



SI-LINK™ DFDB-5445 BK

Polyethylene Moisture Curable System, Flame Retardant Masterbatch

Overview

SI-LINK™ DFDB-5445 BK is a RoHS (Reduction of Hazardous Substances)-compliant flame retardant masterbatch designed to be used in conjunction with SI-LINK™ DFDA-5451 NT Polyethylene and the catalyst masterbatch SI-LINK™ DFDB-5480 NT Polyethylene to form a flame retardant SI-LINK polyethylene insulation system. This system is bulletinized by UL as DFDB-5445 BK and is moisture curable. The specific gravity of the system is 1.02. It is recommended for use in low voltage power cable and industrial cable applications. It is formulated to pass the UL-44 horizontal burn test on larger cables.

SI-LINK™ DFDB-5445 BK, a highly filled black flame retardant master-batch, is intended to be used at a 35% concentration along with 60% SI-LINK Polyethylene DFDA-5451 NT and 5% SI-LINK DFDB-5480 NT Catalyst Master-batch on size #2 AWG conductors and larger. At this concentration the requirements for XHH, XHHW, XHHW-2, RHH, RHW, RHW-2, SIS, USE and USE-2 cables as defined by UL-44, UL-854 are satisfied.

SI-LINK™ DFDB-5445 BK offers flexibility in tailoring the formulation to meet the horizontal burn requirement on a range of cable sizes. At increased concentrations, SI-LINK™ DFDB-5445 BK has been shown to provide horizontal burn test compliance in smaller sizes. The economics of the formulation may be optimized for a particular application depending on the cable sizes produced and the UL submittal sizes selected. Such factors as processing conditions, degree of cure and type of conductor can affect the results, so cable manufacturers must determine the optimal formulations for their applications. Recommendations are available upon request.

SPECIFICATIONS

The SI-LINK™ DFDB-5445 BK system is bulletinized by UL for XHH, XHHW, XHHW-2, RHH, RHW, RHW-2, SIS, USE and USE-2 on sizes 2 AWG and larger. It is suitable for CSA RW-90, and RWU-90 applications.

Physical	Nominal Value (English)	Nominal Value (SI)	Test Method
Density ¹	1.02 g/cm ³	1.02 g/cm ³	ASTM D792
Elastomers	Nominal Value (English)	Nominal Value (SI)	Test Method
Tensile Strength	2000 psi	13.8 MPa	ASTM D412
Tensile Elongation (Break)	300 %	300 %	ASTM D412
Thermal	Nominal Value (English)	Nominal Value (SI)	Test Method
Hot Deformation (268°F (131°C))	< 15 %	< 15 %	UL 44
Hot Set - Elongation ² (392°F (200°C))	< 50 %	< 50 %	IEC 60811-2-1
Aging	Nominal Value (English)	Nominal Value (SI)	Test Method
Change in Relative Permittivity			UL 44
1-14 days	1.0 %	1.0 %	
7-14 days	-3.0 %	-3.0 %	
Retention of Tensile Elongation - 7 days			ASTM D412
250°F (121°C)	80 %	80 %	
Retention of Tensile Strength - 7 days			ASTM D412
250°F (121°C)	80 %	80 %	
Electrical	Nominal Value (English)	Nominal Value (SI)	Test Method
Relative Permittivity ³	4.00	4.00	UL 44
Capacitance ⁴			UL 44
pf, 1 day : 194°F (90°C)	950	950	
pf, 14 days : 194°F (90°C)	950	950	
pf, 7 days : 194°F (90°C)	950	950	
Flammability	Nominal Value (English)	Nominal Value (SI)	Test Method
Oxygen Index	26 %	26 %	ASTM D2863
Flame Test - Horizontal, No. 4 AWG 60 mil wall ⁵	Pass	Pass	UL 44
Additional Information	Nominal Value (English)	Nominal Value (SI)	Test Method
Crushing Test	1260 lbf	5605 N	UL 44
Flexibility - 4 hrs ⁵ (-13°F (-25°C))	No visible cracks	No visible cracks	UL 854

Extrusion Notes

The data below summarizes conditions for a commercial extrusion run of SI-LINK™ DFDB-5445 BK (DFDB-5445 BK/DFDA-5451/DFDB-5480, 35%/60%/5%). Using these conditions with a standard polyethylene screw afforded high quality finished wire. Desiccant drying of the masterbatches at 150°F (66°C) for 4-6 hours is recommended. Conductor pre-heat of 176-212°F (80-100°C) is recommended to obtain the optimum physical properties. Adequate curing requires exposure for a minimum of 24-48 hours to 194°F (90°C) water or steam. Exact extrusion characteristics will of course be dependent on the equipment in use and can only be determined during cable trials.

Extruder

Screw L/D: 15:1 to 20:1

Screw Suggested: Single Flight

Compression Ratio: 2.5:1 to 3.5:1

Screen Pack: 20/40/60/20 Mesh

Extrusion Temperatures**BARREL:**

Barrel Feed Zone: 300°F (149°C)

Barrel Center Zone: 320°F (160°C)

Barrel Metering Zone: 340°F (171°C)

CROSSHEAD:

Head: 340°F (171°C)

Die: 340°F (171°C)

Melt Temperature: 365°F (185°C)

Notes

These are typical properties only and are not to be construed as specifications. Users should confirm results by their own tests.

¹ 23°C

² 15 min, 20N/cm²

³ 1 day. These tests were conducted on #14 AWG solid wires insulated with 0.030 in. wall thickness insulation.

⁴ These tests were conducted on #14 AWG solid wires insulated with 0.030 in. wall thickness insulation.

⁵ These tests were conducted on # 4 AWG stranded wire insulated with 0.060 in. wall thickness insulation.

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