

**THERMOFIT HEAT-SHRINKABLE POLYMERIC PRODUCTS**

**1. Identification of the substance/preparation and of the company/undertaking**

**1.1 Identification of the substance or preparation:**

**Synonyms:** AT099, DR-25, DR-25-TW, DTMS, FRAG, PRDM, T-DR-25, ZHCP  
Moulded Parts Type: -50, -51

For products coated with Tyco Electronics Unicure-225 precatalysed epoxy resin adhesive, refer to supplementary information on Safety Data Sheet RAY/3111E

<b>CAS No.</b>	: N.A.	<b>Reference</b>	: RAY/3137E Revision 1
<b>EC index No.</b>	: N.A.	<b>NFPA code</b>	: N.D.
<b>EINECS No.</b>	: N.A.	<b>Molecular weight</b>	: N.A.
<b>RTECS No.</b>	: N.A.	<b>Formula</b>	: N.A.

**1.2 Use of the substance or the preparation:**

Heat-shrinkable polymeric products for application including primary electrical insulation, cable jacketing and repair, and environmental/mechanical protection

**1.3 Company/undertaking identification:**

TYCO Electronics  
Cheney Manor Industrial Estate  
SN2 2QE Swindon, United Kingdom  
Tel. : +44 1793 57 38 24  
Fax : +44 1793 57 39 53

**1.4 Telephone number for emergency:**

+32 14 58 45 45  
Brandweerinformatiecentrum voor gevaarlijke stoffen (B.I.G.)  
Technische Schoolstraat 43A, B-2440 Geel

**2. Composition/information on ingredients**

Plastic material may be based on polyethylene and olefin copolymers, fluoropolymers, polyamides and polyesters. Products may be coated with Tyco Electronics Unicure-225 precatalysed epoxy resin adhesive.

Some components are physically bound in the product and are not available for exposure.

Hazardous ingredients	CAS No. EINECS/ELINCS No.	Conc. in %	Hazard symbol	Risks (R-phrases)
diphenylmethanediisocyanate, isomers and homologues	- -	< 1.4	Xn	20-36/37/38-42/43 (1)
carbon black (physically bound)	1333-86-4 215-609-9	< 2.5	Xn	40 (1)
antimony trioxide (physically bound)	1309-64-4 215-175-0	< 8	Xn;N	40-51/53 (1)
calcium carbonate	471-34-1 207-439-9	< 10	-	-
amines, hydrogenated tallow alkyl (physically bound)	61788-45-2 262-976-6	< 2	Xi;N	38-41-50 (1)

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oxine-copper	10380-28-6 233-841-9	≤ 0.1	N	50/53 (1)
diantimony pentoxide (physically bound)	1314-60-9 215-237-7	< 2.5	Xn	20/22 (1)
aluminium hydroxide	21645-51-2 244-492-7	< 52	-	-
acrylic acid	79-10-7 201-177-9	< 2	C;N	10-20/21/22-35-50 (1)
1,2-dihydro-2,2,4-trimethylquinoline, oligomers (physically bound)	26780-96-1 500-051-3	< 0.5	N	51/53 (1)

(1) For R-phrases in full: see heading 16

## 3. Hazards identification

- This Safety Data Sheet applies to a group of products which are not hazardous as supplied, but which may emit hazardous thermal decomposition products (refer to section 10.3).
- No hazard classification in accordance with directives 67/548/EEC and 1999/45/EC

## 4. First aid measures

### 4.1 Eye contact:

- If molten material contacts the eyes:  
flush with water for at least 15 minutes, holding eyelids open
- Seek medical attention

### 4.2 Skin contact:

- If molten material contacts the skin:  
cool immediately with cold water
- Treat as a burn
- Do not attempt to remove material adhering to the skin
- Seek medical attention

### 4.3 After inhalation:

- Remove the victim into fresh air
- Keep warm and at rest
- Seek medical attention if breathing problems develop

