DWFR TUBING

Dual Wall Heat Shrink Tubing

Highly Flame-Retardant, UL VW-1 Rated

DWFR tubing from TE Connectivity (TE) is a highly flame-retardant, high-shrink ratio, adhesive-lined tubing made from a polyolefin jacket with a thermoplastic adhesive inner wall. It insulates and environmentally seals and protects components and other electrical connections and terminations. DWFR's medium wall thickness provides increased mechanical protection. Its high shrink ratio allows DWFR to cover a variety of substrates with a limited number of tubing sizes. It is suitable for sealing and protection of connector-to-cable transitions and repairing damaged cable jackets. It can also be used to create and seal breakouts in harnesses.

KEY FEATURES

- Highly flame-retardant with UL VW-1 flammability rating
- 3:1 and 4:1 shrink ratios provide design versatility
- Moisture-resistant seal
- Withstands mechanical stress for increased product reliability

APPLICATIONS

- Household appliances
- Automotive
- Commercial electronics and communications
- Consumer products
- Industrial equipment

MATERIALS

- Irradiated polyolefin jacket
- Thermoplastic adhesive inner wall

ELECTRICAL

- Provides excellent electrical insulation

MECHANICAL

- Medium wall jacket provides mechanical protection from abrasion and bending
- Adhesive liner bonds to a variety of substrate materials, providing protection from moisture ingress

TEMPERATURE RATING

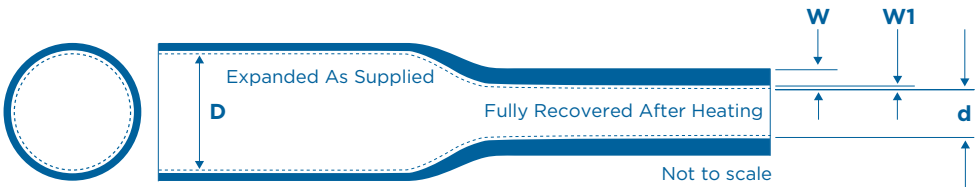
- Minimum shrink temperature: 60°C [140°F]
- Full recovery temperature: 110°C [256°F]
- Operating temperature: -40°C to 110°C [-40°F to 230°F]

STANDARDS AND SPECIFICATIONS

- Customer drawing: DWFR
- UL 224 VW-1
- UL file E35586
- Submitted for CSA Certification

ORDERING INFORMATION

- Color: Black (-0)
- Standard packaging (-STK): Cut pieces that are 1.2m [4ft] long. Optional special order packaging (-SP): Spool, varying lengths (consult TE for details)
- Ordering description: Specify product name, size, color and packaging. For example, DWFR-3/1-0-STK



DIMENSIONS

Shrink Ratio	Size	Minimum Expanded I.D. (D)	Maximum Recovered I.D. (d)	Total Recovered Wall Thickness (W)	Minimum Recovered Inner Meltable Wall Thickness (W1)
3:1	3/1	3.0 [0.118]	1.0 [0.039]	1.12 ± 0.25 [0.044 ± 0.010]	0.25 [0.010]
	6/2	6.0 [0.236]	2.0 [0.079]	1.14 ± 0.25 [0.045 ± 0.010]	0.25 [0.010]
	9/3	9.0 [0.354]	3.0 [0.118]	1.40 ± 0.25 [0.055 ± 0.010]	0.56 [0.022]
	12/4	12.0 [0.472]	4.0 [0.157]	1.78 ± 0.36 [0.070 ± 0.014]	0.58 [0.023]
	19/6	19.0 [0.748]	6.0 [0.236]	2.25 ± 0.50 [0.088 ± 0.020]	0.58 [0.023]
	24/8	24.0 [0.945]	8.0 [0.315]	2.54 ± 0.50 [0.100 ± 0.020]	0.79 [0.031]
	40/13	40.0 [1.575]	13.0 [0.512]	2.54 ± 0.50 [0.100 ± 0.020]	0.86 [0.034]
4:1	4/1	4.0 [0.157]	1.0 [0.039]	1.12 ± 0.25 [0.044 ± 0.010]	0.25 [0.010]
	8/2	8.0 [0.315]	2.0 [0.079]	1.14 ± 0.25 [0.045 ± 0.010]	0.25 [0.010]
	12/3	12.0 [0.472]	3.0 [0.118]	1.40 ± 0.25 [0.055 ± 0.010]	0.56 [0.022]
	16/4	16.0 [0.630]	4.0 [0.157]	1.78 ± 0.36 [0.070 ± 0.014]	0.58 [0.023]
	24/6	24.0 [0.945]	6.0 [0.236]	2.25 ± 0.50 [0.088 ± 0.020]	0.58 [0.023]
	32/8	32.0 [1.260]	8.0 [0.315]	2.54 ± 0.50 [0.100 ± 0.020]	0.79 [0.031]
	52/13	52.0 [2.047]	13.0 [0.512]	2.54 ± 0.50 [0.100 ± 0.020]	0.86 [0.034]

