UNIGARD™ RE DFDA-1638 NT

Non-Halogen, Flame Retardant, Thermoplastic Jacket and Insulation Compound

The Dow Chemical Company

Message:

Color sheath/various telecommunications and industrial applications

General Information	
Additive	UV stabilizer
Uses	Flame Retardant Jacketing Industrial Cable Jacketing LSZH Jacketing Wire and cable applications Communication wire sheath
Agency Ratings	IEEE 383 UL 1685 UL VW-1
Forms	Particle

Physical	Nominal Value	Unit	Test Method
Density	1.50	g/cm³	ASTM D1505
Mechanical Water Absorption - 7 days (70°C)	9.50	mg/in²	UL 1581
Wear resistance-1000 cycle	2	%	ASTM D1044
Shrinkback - 4 hrs (100°C) [1]	1.0	%	REA 89
Tensile strength retention-10 days(110°C) [2]	110	%	ASTM D638
Elongation retention rate-10 days(110°C) [3]	89	%	ASTM D638
Thermal deformation [4]			UL 1581
90°C	2.8	%	UL 1581
100°C	10	%	UL 1581
121°C	48	%	UL 1581
Oxygen sensing time-Al pans, no crimping, no screen, 100 ml oxygen/min	25	min	ASTM D3895
Acid Gas Test - Generation	0.47	%	MIL C-24643
Toxicity	1.40		NES 713
Acid gas emission pH	4.50		IEC 754-2
Acid gas emission conductivity	No conductivity increase of the test fluid		IEC 754-2
Temperature index (combustion)-Critical	> 350	°C	NES 715
Smoke (2.54mm)	5.30		NES 711
Smoke Density			ASTM E662

Flaming Mode - D1.5 : 2.54 mm	0.62		ASTM E662
Flaming Mode - D4.0 : 2.54 mm	1.0		ASTM E662
Flaming Mode - Dm, (corr.) : 2.54 mm	82		ASTM E662
Non-flaming Mode - D1.5 : 2.54 mm	0.24		ASTM E662
Non-flaming Mode - D4.0 : 2.54 mm	16		ASTM E662
Non-flaming Mode - Dm, (corr.) : 2.54 mm	290		ASTM E662
Environmental Stress-Cracking Resistance [5] (10% Igepal)	720	hr	ASTM D1693
Hardness	**Nominal Value**	**Unit**	**Test Method**
Durometer Hardness (Shore A)	89		ASTM D2240
Mechanical	**Nominal Value**	**Unit**	**Test Method**
Tensile Strength [6]	12.4	MPa	ASTM D638
Tensile Elongation [7] (Break)	180	%	ASTM D638
Flexural Modulus - 1% Secant	214	MPa	ASTM D790
Elastomers	**Nominal Value**	**Unit**	**Test Method**
Tear Strength	6.13	kN/m	ASTM D470
Thermal	**Nominal Value**	**Unit**	**Test Method**
Brittleness Temperature	-25.0	°C	ASTM D746
Electrical	**Nominal Value**	**Unit**	**Test Method**
Volume Resistivity (23°C)	3.5E+14	ohms·cm	ASTM D257
Dielectric Constant			ASTM D150
60 Hz	3.42		ASTM D150
100 kHz	3.49		ASTM D150
1 MHz	3.42		ASTM D150
6 MHz	3.34		ASTM D150
Dissipation Factor			ASTM D150
60 Hz	3.7E-3		ASTM D150
100 kHz	7.6E-3		ASTM D150
1 MHz	0.014		ASTM D150
6 MHz	0.016		ASTM D150
Flammability	**Nominal Value**	**Unit**	**Test Method**
Oxygen Index	39	%	ASTM D2863
Additional Information			