### 4.4 After ingestion:

- Seek medical attention

## 5. Fire-fighting measures

### 5.1 Suitable extinguishing media:

- Water spray
- Polyvalent foam
- ABC powder
- Carbon dioxide

### 5.2 Unsuitable extinguishing media:

- No data available

### 5.3 Special exposure hazards:

- Toxic fumes may be evolved in a fire

### 5.4 Instructions:

- Dilute toxic gases with water spray

### 5.5 Special protective equipment for firefighters:

- Self-contained breathing apparatus with full facepiece
- Protective clothing for exposure to chemicals

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## 6. Accidental release measures

- 6.1 Personal protection/precautions:**  
See heading 8.2/8.3/13
- 6.2 Environmental precautions:**  
- Not applicable
- 6.3 Methods for cleaning up:**  
- Pick up for re-use or disposal

## 7. Handling and storage

- 7.1 Handling:**
- Refer to Tyco Electronics product installation instructions
  - Avoid overheating the product after shrinkage has occurred
  - Stop heating immediately if the product bubbles, chars or shows other signs of degradation
  - Avoid inhaling fumes which may be released during use
  - Avoid contact with molten material
  - Wash hands before eating, drinking or smoking
  - Wash hands after handling material
- 7.2 Storage:**
- Keep out of direct sunlight
  - Store in a cool area
  - Store in a dry area
  - Keep only in the original container
  - Meet the legal requirements
  - Keep away from: heat sources
- |                                |                     |      |
|--------------------------------|---------------------|------|
| <b>Storage temperature</b>     | : N.D.              | °C   |
| <b>Quantity limits</b>         | : N.D.              | kg   |
| <b>Storage life</b>            | : N.D.              | days |
| <b>Materials for packaging</b> | :                   |      |
| - suitable                     | : no data available |      |
| - to avoid                     | : no data available |      |
- 7.3 Specific uses:**
- See information supplied by the manufacturer

## 8. Exposure controls/Personal protection

### 8.1 Exposure limit values:

Some components are physically bound in the product and are not available for exposure.

Small amounts of substituted aromatic isocyanates may be released during installation

diphenylmethanediisocyanate, isomers and homologues

<b>MEL-LTEL</b>	: 0.02(-NCO)	mg/m <sup>3</sup>	-	ppm
<b>MEL-STEL</b>	: 0.07(-NCO)	mg/m <sup>3</sup>	-	ppm

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carbon black (physically bound)

TLV-TWA	: 3.5	mg/m <sup>3</sup>		ppm
TLV-STEL	: -	mg/m <sup>3</sup>		ppm
OES-LTEL	: 3.5	mg/m <sup>3</sup>	-	ppm
OES-STEL	: 7	mg/m <sup>3</sup>	-	ppm
MAK	: -	mg/m <sup>3</sup>	-	ppm
MAC-TGG 8 h	: 3.5	mg/m <sup>3</sup>		
VME-8 h	: 3.5	mg/m <sup>3</sup>	-	ppm
VLE-15 min.	: -	mg/m <sup>3</sup>	-	ppm
GWBB-8 h	: 3.6	mg/m <sup>3</sup>	-	ppm
GWK-15 min.	: -	mg/m <sup>3</sup>	-	ppm

antimony trioxide (physically bound)

TLV-TWA	: 0.5(Sb)	mg/m <sup>3</sup>		ppm
TLV-STEL	: -(Sb)	mg/m <sup>3</sup>		ppm
MAK	: -	mg/m <sup>3</sup>	-	ppm
TRK	: 0.1/0.3(Sb) E	mg/m <sup>3</sup>	-	ppm
MAC-TGG 8 h	: 0.5(Sb)	mg/m <sup>3</sup>		
VME-8 h	: 0.5(Sb)	mg/m <sup>3</sup>	-(Sb)	ppm
VLE-15 min.	: -(Sb)	mg/m <sup>3</sup>	-(Sb)	ppm
GWBB-8 h	: 0.5(Sb)	mg/m <sup>3</sup>	-(Sb)	ppm
GWK-15 min.	: -(Sb)	mg/m <sup>3</sup>	-(Sb)	ppm

calcium carbonate (physically bound)

