SI-LINK™ DFDB-5445 BK

Polyethylene Moisture Curable System, Flame Retardant Masterbatch

The Dow Chemical Company

Message:

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.

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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.

General Information	
Wire Types	RHH
	RHW
	RHW-2
	RW-90
	RWU-90
	SIS
	USE-2
	XHH
	XHHW
	XHHW-2
	Uses

Physical	Nominal Value	Unit	Test Method
Specific Gravity [1]	1.02	g/cm³	ASTM D792
Elastomers	**Nominal Value**	**Unit**	**Test Method**
Tensile Strength	13.8	MPa	ASTM D412
Tensile Elongation (Break)	300	%	ASTM D412
Aging	**Nominal Value**	**Unit**	**Test Method**
Change in Relative Permittivity			UL 44
1-14 days	1.0	%	UL 44
7-14 days	-3.0	%	UL 44
Tensile strength retention-7 days(121°C)	80	%	ASTM D412

Elongation retention rate-7 days(121°C)	80	%	ASTM D412
Thermal deformation (131°C)		%	UL 44
Thermosetting-Elongation(200°C) [2]		%	IEC 60811-2-1
Capacitance [3]			UL 44
pf, 1 day : 90°C	950		UL 44
pf, 14 days : 90°C	950		UL 44
pf, 7 days : 90°C	950		UL 44
Flame test-Horizontal, No. 4 AWG 60 mil wall [4]	Pass		UL 44
Crushing Test	5605	N	UL 44
Flexibility - 4 hrs (-25°C) [5]	No visible cracks		UL 854

Electrical	Nominal Value	Unit	Test Method
Relative Permittivity [6]	4.00		UL 44

Flammability	Nominal Value	Unit	Test Method
Oxygen Index	26	%	ASTM D2863

Extrusion instructions

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.ExtruderScrew L/D: 15:1 to 20:1Screw Suggested: Single FlightCompression Ratio: 2.5:1 to 3.5:1Screen Pack: 20/40/60/20 MeshExtrusion TemperaturesBARREL: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)

NOTE	
1.	23°C
2.	15 min, 20N/cm^2
3.	These tests were conducted on #14 AWG solid wires insulated with 0.030 in. wall thickness insulation.
4.	These tests were conducted on # 4 AWG stranded wire insulated with 0.060 in. wall thickness insulation.
5.	These tests were conducted on # 4 AWG stranded wire insulated with 0.060 in. wall thickness insulation.
6.	1 day. These tests were conducted on #14 AWG solid wires insulated with 0.030 in. wall thickness insulation.

Recommended distributors for this material

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