Fluid Resistance:Diesel Fuel, MIL-F-16884, 24 hrs, 35°C
#14 AWG (1.63 mm dia.) solid copper conductor with 0.045 in (1.1 mm) insulation. Full immersion of tubular specimens.
Tensile Strength Retention: 77%
Elongation Retention: 101%
Hydraulic Fuel, MIL-H-5606, 24 hrs, 49°C
#14 AWG (1.63 mm dia.) solid copper conductor with 0.045 in (1.1 mm) insulation. Full immersion of tubular specimens.
Tensile Strength Retention: 61%
Elongation Retention: 93%
Hydraulic Fuel, MIL-H-17672, 24 hrs, 49°C
#14 AWG (1.63 mm dia.) solid copper conductor with 0.045 in (1.1 mm) insulation. Full immersion of tubular specimens.
Tensile Strength Retention: 73%
Elongation Retention: 111%
Lubricating Oil, MIL-L-23699, 24 hrs, 49°C
#14 AWG (1.63 mm dia.) solid copper conductor with 0.045 in (1.1 mm) insulation. Full immersion of tubular specimens.
Tensile Strength Retention: 80%
Elongation Retention: 124%
ASTM #2 Oil, 4 hrs, 70°C
#14 AWG (1.63 mm dia.) solid copper conductor with 0.045 in (1.1 mm) insulation. Full immersion of tubular specimens.
Tensile Strength Retention: 68%
Elongation Retention: 139%
Turbine Fuel, JP-4, MIL-T-5624, 24 hrs, 23°C
#14 AWG (1.63 mm dia.) solid conductor with 0.030 in (0.76 mm) insulation. Full immersion of tubular specimens.
Tensile Strength Retention: 76%
Elongation Retention: 160%
Turbine Fuel, JP-5, MIL-T-5624, 24 hrs, 23°C
#14 AWG (1.63 mm dia.) solid conductor with 0.030 in (0.76 mm) insulation. Full immersion of tubular specimens.
Tensile Strength Retention: 76%
Elongation Retention: 97%
Cleaner, Isopropyl Alcohol, TT-I-735, 24 hrs, 23°C
#14 AWG (1.63 mm dia.) solid conductor with 0.030 in (0.76 mm) insulation. Full immersion of tubular specimens.
Tensile Strength Retention: 82%
Elongation Retention: 103%
Coolant, Monsanto Coolanol 25, 24 hrs
#14 AWG (1.63 mm dia.) solid conductor with 0.030 in (0.76 mm) insulation. Full immersion of tubular specimens.
Tensile Strength Retention: 92%
Elongation Retention: 89%

Extrusion instructions

DFDA-1638 Natural can be processed on a wide range of commercially available thermoplastic extrusion equipment. This material exhibits an ease of processing that is unique for highly filled non-halogen products now on the market. We suggest beginning with the recommended conditions listed below.Extruder
Extruder L/D: 20:1 to 24:1
Screws Suggested: Single flight with metering section, Barrier screws, Maddock screw
Screw Delivery End: Shallow rather than deep
Compression Ratio: 2:1 to 3:1
Screen Pack/Inch: 20/80/20 mesh
Temperature Profile
Feed Zone: 300°F-325°F (149°C-162°C)
Center Zones: 380°F-400°F (193°C-204°C)
Head/Die Zones: 350°F-360°F (175°C-180°C)
Conductor Preheat: 250°F (121°C)
Draw-Down Ratio (DDR)
Core Diameter less than 0.5 in (13 mm) 1:1 to 1.25:1
Core Diameter greater than 0.5 in (13 mm) 2:1
Tooling
Semi-pressure tooling improves surface finish.
Tube-on tooling: Retract guider-tip slightly into die.
Die
Single tapered short land die is preferred.
Vacuum
Though not usually necessary, on occasion may help obtain a tight jacket and offset any low DDR effect.
Air-Gap/Cooling Water
Short air gap (such as 6 in [150 mm]) and ambient water
Pre-Drying
Pre-drying at approximately 158°F (70°C) for 4 hours is recommended in commercially available dehumidifying dryers. Do not heat over 195°F (90°C).
Colorability
UNIGARD RE DFDA-1638 Natural is a colorable compound. Color masterbatch materials designed for use with polyethylene or ethylene copolymer wire and cable products are recommended. Generally speaking, color masterbatch added at the level from 0.5 to 1.0% by weight gives adequate color and disperses well in the extrusion process.

NOTE	
1.	#14 AWG (1.63 mm dia.) solid copper conductor with 0.045 in (1.1 mm) insulation.
2.	#14 AWG (1.63 mm dia.) solid copper conductor with 0.030 in (0.76 mm) insulation.
3.	#14 AWG (1.63 mm dia.) solid copper conductor with 0.030 in (0.76 mm) insulation.
4.	#14 AWG (1.63 mm dia.) solid copper conductor with 0.045 in (1.1 mm) insulation.
5.	No Cracks
6.	#14 AWG (1.63 mm dia.) solid copper conductor with 0.030 in (0.76 mm) insulation.
7.	#14 AWG (1.63 mm dia.) solid copper conductor with 0.030 in (0.76 mm) insulation.

Recommended distributors for this material

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