	NA	ID Number	NA
Packing Group	NA	Labels	NA

AIRCRAFT - ICAO-IATA:

Proper Shipping Name	Not Regulated as Dangerous Goods under Canadian TDG regulations.		
Hazard Class	NA	ID Number	NA
Packing Group	NA	Labels	NA

VESSEL - IMO-IMDG:

Proper Shipping Name	Not Regulated as Dangerous Goods under Canadian TDG regulations.		
Hazard Class	NA	ID Number	NA
Packing Group	NA	Labels	NA

Additional Information

- Transport requires proper packaging and paperwork, including the Nature and Quantity of goods, per applicable origin/destination/customs points as-shipped.
- 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: The finished product contains chemicals subject to TSCA Section 12b export notification.

<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)



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The finished product contains chemicals subject to the reporting requirements of Section 313 of SARA Title III.

<u>Chemical</u>	<u>CAS #</u>	<u>% wt</u>
None	NA	NA

CERCLA SECTION 311/312 HAZARD CATEGORIES: Note that the finished 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 finished 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>
None	NA	NA

California Consumer Product Volatile Organic Compound Emissions

This Product is not regulated as a Consumer Product for purposes of CARB/OTC VOC Regulations, as-sold for the intended purpose and into the industrial/Commercial supply chain.

INTERNATIONAL REGULATIONS (Non-US):

Canadian Domestic Substance List (DSL)

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

WHMIS Classifications

Not Regulated.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all 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 +/-or Ont. Reg. 127/01:

<u>Chemical</u>	<u>CAS #</u>	<u>% Wt</u>
None	NA	NA

European Inventory of Existing Commercial Chemical Substances (EINECS)

All ingredients remaining in the finished 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 1272/2008/EC-Classification, Labelling and Packaging of Substances and Mixtures and 98/24/EC-Chemical Agents at Work.

Please refer to the GHS Classifications and hazard/precaution statements in Section 2.

Additional Information

Not Applicable. U.S., Canada and EEC/EU Directives related to chemical hazards provide exemption of manufactured articles composed of discrete solid structures, and for articles that do not pose a safety or health hazard. When properly used as intended, this product is not expected to present a safety or health hazard when distributed into commerce.

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.

REFERENCES:

1. ACGIH (2011), Guide to Occupational Exposure Values, American Conference of Governmental Industrial Hygienists, Cincinnati, Ohio.
2. ACGIH (2013), 2013 TLVs and BEIs Based on the Documentation of the Threshold Limit Values and Biological



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- Exposure Indices, American Conference of Governmental Industrial Hygienists, Cincinnati, Ohio.
3. Cal-EPA (2014), Safe Drinking Water and Toxic Enforcement Act of 1986, Chemicals Known to the State to Cause Cancer or Reproductive Toxicity, Proposition 65 list dated January 3, 2014.
 4. CSST (20103) Laws and Corresponding Regulations of Québec, "Regulation respecting the quality of the work environment, An Act respecting occupational health and safety" (L.R.Q., c. S-2.1, r. 15), La Commission de la Santé et de la Sécurité du Travail du Québec.
 5. Ontario Ministry of Labour (2013). Control of Exposure to Biological or Chemical Agents. R.R.O. 1990, Regulation 833, as amended by O. Reg. 149/12. 12 June 2012.
 6. Ontario Ministry of Labour Regulations. Control of Exposure to Biological or Chemical Agents. R.R.O. 1990, Regulation 833, as amended by O. Reg. 491/09 and July 2010 revisions.
 7. U.S. Department of Labor, Occupational Safety and Health Administration (2006), "Air Contaminants," 29 CFR 1910.1000.
 8. United Kingdom Health and Safety Executive (2013), "Table 1: List of approved workplace exposure limits (as consolidated with amendments, 2011)," Health & Safety Commission, EH40/2005.

MSDS/SDS PREPARATION INFORMATION:

DATE OF ISSUE: 28 January 2014

SUPERCEDES: 7 October 2010

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