MAC-TGG 8 h	: 10	mg/m <sup>3</sup>		
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oxine-copper

TLV-TWA	: 1 du + a (Cu)	mg/m <sup>3</sup>		ppm
TLV-STEL	: - (Cu)	mg/m <sup>3</sup>		ppm
OES-LTEL	: 0.2(Cu) fu/1 du+a	mg/m <sup>3</sup>	mg/m <sup>3</sup>	- ppm
OES-STEL	: 2(Cu) du+a	mg/m <sup>3</sup>	-	ppm
MAK	: 1 E	mg/m <sup>3</sup>		ppm
VME-8 h	: 0.2 fumées	mg/m <sup>3</sup>	-	ppm
VLE-15 min.	: -	mg/m <sup>3</sup>	-	ppm
GWBB-8 h	: 1 stof + a	mg/m <sup>3</sup>	-	ppm
GWK-15 min.	: -	mg/m <sup>3</sup>	-	ppm

diantimony pentoxide (physically bound)

TLV-TWA	: 0.5(Sb)	mg/m <sup>3</sup>		ppm
TLV-STEL	: -(Sb)	mg/m <sup>3</sup>		ppm
MEL-LTEL	: 0.5(Sb)	mg/m <sup>3</sup>	-(Sb)	ppm
MEL-STEL	: -(Sb)	mg/m <sup>3</sup>	-(Sb)	ppm
MAC-TGG 8 h	: 0.5(Sb)	mg/m <sup>3</sup>		
VME-8 h	: 0.5(Sb)	mg/m <sup>3</sup>	-(Sb)	ppm
VLE-15 min.	: -(Sb)	mg/m <sup>3</sup>	-(Sb)	ppm
GWBB-8 h	: 0.5(Sb)	mg/m <sup>3</sup>	-(Sb)	ppm
GWK-15 min.	: -(Sb)	mg/m <sup>3</sup>	-(Sb)	ppm

aluminium hydroxide (physically bound)

MAK	: 1.5 A	mg/m <sup>3</sup>		ppm
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acrylic acid

<b>TLV-TWA</b>	:		<b>mg/m<sup>3</sup></b>	<b>2</b>		<b>ppm</b>
<b>TLV-STEL</b>	:		<b>mg/m<sup>3</sup></b>	<b>-</b>		<b>ppm</b>
<b>OES-LTEL</b>	:	<b>30</b>	<b>mg/m<sup>3</sup></b>	<b>10</b>		<b>ppm</b>
<b>OES-STEL</b>	:	<b>60</b>	<b>mg/m<sup>3</sup></b>	<b>20</b>		<b>ppm</b>
<b>MAK</b>	:	<b>-</b>	<b>mg/m<sup>3</sup></b>	<b>-</b>		<b>ppm</b>
<b>MAC-TGG 8 h</b>	:	<b>5.9</b>	<b>mg/m<sup>3</sup></b>			
<b>VME-8 h</b>	:	<b>6</b>	<b>mg/m<sup>3</sup></b>	<b>2</b>		<b>ppm</b>
<b>VLE-15 min.</b>	:	<b>30</b>	<b>mg/m<sup>3</sup></b>	<b>10</b>		<b>ppm</b>
<b>GWBB-8 h</b>	:	<b>6.0</b>	<b>mg/m<sup>3</sup></b>	<b>2</b>		<b>ppm</b>
<b>GWK-15 min.</b>	:	<b>-</b>	<b>mg/m<sup>3</sup></b>	<b>-</b>		<b>ppm</b>

