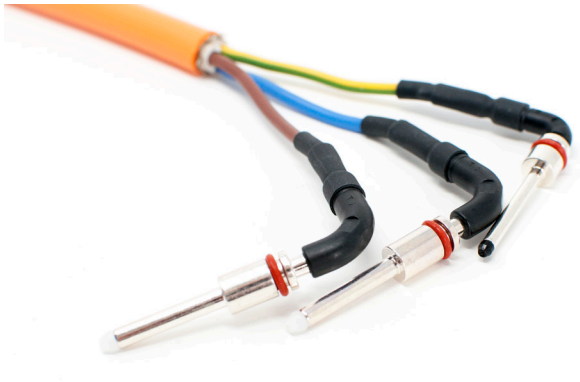
DERAY®-H

Thin Wall Crosslinked Polyolefin

Multi-purpose, flame retardant, flexible heat shrink tubing.



Features and Benefits

- Self-extinguishing (colors only)
- Flexible
- Suitable for various applications
- Good resistance to common fluids and solvents
- High dielectric strength
- Shrink ratio: 2:1
- Continuous operating temperature: -55°C to 135°C
- Shrink temperature: 110°C min.

Standards

- UL 224 125C ATF - UL file # E107857 (colors only)
- CSA 22.2 No 198.1 125C - CSA file # 065789_0_000 (colors only)
- Approved to major automotive OEM specifications

Typical Applications

- Abrasion and mechanical protection
- Cable insulation, marking and bundling of electrical or mechanical components
- Strain relief
- Corrosion protection

2:1

Shrink ratio

Markets:
Automotive, Industrial

Standards:

-55°C - 135°C

(-67°F to 275°F)

Continuous operating temperature

DSG-CANUSA

DERAY®-H

ORDER NUMBER	EXPANDED	RECOVERED		DELIVERY UNITS		
	INTERNAL DIAMETER (MIN) D	INTERNAL DIAMETER (MAX) D	TOTAL WALL THICKNESS (NOM) W	SPOOL*	MINI-SPOOL	LENGTHS
	mm (in)	*mm (in)*	*mm (in)*	*m (ft)*	*m (ft)*	*1.22 m (48 in)*
0047	1.2 (3/64)	0.6 (0.024)	0.40 (0.016)	300 (984)	150 (492)	25
0063	1.6 (1/16)	0.8 (0.031)	0.40 (0.016)	300 (984)	150 (492)	25
0094	2.4 (3/32)	1.2 (0.047)	0.50 (0.020)	300 (984)	150 (492)	25
0125	3.2 (1/8)	1.6 (0.063)	0.50 (0.020)	300 (984)	150 (492)	25
0187	4.8 (3/16)	2.4 (0.094)	0.50 (0.020)	300 (984)	75 (246)	25
0250	6.4 (1/4)	3.2 (0.126)	0.60 (0.024)	300 (984)	75 (246)	25
0375	9.5 (3/8)	4.8 (0.189)	0.60 (0.024)	150 (492)	75 (246)	25
0500	12.7 (1/2)	6.4 (0.252)	0.60 (0.024)	100 (328)	50 (164)	25
0625	16.0 (5/8)	8.0 (0.315)	0.60 (0.024)	100 (328)	50 (164)	10
0750	19.0 (3/4)	9.5 (0.374)	0.80 (0.031)	50 (164)	30 (98)	10
1000	25.4 (1)	12.7 (0.500)	0.90 (0.035)	50 (164)	30 (98)	10
1250	31.8 (1 ¼)	15.9 (0.626)	0.90 (0.035)	50 (164)	30 (98)	-
1500	38.0 (1 ½)	19.0 (0.748)	1.00 (0.039)	50 (164)	30 (98)	-
2000	51.0 (2)	25.4 (1.000)	1.00 (0.043)	50 (164)	30 (98)	-
3000	76.0 (3)	38.0 (1.496)	1.30 (0.051)	25 (82)	15 (49)	-
4000	101.6 (4)	50.8 (2.000)	2:00 (0.055)	25 (82)	15 (49)	-

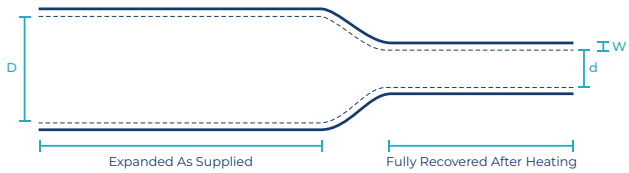
Clear items not UL or CSA listed.
*Delivery unit spool only available for black items

Ordering

Select a dimension which will shrink snugly over the application to be covered. If recovery is restricted the resultant wall thickness will be less than specified.

- Select options:
  - Color: Black (BK), red (RD), white (WT), clear (CL), blue (BL), yellow (YL), green (GR), brown (BN), grey (GY)
- Please specify the product name, order number and options you require:
  - Example: DERAY®-H, 0250 or 1/4 in, black

Please contact your Customer Service Representative for information on custom colors, sizes, lengths and material data sheet.



DERAY®-H colored

Technical data

PROPERTY	CURRENT VALUES	TEST METHODS
	MATERIAL	
Material	PE, modified; free of lead, silicone and cadmium	n/a
Surface	matt	n/a
Specific gravity	1.3 g/cm³ max.	ASTM-D 792, A-I
Shrink ratio	2:1	n/a
Longitudinal shrinkage	-10% max.	ASTM-D 2671
	MECHANICAL	
Tensile strength	15 MPa	IEC 60684-2
Elongation	450%	IEC 60684-2
Secant modulus	175 MPa max.	ASTM-D 882
	THERMAL	
Tensile strength after thermal ageing (168 h at 158°C)	12 MPa	UL 224
Elongation after thermal ageing (168 h at 158°C)	300%	UL 224
Tensile strength after thermal shock (4 h at 200°C)	13 MPa	IEC 811-1-2
Elongation after thermal shock (4 h at 200°C)	400%	IEC 811-1-2
Cold bend test	does not break at -55°C	ASTM-D 2671 Meth. C
Combustion behaviour	flame retardant	UL 224
Shrink temperature	110°C min.	n/a
Storage temperature	50°C max.	n/a
Continuous operating temperature	-55°C to 135°C	IEC 216
	CHEMICAL	
Corrosive action	non-corrosive	ASTM-D 2671 Meth. A
Compatibility with copper	non-corrosive	ASTM-D 2671 Meth. B
Resistance against chemicals	good	n/a
Water absorption	0.15% max.	VDE 0473
	ELECTRICAL	
Dielectric strength	24 kV/mm	VDE 0303 Part 2
Spec. volume resistivity	10^{15} Ω x cm	VDE 0303 Part 3
Insulation class	E	VDE 0530

