Dow ENDURANCE™ HFDA-0802 BK EC
Supersmooth, Extra-Clean, Crosslinkable Semiconductive Shielding Compound

Overview

DOW ENDURANCE™ HFDA-0802 BK EC is a specially formulated semiconductive, vulcanizable compound designed for conductor shield and bonded insulation shield applications in medium and high voltage crosslinked polyethylene insulated cables.(1) DOW ENDURANCE™ HFDA-0802 BK EC has stable volume resistivity characteristics at elevated temperatures and is formulated with a polymer system that assists in obtaining minimum shrinkback on aluminum conductors, especially solid conductors. DOW ENDURANCE™ HFDA-0802 BK EC is not recommended for use with bare copper conductors.

DOW ENDURANCE™ HFDA-0802 BK EC was specifically developed utilizing a special acetylene carbon black to provide a supersmooth surface to achieve best in class performance and yielding a more perfect interface between the extruded shield and the insulation. As a result, significantly improved cable performance can be expected.

Specifications

DOW ENDURANCE™ HFDA-0802 BK EC is designed for use in power distribution cables. Cables with conductor and insulation shielding of DOW ENDURANCE™ HFDA-0802 BK EC, prepared using sound commercial fabrication practice, would be expected to meet the following specifications:

- ANSI/ICEA: S-94-649, S-97-682, S-93-639 / NEMA WC74
- AEIC: CS8
- IEC: 60502

(1) DOW ENDURANCE™ HFDA-0802 BK EC is recommended for use in conjunction with DOW cross-linked polyethylene and tree-retardant cross-linked polyethylene compounds. For other polymer insulation such as EPR and EPDMs, the user is cautioned to establish the utility of DOW ENDURANCE™ HFDA-0802 BK EC with each formulation.

Physical	Nominal Value	(English)	Nominal Value	(SI)	Test Method
Density	1.15	g/cm³	1.15	g/cm³	ASTM D792
Environmental Stress-Cracking Resistance (ESCR)					ASTM D1693
100% Igepal, F0	> 504	hr	> 504	hr	
Mechanical	**Nominal Value**	**(English)**	**Nominal Value**	**(SI)**	**Test Method**
Tensile Strength	2700	psi	18.6	MPa	ASTM D638
Tensile Elongation (Break)	200	%	200	%	ASTM D638
Thermal	**Nominal Value**	**(English)**	**Nominal Value**	**(SI)**	**Test Method**
Brittleness Temperature	-40.0	°F	-40.0	°C	ASTM D746
Aging	**Nominal Value**	**(English)**	**Nominal Value**	**(SI)**	**Test Method**
Retention of Tensile Elongation - 1 week					ASTM D638
302°F (150°C)	90	%	90	%	
Retention of Tensile Strength - 1 week					ASTM D638
302°F (150°C)	98	%	98	%	
Electrical	**Nominal Value**	**(English)**	**Nominal Value**	**(SI)**	**Test Method**
Volume Resistivity					ASTM D991
73°F (23°C)	15	ohms·cm	15	ohms·cm	
194°F (90°C)	60	ohms·cm	60	ohms·cm	
266°F (130°C)	65	ohms·cm	65	ohms·cm	

Form No. 400-00088971en
Rev: 2013-10-21

Additional Information

Nominal property values above represent tests on molded, stress-relieved slabs. Cure times were 15 minutes at 175°C.

Extra-Clean Requirements

- Among many desirable characteristics, DOW ENDURANCE™ HFDA-0802 BK EC is extra-clean. DOW ENDURANCE™ HFDA-0802 BK EC typically has less than 0.005% sulfur and less than 0.01% ash. The raw materials used for DOW ENDURANCE™ HFDA-0802 BK EC are cleaner by design than those used for conventional semiconductive materials. Additional precautions are employed during the manufacture of DOW ENDURANCE™ HFDA-0802 BK EC relative to conventional conductor shields to prevent introduction of any contamination to the raw materials and to the final product. These low levels of contamination can be expected to play a positive role in the manufacture of a totally extra-clean cable.

Supersmooth Extruded Surface

- DOW ENDURANCE™ HFDA-0802 BK EC meets strict standards of smoothness established for a crosslinkable semiconductive shield compound. The extruded surface of DOW ENDURANCE™ HFDA-0802 BK EC must meet a smoothness specification that is more rigorous that conventional semiconductive shields. Throughout the production process, the product is tested to ensure smoothness. Extruded tapes are scanned by an automatic inspection system in a clean room. The tape smoothness data is managed using an acceptance sampling plan, which ensures that the shipping container meets or exceeds the product's smoothness standard. The DOW ENDURANCE™ HFDA-0802 BK EC smoothness standard has been designed to meet the global industry specifications for semiconductive shield materials on medium and high voltage cables.

Each batch of DOW ENDURANCE™ HFDA-0802 BK EC meets the following smoothness requirement:

- Protrusion Height / Maximum Allowable
  - 60-74 µm / 0 per m²
  - >75 µm / 0 per m²

Storage

- The environment or conditions of storage greatly influences the recommended storage time. Storage should be in accordance with good manufacturing practices. If proper warehousing and storage temperatures [dry conditions, between 50°F and 86°F (10°C and 30°C) in temperature] are utilized, this product may be stored by the customer for up to one year. It is recommended that the practice of using the product on a first-in / first-out basis be established. Storage under extreme conditions may affect the quality, processing, or performance of the product.

Extrusion	Nominal Value (English)		Nominal Value (SI)	
Drying Temperature	140 to 158	°F	60 to 70	°C
Drying Time	< 6.0	hr	< 6.0	hr
Melt Temperature	250 to 284	°F	121 to 140	°C

Extrusion Notes

DOW ENDURANCE™ HFDA-0802 BK EC provides excellent surface finish and outstanding output rates over a broad range of conditions. For optimum results, use melt extrusion temperatures in the suggested range of 250 to 285°F (121 to 140°C) to avoid pre-cure or scorch. Extruder barrel settings of 110°C (230°F) are suggested as a starting point while learning to process DOW ENDURANCE™ HFDA-0802 BK EC. Specific machine settings will depend on the extruder design and must be established through conventional practices.

Dehumidified air hopper drying at 140-160°F (60-70°C) for up to six hours may be employed to remove residual moisture prior to extrusion. Drying is not necessary for DOW ENDURANCE™ HFDA-0802 BK EC due to the lower moisture absorption characteristics relative to conventional semiconductive products.

Notes

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

Form No. 400-00088971en
Rev: 2013-10-21

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