**Sampling methods:**

- Copper (Elements)	NIOSH 7300
- Copper Dust and fume	NIOSH 7029
- Copper, Dusts & Mists and fume	OSHA ID 121
- Copper, Dusts & Mists and fume	OSHA ID 125G
- Isocyanates	NIOSH 5522
- Isocyanates	NIOSH 5521
- Aluminum & Compounds (as Al)	NIOSH 7013
- Antimony & Compounds (as Sb)	NIOSH 2(S2)
- Antimony & Compounds (as Sb)	OSHA ID 121
- Antimony & Compounds (as Sb)	OSHA ID 125
- Antimony Particulates	NIOSH 4(261)
- Carbon Black	NIOSH 5000
- Carbon Black	OSHA ID 196
- Acrylic Acid	NON 10
- Acrylic Acid	OSHA 28

**8.2 Exposure controls:**

**8.2.1 Occupational exposure controls:**

- Use general and/or local exhaust ventilation of the workplace
- When using gas torches in confined spaces ensure an adequate supply of fresh air to avoid oxygen depletion

**8.2.2 Environmental exposure controls:** see heading 13

**8.3 Personal protection:**

**8.3.1 respiratory protection:**

- Not required under normal circumstances
- Approved respirator or self contained breathing apparatus for installations in confined/unventilated areas.

**8.3.2 hand protection:**

- Heat resistant gloves may be required to manipulate hot products after installation

Suitable materials: No data available

- Breakthrough time: N.D.

**8.3.3 eye protection:**

- Safety glasses, goggles or face shield depending on application

**8.3.4 skin protection:**

- Protective clothing
- Suitable materials: No data available

# THERMOFIT HEAT-SHRINKABLE POLYMERIC PRODUCTS

## 9. Physical and chemical properties

### 9.1 General information:

Appearance (at 20°C)	:	Plastic tubing and moulded parts in a variety of shapes, sizes and colours
Odour	:	Almost odourless
Colour	:	Variable in colour, depending on the composition

### 9.2 Important health, safety and environmental information:

pH value	:	N.D.	
Boiling point/boiling range	:	N.D.	°C
Flashpoint	:	N.D.	°C
Explosion limits	:	N.D.	vol% ( °C)
Vapour pressure (at 20°C)	:	N.D.	hPa
Vapour pressure (at 50°C)	:	N.D.	hPa
Relative density (at 20°C)	:	0.9/1.4	
Water solubility	:	Insoluble	
Soluble in	:	N.D.	
Relative vapour density	:	N.D.	
Viscosity	:	N.D.	Pa.s
Partition coefficient n-octanol/water	:	N.D.	
Evaporation rate	:		
ratio to butyl acetate	:	N.D.	
ratio to ether	:	N.D.	

### 9.3 Other information:

Melting point/melting range	:	N.D.	°C
Auto-ignition point	:	N.D.	°C
Saturation concentration	:	N.D.	g/m <sup>3</sup>

## 10. Stability and reactivity

### 10.1 Conditions to avoid/reactivity:

- Stable under normal conditions

### 10.2 Materials to avoid:

- Keep away from: heat sources

### 10.3 Hazardous decomposition products:

- Thermal decomposition and combustion products will depend on the base polymer used and may include, but not be limited to: alcohols, aldehydes, aromatic amines, aromatic isocyanates, bromine, carbon dioxide, carbon monoxide, esters, fluorinated hydrocarbons, hydrocarbons, hydrogen bromide, hydrogen fluoride, hydrogen chloride, ketones, nitrogen oxides, organic acids and tetrahydrofuran

## 11. Toxicological information

### 11.1 Acute toxicity:

LD50 oral rat	:	N.D.	mg/kg
LD50 dermal rat	:	N.D.	mg/kg
LD50 dermal rabbit	:	N.D.	mg/kg
LC50 inhalation rat	:	N.D.	mg/l/4 h
LC50 inhalation rat	:	N.D.	ppm/4 h