PRODUCT DESCRIPTION AND ORDERING INFORMATION

Shrink Ratio	Material Description	Material Number
3:1	DWFR-3/1-0-STK	EH2288-000
	DWFR-6/2-0-STK	EH2289-000
	DWFR-9/3-0-STK	EH2290-000
	DWFR-12/4-0-STK	EH2291-000
	DWFR-19/6-0-STK	EH2292-000
	DWFR-24/8-0-STK	EH2293-000
	DWFR-40/13-0-STK	EH2294-000

Shrink Ratio	Material Description	Material Number
4:1	DWFR-4/1-0-STK	EH2295-000
	DWFR-8/2-0-STK	EH2296-000
	DWFR-12/3-0-STK	EH2297-000
	DWFR-16/4-0-STK	EH2298-000
	DWFR-24/6-0-STK	EH2299-000
	DWFR-32/8-0-STK	EH2300-000
	DWFR-52/13-0-STK	EH2301-000

DWFR-3/1-0-STK

- Stick Packaging (Cut pieces that are 1.2m [4ft] long)
- Color is Black
- Size
- Highly Flame-retardant, Dual Wall Product

PROPERTY REQUIREMENTS

Property	Unit	Requirement	Test Method
Physical			
Dimensions*	mm [in]	As shown in DIMENSIONS table	ASTM D 2671
Longitudinal Change	Percent	0, -15%	ASTM D 2671
Tensile Strength*	psi (MPa)	1500 (10.3) minimum	ASTM D 2671
Ultimate Elongation*	Percent	200 minimum	ASTM D 2671
Secant Modulus (Expanded)	psi (MPa)	2.5 x 10^4 (172) maximum	ASTM D 882, 2% strain
Cold Bend Test at -30 ± 1°C (-22 ± 1.8°F) for 1 hour	–	No cracking	UL 224, section 5.9
Heat Shock* 4 hours at 250 ± 1°C (482 ± 1.8°F)	–	No dripping. flowing or cracking of outer wall	UL 224, section 5.8
Heat Resistance 168 hours at 158 ± 2°C (347 ± 4°F) followed by test for Tensile strength Elongation	 psi (MPa) Percent	 70% of original minimum 100% minimum	UL 224
Sealing Efficiency	–	No openings on reheat	AMS-DTL 23053/4
Electrical			
Dielectric Strength	Volts/mil (V/mm)	300 (11,811) minimum on dual wall specimen	ASTM D 2671
Volume Resistivity	ohm/cm	10^{14} minimum on dual wall specimen	ASTM D 2671
Chemical			
Copper Mirror Corrosion 16 hours at 121 ± 2°C (250 ± 4°F)	–	No removal of copper	ASTM D 2671, Procedure A
Copper Contact Corrosion 16 hours at 121 ± 2°C (250 ± 4°F)	–	No pitting or blackening of copper	ASTM D 2671, Procedure B
Flammability	–	Pass	UL 224, VW-1
Water Absorption 24 hours at 23°C (73°F)	Percent	0.5 maximum	ASTM D 2671

*Denotes Lot Acceptance Test

FOR MORE INFORMATION

VIsit www.te.com and enter search term “DWFR” or visit www.te.com/DWFRtubing

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