DERAY®-H transparent

Technical data

PROPERTY	CURRENT VALUES	TEST METHODS
	MATERIAL	
Material	PE, modified, free of lead, silicone, halogen and cadmium	n/a
Surface	semi glossy	n/a
Specific gravity	1.0 g/cm^3 max.	ASTM-D 792, A-I
Shrink ratio	2:1	n/a
Longitudinal shrinkage	-6% max.	ASTM-D 2671
	MECHANICAL	
Tensile strength	19 MPa	IEC 60684-2
Elongation	530%	IEC 60684-2
Secant modulus	175 MPa max.	ASTM-D 882
	THERMAL	
Tensile strength after thermal ageing (168 h at 158°C)	18 MPa	UL 224
Elongation after thermal ageing (168 h at 158°C)	490%	UL 224
Tensile strength after thermal shock (4 h at 200°C)	18 MPa	IEC 811-1-2
Elongation after thermal shock (4 h at 200°C)	500%	IEC 811-1-2
Cold bend test	does not break at -55°C	ASTM-D 2671 Meth. C
Combustion behaviour	passed	FMVSS 302
Shrink temperature	110°C min.	n/a
Storage temperature	40°C max.	n/a
Continuous operating temperature	-55°C to 135°C	IEC 216
	CHEMICAL	
Corrosive action	non-corrosive	ASTM-D 2671 Meth. A
Compatibility with copper	non-corrosive	ASTM-D 2671 Meth. B
Resistance against chemicals	good	n/a
Water absorption	0.3% max.	VDE 0473
	ELECTRICAL	
Dielectric strength	26 kV/mm	VDE 0303 Part 2
Spec. volume resistivity	10^{15} Ω x cm	VDE 0303 Part 3

DERAY®-I 3000

Thin wall crosslinked polyolefin

High shrink ratio, multiple specifications flexible heat shrink tubing with excellent physical and mechanical properties.

Features and Benefits

- Self-extinguishing (colors only)
- Flexible
- High shrink ratio
- Resistant to common fluids and solvents
- Additionally available in RAL2003 orange color
- Shrink ratio: 3:1
- Continuous operating temperature: -55°C to 135°C
- Shrink temperature: 90°C min.

Standards

- UL 224 125C ATF - UL file # E107857 (colors only)
- CSA 22.2 No 198.1 125C - CSA file # 065789_0_000 (colors only)
- DEF STAN 59-97 Type 2b
- BS G198 Part 3 Type 11B
- VG95343 Part 5 Type A/B
- CNES approved and listed in Matrex database
- ECSS-Q-ST-70-02
- Approved to major automotive OEM specifications
- Fiat 91992

Typical Applications

- Electrical insulation of in-line splices
- Strain relief of terminals
- Color coding of electronic components
- Insulation and protection of objects with large diameter variations

3:1

Shrink ratio

-55°C - 135°C

(-67°F to 275°F)

Continuous operating temperature

Markets:
Automotive, Aerospace, Defense, Industrial, Mass transit

Standards:

DSG-CANUSA

DERAY®-I 3000

ORDER NUMBER	EXPANDED	RECOVERED		DELIVERY UNITS		
	INTERNAL DIAMETER (MIN) D	INTERNAL DIAMETER (MAX) D	TOTAL WALL THICKNESS (NOM) W	SPOOL*	MINI-SPOOL	LENGTHS
	mm (in)	*mm (in)*	*mm (in)*	*m (ft)*	*m (ft)*	*1.22 m (48 in)*
0063	1.6 (1/16)	0.5 (0.020)	0.45 (0.018)	300 (984)	150 (492)	25
0125	3.2 (1/8)	1.0 (0.039)	0.55 (0.022)	300 (984)	150 (492)	25
0187	4.8 (3/16)	1.5 (0.059)	0.60 (0.024)	300 (984)	75 (246)	25
0250	6.4 (1/4)	2.0 (0.079)	0.65 (0.026)	300 (984)	75 (246)	25
0375	9.5 (3/8)	3.0 (0.118)	0.75 (0.030)	150 (492)	75 (246)	25
0500	12.7 (1/2)	4.0 (0.157)	0.75 (0.030)	100 (328)	50 (164)	25
0750	19.0 (3/4)	6.0 (0.236)	0.85 (0.033)	50 (164)	30 (98)	10
1000	25.4 (1)	8.0 (0.315)	1.00 (0.039)	50 (164)	30 (98)	10
1500	38.0 (1 ½)	13.0 (0.512)	1.15 (0.045)	50 (164)	30 (98)	-

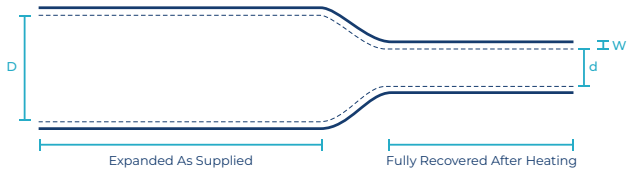
Clear items not UL listed.
*Delivery unit spool only available for black items

Ordering

Select a dimension which will shrink snugly over the application to be covered. If recovery is restricted the resultant wall thickness will be less than specified.