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## 11.2 Chronic toxicity:

Some components are physically bound in the product and are not available for exposure.

carbon black (physically bound)  
EC carc. cat. : 3  
Carcinogenicity (TLV) : A4  
Carcinogenicity (MAK) : 3B  
Teratogenicity (MAK) : -  
IARC classification : 2B

antimony trioxide (physically bound)  
EC carc. cat. : 3  
Carcinogenicity (TLV) : A2  
Carcinogenicity (MAK) : 2  
Teratogenicity (MAK) : -  
IARC classification : 2B

oxine-copper  
IARC classification : 3

acrylic acid  
Carcinogenicity (TLV) : A4  
IARC classification : 3

11.3 Routes of exposure: Skin contact/inhalation of thermal decomposition products

## 11.4 Acute effects/symptoms:

### AFTER INHALATION

OVERHEATING products during installation may produce fumes that can cause

- Dizziness
- Headache
- Irritation of the respiratory tract
- Nausea
- and in the absence of ventilation, possible asphyxiation

### AFTER EYE CONTACT

OVERHEATING products during installation may produce fumes that can cause

- Irritation of the eye tissue
- Redness of the eye tissue
- Watering of the eyes

### AFTER SKIN CONTACT

- These products would not be expected to cause irritation, or present a hazard to health through skin absorption
- Contact with hot/molten material may cause thermal burns

### AFTER INGESTION

- Not a normal route of exposure
- Acute oral toxicity is expected to be low, based on available data for ingredients

## 11.5 Chronic effects:

### On heating:

- May cause sensitization by skin contact
- May cause sensitization by inhalation

### ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:

- Skin rash/inflammation
- Respiratory difficulties
- Overheating products during installation may produce vapours/fumes that include aromatic isocyanates which can cause sensitisation by inhalation
- Hypersensitive persons may suffer respiratory problems (difficult breathing, coughing, asthma) even at low isocyanate concentrations.

# THERMOFIT HEAT-SHRINKABLE POLYMERIC PRODUCTS

## 12. Ecological information

### 12.1 Ecotoxicity:

- No data available

### 12.2 Mobility:

- **Volatile organic compounds (VOC):** N.D.%
- Insoluble in water

For other physicochemical properties see heading 9

### 12.3 Persistence and degradability:

- **biodegradation BOD<sub>5</sub>** : N.D. % **ThOD**
- **water** : - Non biodegradable in water
- **soil** : **T ½:** N.D. **days**

### 12.4 Bioaccumulative potential:

- **log P<sub>ow</sub>** : N.D.
- **BCF** : N.D.

### 12.5 Other adverse effects:

- **WGK** : - (Classification in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- **Effect on the ozone layer** : Not dangerous for the ozone layer (1999/45/EC)
- **Greenhouse effect** : no data available
- **Effect on waste water purification** : no data available

## 13. Disposal considerations

### 13.1 Provisions relating to waste:

- Waste material code (75/442/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 07 02 13 (waste plastic)
- Waste material code (Flanders): 567

### 13.2 Disposal methods:

- Landfill or incinerate at an approved site in accordance with national and local regulations
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber
- Use appropriate containment to avoid environmental contamination