- Select options:
  - Color: Black (BK), red (RD), white (WT), clear (CL), blue (BL), yellow (YL), orange (OE)
- Please specify the product name, order number and options you require:
  - Example: DERAY®-I 3000, 0375 or 9/3 in, black

Please contact your Customer Service Representative for information on custom colors, sizes, lengths and material data sheet.



DSG-CANUSA

DERAY®-I 3000 colored

Technical data

PROPERTY	CURRENT VALUES	TEST METHODS
MATERIAL		
Material	PE, modified; free of lead, silicone and cadmium	n/a
Surface	matt	n/a
Specific gravity	1.3 g/cm³ max.	ASTM-D 792, A-I
Shrink ratio	3:1	n/a
Longitudinal shrinkage	-10% max.	ASTM-D 882
MECHANICAL		
Tensile strength	17 MPa	IEC 60684-2
Elongation	500%	IEC 60684-2
Secant modulus	175 MPa max.	ASTM-D 882
THERMAL		
Tensile strength after thermal ageing (168 h at 158°C)	13 MPa	UL 224
Elongation after thermal ageing (168 h at 158°C)	300%	UL 224
Tensile strength after thermal shock (4 h at 200°C)	15 MPa	IEC 811-1-2
Elongation after thermal shock (4 h at 200°C)	480%	IEC 811-1-2
Cold bend test	does not break at -55°C	ASTM-D 2671 Meth. C
Combustion behaviour	selfextinguishing	UL 224
Shrink temperature	90°C min.	n/a
Storage temperature	50°C max.	n/a
Continuous operating temperature	-55°C to 135°C	IEC 216
CHEMICAL		
Corrosive action	non-corrosive	ASTM-D 2671 Meth. A
Compatibility with copper	non-corrosive	ASTM-D 2671 Meth. B
Resistance against chemicals	good	n/a
Water absorption	0.20%	VDE 0473
ELECTRICAL		
Dielectric strength	24 kV/mm	VDE 0303 Part 2
Spec. volume resistivity	10^{16} Ω x cm	VDE 0303 Part 3

DERAY®-I 3000 transparent

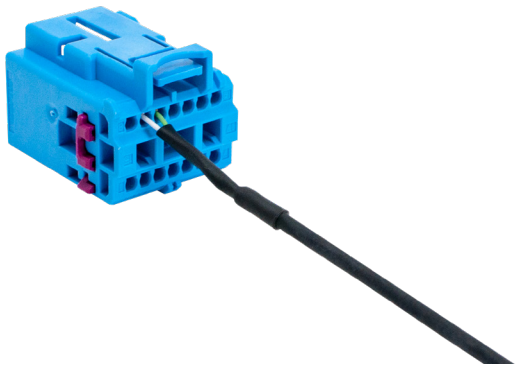
Technical data

PROPERTY	CURRENT VALUES	TEST METHODS
	MATERIAL	
Material	PE, modified, free of lead, silicon, cadmium and halogen free	n/a
Surface	matt	n/a
Specific gravity	1.0 g/cm^3 max.	ASTM-D 792, A-I
Shrink ratio	3:1	n/a
Longitudinal shrinkage	-10% max.	ASTM-D 2671
	MECHANICAL	
Tensile strength	20 MPa	IEC 60684-2
Elongation	550%	IEC 60684-2
Secant modulus	175 MPa max.	ASTM-D 882
	THERMAL	
Tensile strength after thermal ageing (168 h at 158°C)	18 MPa	UL 224
Elongation after thermal ageing (168 h at 158°C)	500%	UL 224
Tensile strength after thermal shock (4 h at 200°C)	19 MPa	IEC 811-1-2
Elongation after thermal shock (4 h at 200°C)	no cracking or dripping	IEC 811-1-2
Cold bend test	does not break at -55°C	ASTM-D 2671 Meth. C
Combustion behaviour	passed	FMVSS 302
Shrink temperature	90°C min.	n/a
Storage temperature	40°C max.	n/a
Continuous operating temperature	-55°C to 135°C	IEC 216
	CHEMICAL	
Corrosive action	non-corrosive	ASTM-D 2671 Meth. A
Compatibility with copper	non-corrosive	ASTM-D 2671 Meth. B
Resistance against chemicals	good	n/a
Water absorption	0.2% max.	VDE 0473
	ELECTRICAL	
Dielectric strength	24 kV/mm	VDE 0303 Part 2
Spec. volume resistivity	10^{16} Ω x cm	VDE 0303 Part 3

DERAY®-I

Thin Wall Crosslinked Polyolefin

Universal heat shrink tubing with excellent physical and mechanical properties.



Features and Benefits

- Self-extinguishing (colors only)
- Flexible
- Very good resistant to common fluids and solvents
- Excellent physical and electrical performance
- Shrink ratio: 2:1
- Continuous operating temperature: -55°C to 135°C
- Shrink temperature: 90°C min.

Standards

- UL 224 125C ATF - UL file # E107857 (colors only)
- CSA 22.2 No 198.1 125C - CSA file # 065789_0_000 (colors only)
- DEF STAN 59-97 Type 2b
- BS G198 Part 3 Type 11B
- VG95343 Part 5 Type A/B
- QPL SAE AS23053/5 Class 1 + 2
- CNES approved and listed in Matrex database
- ECSS-Q-ST-70-02
- Approved to major automotive OEM specifications

Typical Applications

- Electrical insulation of wire splices and terminals
- Protection against chemical strength
- Strain relief of wire terminations
- Cable marking and bundling of electrical or mechanical components
- Secures components from abrasion and fluids

2:1

Shrink ratio

-55°C - 135°C

(-67°F to 275°F)

Continuous operating temperature

Markets:
Automotive, Aerospace, Defense, Industrial, Mass transit

Standards:

RoHS · DEF STAN 59/97 · VG · QPL

DSG-CANUSA

DERAY®-I

ORDER NUMBER	EXPANDED	RECOVERED		DELIVERY UNITS		
	INTERNAL DIAMETER (MIN) D	INTERNAL DIAMETER (MAX) D	TOTAL WALL THICKNESS (NOM) W	SPOOL*	MINI-SPOOL	LENGTHS
	mm (in)	*mm (in)*	*mm (in)*	*m (ft)*	*m (ft)*	*1.22 m (48 in)*
0031	0.8 (1/32)	0.4 (0.016)	0.40 (0.016)	300 (984)	- (-)	- (-)
0047	1.2 (3/64)	0.6 (0.024)	0.40 (0.016)	300 (984)	150 (492)	25
0063	1.6 (1/16)	0.8 (0.031)	0.40 (0.016)	300 (984)	150 (492)	25
0094	2.4 (3/32)	1.2 (0.047)	0.50 (0.020)	300 (984)	150 (492)	25
0125	3.2 (1/8)	1.6 (0.063)	0.50 (0.020)	300 (984)	150 (492)	25
0187	4.8 (3/16)	2.4 (0.094)	0.50 (0.020)	300 (984)	75 (246)	25
0250	6.4 (1/4)	3.2 (0.126)	0.60 (0.024)	300 (984)	75 (246)	25
0375	9.5 (3/8)	4.8 (0.189)	0.60 (0.024)	150 (492)	75 (246)	25
0500	12.7 (1/2)	6.4 (0.252)	0.60 (0.024)	100 (328)	50 (164)	25
0625	16.0 (5/8)	8.0 (0.315)	0.60 (0.024)	100 (328)	50 (164)	10
0750	19.0 (3/4)	9.5 (0.374)	0.80 (0.031)	50 (164)	30 (98)	10
1000	25.4 (1)	12.7 (0.500)	0.90 (0.035)	50 (164)	30 (98)	10
1250	31.8 (1 ¼)	15.9 (0.626)	0.90 (0.035)	50 (164)	30 (98)	-
1500	38.0 (1 ½)	19.0 (0.748)	1.00 (0.039)	50 (164)	30 (98)	-
2000	51.0 (2)	25.4 (1.000)	1.10 (0.043)	50 (164)	30 (98)	-
3000	76.0 (3)	38.0 (1.496)	1.30 (0.051)	25 (82)	15 (49)	-
4000	101.6 (4)	50.8 (2.000)	1.40 (0.055)	25 (82)	15 (49)	-

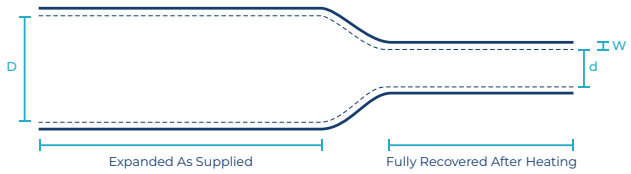
Clear items not UL or CSA listed.
*Delivery unit spool only available for black items

Ordering

Select a dimension which will shrink snugly over the application to be covered. If recovery is restricted the resultant wall thickness will be less than specified.

- Select options:
  - Color: Black (BK), red (RD), white (WT), clear (CL), blue (BL), yellow (YL), green (GR), brown (BN), grey (GY)
  - Approval: Standard, VG or QPL
- Please specify the product name, order number and options you require:
  - Example: DERAY®-I, 0375 or 3/8 in, black, QPL

Please contact your Customer Service Representative for information on custom colors, sizes, lengths and material data sheet.



DSG-CANUSA

DERAY®-I colored

Technical data

PROPERTY	CURRENT VALUES	TEST METHODS
MATERIAL		
Material	PE, modified; free of lead, silicone and cadmium	n/a
Surface	smooth	n/a
Specific gravity	1.3 g/cm³ max.	ASTM-D 792, A-I
Shrink ratio	2:1	n/a
Longitudinal shrinkage	+-5% max.	ASTM-D 2671
MECHANICAL		
Tensile strength	17 MPa	IEC 60684-2
Elongation	510%	IEC 60684-2
Secant modulus	175 MPa max.	ASTM-D 882
THERMAL		
Tensile strength after thermal ageing (168 h at 158°C)	13 MPa	UL 224
Elongation after thermal ageing (168 h at 158°C)	305%	UL 224
Tensile strength after thermal shock (4 h at 200°C)	14 MPa	IEC 811-1-2
Elongation after thermal shock (4 h at 200°C)	470%	IEC 811-1-2
Cold bend test	does not break at -55°C	ASTM-D 2671
Combustion behaviour	selfextinguishing	UL 224
Shrink temperature	90°C min.	n/a
Storage temperature	50°C max.	n/a
Continuous operating temperature	-55°C to 135°C	VDE 0473
CHEMICAL		
Corrosive action	non-corrosive	ASTM-D 2671 Meth. A
Compatibility with copper	non-corrosive	ASTM-D 2671 Meth. B
Resistance against chemicals	good	n/a
Water absorption	0.2% max.	VDE 0473
ELECTRICAL		
Dielectric strength	24 kV/mm	VDE 0303 Part 2
Spec. volume resistivity	10^{16} Ω x cm	VDE 0303 Part 3

DERAY®-I transparent

Technical data

PROPERTY	CURRENT VALUES	TEST METHODS
	MATERIAL	
Material	PE, modified; free of lead, silicone, halogen and cadmium	n/a
Surface	semi glossy	n/a
Specific gravity	1.0 g/cm^3 max.	ASTM-D 792, A-I
Shrink ratio	2:1	n/a
Longitudinal shrinkage	-5% max.	ASTM-D 2671
	MECHANICAL	
Tensile strength	20 MPa	IEC 60684-2
Elongation	550%	IEC 60684-2
Secant modulus	175 MPa max.	ASTM-D 882
	THERMAL	
Tensile strength after thermal ageing (168 h at 158°C)	18 MPa	UL 224
Elongation after thermal ageing (168 h at 158°C)	500%	UL 224
Tensile strength after thermal shock (4 h at 200°C)	19 MPa	IEC 811-1-2
Elongation after thermal shock (4 h at 200°C)	530%	IEC 811-1-2
Cold bend test	does not break at -55°C	ASTM-D 2671 Meth. C
Combustion behaviour	passed	FMVSS 302
Shrink temperature	90°C min.	n/a
Storage temperature	40°C max.	n/a
Continuous operating temperature	-55°C to 135°C	IEC 216
	CHEMICAL	
Corrosive action	non-corrosive	ASTM-D 2671 Meth. A
Compatibility with copper	non-corrosive	ASTM-D 2671 Meth. B
Resistance against chemicals	good	n/a
Water absorption	0.2% max.	VDE 0473
	ELECTRICAL	
Dielectric strength	24 kV/mm	VDE 0303 Part 2
Spec. volume resistivity	10^{16} Ω x cm	VDE 0303 Part 3

DERAY®-IAKT

Thin wall adhesive lined polyolefin

Adhesive lined heat shrink tubing ideal for effective moisture-resistant insulation.

Features and Benefits

- Flexible
- Adhesive bonds to plastics, rubber, steel polyethylene and other materials
- Shrink ratio: 3:1 & 4:1
- Continuous operating temperature of outer jacket: -55°C to 110°C
- Shrink temperature: 95°C min.

Standards

- Industrial and automotive OEM specifications

Typical Applications

- Environmental sealing and strain relief of connectors and terminals
- Moisture sealing and electrical insulation of simple in-line splices
- Abrasion resistance for tubes and pipes
- Repair of damaged wire harnesses

3:1 & 4:1

Shrink ratio

-55°C - 110°C

(-67°F to 230°F)

Continuous operating temperature

Markets:
Automotive, Industrial

Standards:

RoHS

DSG-CANUSA

DERAY®-IAKT

Dimensions for shrink ratio 3:1

ORDER NUMBER	EXPANDED	RECOVERED		DELIVERY UNITS	
	INTERNAL DIAMETER (MIN) D	INTERNAL DIAMETER (MAX) D	TOTAL WALL THICKNESS (NOM) W	SPOOL	LENGTHS
	mm (in)	*mm (in)*	*mm (in)*	*m (ft)*	*1.22 m (48 in)*
3.0/1.0	3.0 (0.118)	1.0 (0.039)	1.00 (0.039)	300 (984)	25
4.5/1.5	4.5 (0.177)	1.5 (0.059)	1.10 (0.043)	300 (984)	25
6.0/2.0	6.0 (0.236)	2.0 (0.079)	1.20 (0.047)	300 (984)	10
9.0/3.0	9.0 (0.354)	3.0 (0.118)	1.40 (0.055)	150 (492)	10
12.0/4.0	12.0 (0.472)	4.0 (0.157)	1.70 (0.067)	100 (328)	10
19.0/6.0	19.0 (0.748)	6.0 (0.236)	2.10 (0.083)	50 (164)	10
24.0/8.0	24.0 (0.945)	8.0 (0.315)	2.40 (0.094)	50 (164)	10
40.0/13.0	40.0 (1.575)	13.0 (0.512)	2.40 (0.094)	30 (98)	10

Dimensions for shrink ratio 4:1

ORDER NUMBER	EXPANDED	RECOVERED		DELIVERY UNITS	
	INTERNAL DIAMETER (MIN) D	INTERNAL DIAMETER (MAX) D	TOTAL WALL THICKNESS (NOM) W	SPOOL	LENGTHS
	mm (in)	*mm (in)*	*mm (in)*	*m (ft)*	*1.22 m (48 in)*
4.0/1.0	4.0 (0.157)	1.0 (0.039)	1.00 (0.039)	300 (984)	25
8.0/2.0	8.0 (0.315)	2.0 (0.079)	1.20 (0.047)	150 (492)	10
12.0/3.0	12.0 (0.472)	3.0 (0.118)	1.40 (0.055)	100 (328)	10
16.0/4.0*	16.0 (0.630)	4.0 (0.157)	1.70 (0.067)	50 (164)	10
24.0/6.0	24.0 (0.945)	6.0 (0.236)	2.10 (0.083)	50 (164)	10
32.0/8.0	32.0 (0.1.260)	8.0 (0.315)	2.40 (0.094)	50 (164)	10
52.0/13.0*	52.0 (2.047)	13.0 (0.512)	2.40 (0.094)	30 (98)	10

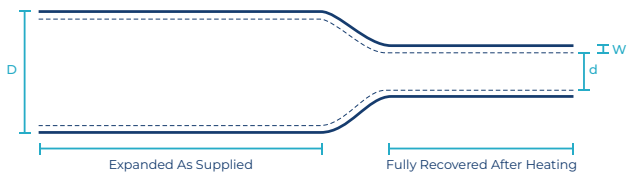
*IAKT 4:1 sizes 16.0/4.0 & 52.0/13.0 clear have different delivery units

Ordering

Select a dimension which will shrink snugly over the application to be covered. If recovery is restricted the resultant wall thickness will be less than specified.

- Select options:
  - Color: Black (BK), clear (CL)
- Please specify the product name, order number and options you require:
  - Example: DERAY®-IAKT 3:1, 40.0/13.0, black

Please contact your Customer Service Representative for information on custom colors, sizes, lengths and material data sheet.



DSG-CANUSA

DERAY®-IAKT colored

Technical data

PROPERTY	CURRENT VALUES	TEST METHODS
	MATERIAL	
Material	Polyolefin, modified; free of lead	n/a
Specific gravity	1.25 g/cm³ max.	ASTM-D 792, A-I
Shrink ratio	3:1 / 4:1	n/a
Longitudinal shrinkage	3:1: - 15 % max.; 4:1: - 18 % max.	ASTM-D 2671
	MECHANICAL	
Tensile strength	15 MPa	IEC 60684-2
Elongation	410%	IEC 60684-2
Secant modulus	175 MPa max.	ASTM-D 882
	THERMAL	
Tensile strength after thermal ageing (168 h at 150°C)	14 MPa	IEC 811-1-2
Elongation after thermal ageing (168 h at 150°C)	310%	IEC 811-1-2
Tensile strength after thermal shock (4 h at 200°C)	15 MPa	IEC 811-1-2
Elongation after thermal shock (4 h at 200°C)	370%	IEC 811-1-2
Cold bend test	does not break at -55°C	ASTM-D 2671 Meth. C
Combustion behaviour	jacket selfextinguishing	FMVSS 302
Shrink temperature	95°C min.	n/a
Storage temperature	40°C max.	n/a
Continuous operating temperature	-55°C to 110°C	IEC 216
	CHEMICAL	
Corrosive action	non-corrosive	ASTM-D 2671 Meth. A
Compatibility with copper	non-corrosive	ASTM-D 2671 Meth. B
Resistance against chemicals	good	n/a
Water absorption	0.15%	VDE 0472
	ELECTRICAL	
Dielectric strength	22 kV/mm	VDE 0303 Part 2
Spec. volume resistivity	10^{14} Ω x cm	VDE 0303 Part 3

DERAY®-IAKT transparent

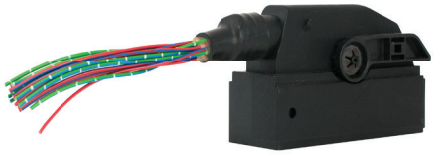
Technical data

PROPERTY	CURRENT VALUES	TEST METHODS
MATERIAL		
Material	Polyolefin, modified; free of lead and cadmium	n/a
Specific gravity	1.00 g/cm³ max.	ASTM-D 792, A-I
Shrink ratio	3:1 / 4:1	n/a
Longitudinal shrinkage	3:1: - 15 % max.; 4:1: - 18 % max.	ASTM-D 2671
MECHANICAL		
Tensile strength	17 MPa	IEC 60684-2
Elongation	450%	IEC 60684-2
Secant modulus	175 MPa max.	ASTM-D 882
THERMAL		
Tensile strength after thermal ageing (168 h at 150°C)	15 MPa	IEC 811-1-2
Elongation after thermal ageing (168 h at 150°C)	360%	IEC 811-1-2
Tensile strength after thermal shock (4 h at 200°C)	16 MPa	IEC 811-1-2
Elongation after thermal shock (4 h at 200°C)	380%	IEC 811-1-2
Cold bend test	does not break at -55°C	ASTM-D 2671 Meth. C
Combustion behaviour	passed	FMVSS 302
Shrink temperature	95°C min.	n/a
Storage temperature	50°C max.	n/a
Continuous operating temperature	-55°C to 110°C	IEC 216
CHEMICAL		
Corrosive action	non-corrosive	ASTM-D 2671 Meth. A
Compatibility with copper	non-corrosive	ASTM-D 2671 Meth. B
Resistance against chemicals	good	n/a
Resistance against mould	does not promote mould growth	ISO 846
Water absorption	0.17%	VDE 0472
ELECTRICAL		
Dielectric strength	23 kV/mm	VDE 0303 Part 2
Spec. volume resistivity	10^{14} Ω x cm	VDE 0303 Part 3

DERAY®-IHKT

Thin wall adhesive lined polyolefin

Flexible heat shrink tubing with a temperature resistant polyamide adhesive inner lining; ideal for protecting components in a wide range of electrical and mechanical applications where adhesion to connector and metal substrates is critical.



Features and Benefits

- High shrink ratio allows for coverage of irregularly shaped connectors and components
- Flame retardant
- Specially designed polyamide adhesive protects components at elevated temperatures
- Superior sealing against water and other contaminants
- Inner adhesive bonds to plastics, rubbers and metals
- Shrink ratio: 4:1
- Continuous operating temperature: -55°C to 125°C
- Shrink temperature: 100°C min.

Standards

- VG 95343 Part 12 Type D
- Approved to major automotive OEM specifications

Typical Applications

- Retrofit protection of connectors
- Repair of damaged wire harnesses
- Moisture sealing and strain relief at connectors and terminals

4:1

Shrink ratio

-55°C to 125°C

(-67°F to 257°F)

Continuous operating temperature

Markets:
Automotive, Industrial, Defense

Standards:

RoHS VG

DSG-CANUSA

DERAY®-IHKT

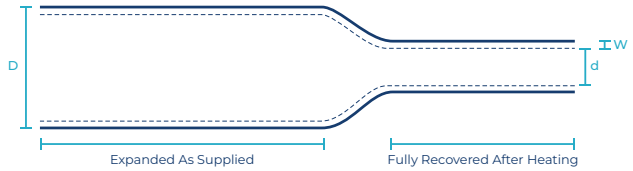
ORDER NUMBER	EXPANDED	RECOVERED		DELIVERY UNITS	
	INTERNAL DIAMETER (MIN) D	INTERNAL DIAMETER (MAX) D	TOTAL WALL THICKNESS (NOM) W	SPOOL	LENGTHS
	mm (in)	*mm (in)*	*mm (in)*	*m (ft)*	*1.22 m (48 in)*
0157	4.0 (0.157)	1.0 (0.039)	1.00 (0.039)	300 (984)	25
0315	8.0 (0.315)	2.0 (0.079)	1.20 (0.047)	150 (492)	10
0472	12.0 (0.472)	3.0 (0.118)	1.40 (0.055)	100 (328)	10
0630	16.0 (0.630)	4.0 (0.157)	1.70 (0.067)	50 (164)	10
0945	24.0 (0.945)	6.0 (0.236)	2.10 (0.083)	50 (164)	10
1260	32.0 (1.260)	8.0 (0.315)	2.40 (0.094)	50 (164)	10
2047	52.0 (2.047)	13.0 (0.512)	2.40 (0.094)	30 (98)	10

Ordering

Select a dimension which will shrink snugly over the application to be covered. If recovery is restricted the resultant wall thickness will be less than specified.

- Select options:
  - Color: Black (BK)
- Please specify the product name, order number and options you require:
  - Example: DERAY®-IHKT, 0630 or 16.0/4.0, black

Please contact your Customer Service Representative for information on custom colors, sizes, lengths and material data sheet.



DSG-CANUSA

DERAY®-IHKT

Technical data

PROPERTY	CURRENT VALUES	TEST METHODS
	MATERIAL	
Material	Polyolefin, modified; free of lead and cadmium	n/a
Surface	smooth	n/a
Specific gravity	1.25 g/cm³ max.	ASTM-D 792, A-I
Shrink ratio	4:1	n/a
Longitudinal shrinkage	- 18 % max.	ASTM-D 2671
	MECHANICAL	
Tensile strength	17 MPa	IEC 60684-2
Elongation	600%	IEC 60684-2
	THERMAL	
Tensile strength after heat aging (168 h at 160°C)	11 MPa	IEC 811-1-2
Elongation after heat aging (168 h at 160°C)	400%	IEC 811-1-2
Tensile Strength after heat shock (4 h at 210°C)	14 MPa	IEC 811-1-2
Elongation after heat shock (4 h at 210°C)	360%	IEC 811-1-2
Cold bend test	does not break at -55°C	ASTM-D 2671 Meth. C
Combustion behaviour	jacket selfextinguishing	ASTM-D 876
Shrink temperature	100°C min.	n/a
Storage temperature	50°C max.	n/a
Continuous operating temperature	-55°C to 125°C	IEC 216
	CHEMICAL	
Corrosive action	non-corrosive	ASTM-D 2671 Meth. A
Compatibility with copper	non-corrosive	ASTM-D 2671 Meth. B
Resistance against chemicals	good	n/a
	ELECTRICAL	
Dielectric strength	16 kV/mm	VDE 0303 Part 2
Volume resistivity	10^{14} Ω x cm	VDE 0303 Part 3

ECO BOX

Thin Wall Crosslinked Polyolefin

Halogen free, economical, heat shrink tubing.

Features and Benefits

- Flexible
- Economical
- General Purpose
- Halogen free alternative to PVC
- Shrink ratio: 2:1
- Continuous operating temperature: -55°C to 125°C
- Shrink temperature: 110°C min.

Typical Applications

- Abrasion protection
- Insulation of electrical or mechanical components
- Protection against mechanical damage and corrosion

2:1

Shrink ratio

-55°C - 125°C

(-67°F to 257°F)

Continuous operating temperature

Markets:
Automotive, Industrial, Aerospace

Standards:

RoHS

DSG-CANUSA

ECO BOX

ORDER NUMBER	EXPANDED	RECOVERED		DELIVERY UNITS	
	INTERNAL DIAMETER (MIN) D	INTERNAL DIAMETER (MAX) D	TOTAL WALL THICKNESS (NOM) W	SPOOL*	MINI-SPOOL
	mm (in)	*mm (in)*	*mm (in)*	*m (ft)*	*m (ft)*
0063	1.6 (1/16)	0.8 (0.031)	0.40 (0.016)	300* (984*)	150 (492)
0094	2.4 (3/32)	1.2 (0.047)	0.50 (0.020)	300* (984*)	150 (492)
0125	3.2 (1/8)	1.6 (0.063)	0.50 (0.020)	300 (984)	150 (492)
0187	4.8 (3/16)	2.4 (0.094)	0.50 (0.020)	300 (984)	75 (246)
0250	6.4 (1/4)	3.2 (0.126)	0.60 (0.024)	300 (984)	75 (246)
0375	9.5 (3/8)	4.8 (0.189)	0.60 (0.024)	150 (492)	75 (246)
0500	12.7 (1/2)	6.4 (0.252)	0.60 (0.024)	100 (328)	50 (164)
0625	16.0 (5/8)	8.0 (0.315)	0.60 (0.024)	- (-)	50 (164)
0750	19.0 (3/4)	9.5 (0.374)	0.80 (0.031)	50 (164)	30 (98)
1000	25.4 (1)	12.7 (0.500)	0.90 (0.035)	50 (164)	30 (98)
1500	38.0 (1 ½)	19.0 (0.748)	1.00 (0.039)	50 (164)	30 (98)
2000	51.0 (2)	25.4 (1.000)	1.00 (0.043)	50 (164)	30 (98)

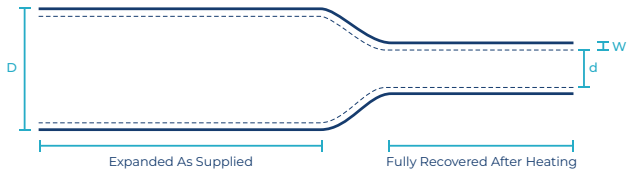
*Delivery unit spool only available for black items

Ordering

Select a dimension which will shrink snugly over the application to be covered. If recovery is restricted the resultant wall thickness will be less than specified.

- Select options:
  - Color: Black (BK), clear (CL)
- Please specify the product name, order number and options you require:
  - Example: DERAY®-HB, 0500 or 1/2 in, black

Please contact your Customer Service Representative for information on custom colors, sizes, lengths and material data sheet.



DSG-CANUSA

ECO BOX

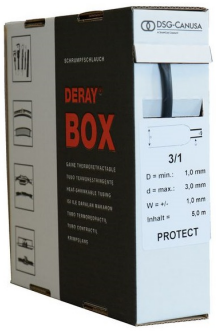
Technical data

PROPERTY	CURRENT VALUES	TEST METHODS
MATERIAL		
Material	PE, modified, free of halogen, lead and cadmium	n/a
Surface	semi glossy	n/a
Specific gravity	0.95 g/cm³ max.	ASTM-D 792, A-I
Shrink ratio	2:1	n/a
Longitudinal shrinkage	-6% max.	ASTM-D 2671
MECHANICAL		
Tensile strength	17 MPa	IEC 60684-2
Elongation	500%	IEC 60684-2
Secant modulus	170 MPa max.	ASTM-D 882
THERMAL		
Tensile strength after thermal ageing (168 h at 150°C)	16 MPa	IEC 811-1-2
Elongation after thermal ageing (168 h at 150°C)	470%	IEC 811-1-2
Tensile strength after thermal shock (4 h at 200°C)	16 MPa	IEC 811-1-2
Elongation after thermal shock (4 h at 200°C)	480%	IEC 811-1-2
Cold bend test	does not break at -55°C	ASTM-D 2671 Meth. C
Combustion behaviour	passed	FMVSS 302
Shrink temperature	110°C min.	n/a
Storage temperature	50°C max.	n/a
Continuous operating temperature	-55°C to 125°C	IEC 216
CHEMICAL		
Corrosive action	non-corrosive	ASTM-D 2671 Meth. A
Compatibility with copper	non-corrosive	ASTM-D 2671 Meth. B
Resistance against chemicals	good	n/a
Water absorption	0.3% max.	VDE 0473
ELECTRICAL		
Dielectric strength	20 kV/mm	VDE 0303 Part 2
Spec. volume resistivity	10^{15} Ω x cm	VDE 0303 Part 3

Protect box

Thin wall adhesive lined polyolefin

Adhesive lined heat shrink tubing ideal for effective moisture-resistant insulation.



Features and Benefits

- Flexible
- Adhesive bonds to plastics, rubber, steel polyethylene and other materials
- Shrink ratio: 3:1 & 4:1
- Continuous operating temperature of outer jacket: -55°C to 110°C
- Shrink temperature: 95°C min.

Standards

- Industrial and automotive OEM specifications

Typical Applications

- Environmental sealing and strain relief of connectors and terminals
- Moisture sealing and electrical insulation of simple in-line splices
- Abrasion resistance for tubes and pipes
- Repair of damaged wire harnesses

3:1 & 4:1

Shrink ratio

-55°C - 110°C

(-67°F to 230°F)

Continuous operating temperature

Markets:
Automotive, Industrial

Standards:

RoHS

DSG-CANUSA

Protect box

Dimensions for shrink ratio 3:1

ORDER NUMBER	EXPANDED	RECOVERED		DELIVERY UNITS	
	INTERNAL DIAMETER (MIN) D	INTERNAL DIAMETER (MAX) D	TOTAL WALL THICKNESS (NOM) W	SPOOL	LENGTHS
	mm (in)	*mm (in)*	*mm (in)*	*m (ft)*	*1.22 m (48 in)*
3.0/1.0	3.0 (0.118)	1.0 (0.039)	1.00 (0.039)	300 (984)	25
4.5/1.5	4.5 (0.177)	1.5 (0.059)	1.10 (0.043)	300 (984)	25
6.0/2.0	6.0 (0.236)	2.0 (0.079)	1.20 (0.047)	300 (984)	10
9.0/3.0	9.0 (0.354)	3.0 (0.118)	1.40 (0.055)	150 (492)	10
12.0/4.0	12.0 (0.472)	4.0 (0.157)	1.70 (0.067)	100 (328)	10
19.0/6.0	19.0 (0.748)	6.0 (0.236)	2.10 (0.083)	50 (164)	10
24.0/8.0	24.0 (0.945)	8.0 (0.315)	2.40 (0.094)	50 (164)	10
40.0/13.0	40.0 (1.575)	13.0 (0.512)	2.40 (0.094)	30 (98)	10

Dimensions for shrink ratio 4:1

ORDER NUMBER	EXPANDED	RECOVERED		DELIVERY UNITS	
	INTERNAL DIAMETER (MIN) D	INTERNAL DIAMETER (MAX) D	TOTAL WALL THICKNESS (NOM) W	SPOOL	LENGTHS
	mm (in)	*mm (in)*	*mm (in)*	*m (ft)*	*1.22 m (48 in)*
4.0/1.0	4.0 (0.157)	1.0 (0.039)	1.00 (0.039)	300 (984)	25
8.0/2.0	8.0 (0.315)	2.0 (0.079)	1.20 (0.047)	150 (492)	10
12.0/3.0	12.0 (0.472)	3.0 (0.118)	1.40 (0.055)	100 (328)	10
16.0/4.0*	16.0 (0.630)	4.0 (0.157)	1.70 (0.067)	50 (164)	10
24.0/6.0	24.0 (0.945)	6.0 (0.236)	2.10 (0.083)	50 (164)	10
32.0/8.0	32.0 (0.1.260)	8.0 (0.315)	2.40 (0.094)	50 (164)	10
52.0/13.0*	52.0 (2.047)	13.0 (0.512)	2.40 (0.094)	30 (98)	10

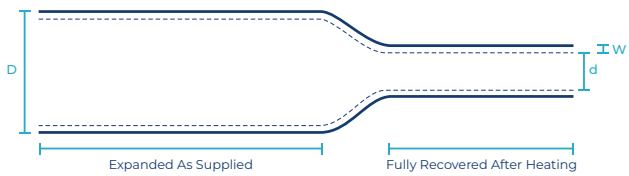
*IAKT 4:1 sizes 16.0/4.0 & 52.0/13.0 clear have different delivery units

Ordering

Select a dimension which will shrink snugly over the application to be covered. If recovery is restricted the resultant wall thickness will be less than specified.

- Select options:
  - Color: Black (BK), clear (CL)
- Please specify the product name, order number and options you require:
  - Example: DERAY®-IAKT 3:1, 40.0/13.0, black

Please contact your Customer Service Representative for information on custom colors, sizes, lengths and material data sheet.



DSG-CANUSA