### 13.3 Packaging/Container:

- No available data



# THERMOFIT HEAT-SHRINKABLE POLYMERIC PRODUCTS

## 14. Transport information

- 14.1 Classification of the substance in compliance with UN Recommendations  
UN number : -  
CLASS :  
SUB RISKS :  
PACKING :  
PROPER SHIPPING NAME :
- 14.2 ADR (transport by road)  
CLASS : NOT SUBJECT  
PACKING :  
DANGER LABEL TANKS :  
DANGER LABEL PACKAGES :
- 14.3 RID (transport by rail)  
CLASS : NOT SUBJECT  
PACKING :  
DANGER LABEL TANKS :  
DANGER LABEL PACKAGES :
- 14.4 ADNR (transport by inland waterways)  
CLASS : NOT SUBJECT  
PACKING :  
DANGER LABEL TANKS :  
DANGER LABEL PACKAGES :
- 14.5 IMDG (maritime transport)  
CLASS : NOT SUBJECT  
SUB RISKS :  
PACKING :  
MFAG :  
EMS :  
MARINE POLLUTANT :
- 14.6 ICAO (air transport)  
CLASS : NOT SUBJECT  
SUB RISKS :  
PACKING :  
PACKING INSTRUCTIONS PASSENGER AIRCRAFT :  
PACKING INSTRUCTIONS CARGO AIRCRAFT :
- 14.7 Special precautions in connection with transport : not restricted for any mode of international transport

# THERMOFIT HEAT-SHRINKABLE POLYMERIC PRODUCTS

## 15. Regulatory information

This preparation, although classified dangerous to health and/or environment in accordance with Directive 1999/45/EC, does not require mention of this on the label because of the form in which it is placed on the market.

Contains diphenylmethanediisocyanate, isomers and homologues.  
See information supplied by the manufacturer.

## 16. Other information

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.

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 obligations 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 this product.

**N.A.** = NOT APPLICABLE  
**N.D.** = NOT DETERMINED  
**(\*)** = INTERNAL CLASSIFICATION (NFPA)

### Exposure limits:

**TLV** : Threshold Limit Value - ACGIH USA 2003  
**OES** : Occupational Exposure Standards - United Kingdom 2003  
**MEL** : Maximum Exposure Limits - United Kingdom 2003  
**MAK** : Maximale Arbeitsplatzkonzentrationen - Germany 2002  
**TRK** : Technische Richtkonzentrationen - Germany 2002  
**MAC** : Maximale aanvaarde concentratie - The Netherlands 2003  
**VME** : Valeurs limites de Moyenne d'Exposition - France 1999  
**VLE** : Valeurs limites d'Exposition à court terme - France 1999  
**GWBB** : Grenswaarde beroepsmatige blootstelling - Belgium 2002  
**GWK** : Grenswaarde kortstondige blootstelling - Belgium 2002  
**EC** : Indicative occupational exposure limit values - directive 2000/39/EC

**I** : Inhalable fraction = **T**: Total dust = **E**: Einatembarer Aerosolanteil  
**R** : Respirable fraction = **A**: Alveolengängiger Aerosolanteil/Alveolar dust  
**C** : Ceiling limit

<b>a:</b>	aerosol	<b>r:</b>	rook/Rauch	(fume)
<b>d:</b>	damp (vapour)	<b>st:</b>	stof/Staub	(dust)
<b>du:</b>	dust	<b>ve:</b>	vezel	(fibre)
<b>fa:</b>	Faser (fibre)	<b>va:</b>	vapour	
<b>fi:</b>	fibre	<b>om:</b>	oil mist	
<b>fu:</b>	fume	<b>on:</b>	olienevel/Ölnebel	(oil mist)
<b>p:</b>	poussière (dust)	<b>part:</b>	particles	

### Chronic toxicity:

**K** : List of the carcinogenic substances and processes - The Netherlands 2003

## THERMOFIT HEAT-SHRINKABLE POLYMERIC PRODUCTS

### Full text of any R-phrases referred to under heading 2:

R10 : Flammable  
R20 : Harmful by inhalation  
R20/21/22 : Harmful by inhalation, in contact with skin and if swallowed  
R20/22 : Harmful by inhalation and if swallowed  
R35 : Causes severe burns  
R36/37/38 : Irritating to eyes, respiratory system and skin  
R38 : Irritating to skin  
R40 : Limited evidence of a carcinogenic effect  
R41 : Risk of serious damage to eyes  
R42/43 : May cause sensitization by inhalation and skin contact  
R50 : Very toxic to aquatic organisms  
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment  
R51/53 : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment