# Dow ENDURANCE™ HFDB-0801 BK EC

Supersmooth, Extra-Clean, Crosslinkable Semiconductive Shielding Compound

The Dow Chemical Company

## Message:

DOW ENDURANCE™ HFDB-0801 BK EC is a vulcanizable semiconductive compound based on a polyethylene copolymer and is designed for conductor shield and bonded insulation shield applications in crosslinked polyethylene insulated medium and high voltage cables.(1) DOW ENDURANCE™ HFDB-0801 BK EC has improved processability and demonstrated compatibility with copper and aluminum conductors.
DOW ENDURANCE™ HFDB-0801 BK EC was specifically developed utilizing a special acetylene carbon black to provide a super-smooth surface yielding a more perfect interface between the extruded shield and the insulation. As a result, significantly improved cable performance can be expected. DOW ENDURANCE™ HFDB-0801 BK EC is formulated with a higher temperature peroxide. Thus, DOW ENDURANCE™ HFDB-0801 BK EC is less subject to pre-cure or scorch within the processing extruder and die.
Specifications
DOW ENDURANCE™ HFDB-0801 BK EC is designed for use in power distribution cables. Cables with conductor and insulation shielding of DOW ENDURANCE™ HFDB-0801 BK EC, prepared using sound commercial fabrication practice, would be expected to meet the following specifications:
AEIC: CS7, CS8
IEC: 60502, 60840, 62067
ICEA: S-108-720, S-94-649; S-97-682; S-93-639 (NEMA WC 74),
DIN: VDE 0273

| General Information | |
|---|---|
| Uses | High Voltage Semiconductive Shield |
| | Semiconductive Shield |
| | Underground cable |
| | Cable guard |
| | Wire and cable applications |
| Agency Ratings | AEIC CS7 |
| | AEIC CS8 |
| | ICEA S-93-639 |
| | ICEA S-94-649 |
| | ICEA S-97-682 |
| | IEC 60502 |
| | IEC 60840 |
| | IEC 62067 |
| | NEMA WC-74 |
| | VDE 0273 |
| Forms | Particle |

| Physical | Nominal Value | Unit | Test Method |
|---|---|---|---|
| Specific Gravity | 1.05 | g/cm³ | ASTM D792 |
| **Hardness** | **Nominal Value** | **Unit** | **Test Method** |
| Durometer Hardness (Shore D) | 50 | | ASTM D2240 |
| **Mechanical** | **Nominal Value** | **Unit** | **Test Method** |
| Tensile Modulus - 1% Secant [1] | 165 | MPa | ASTM D638 |

| | | | |
|---|---|---|---|
| Tensile Strength [2] | 14.1 | MPa | ASTM D638 |
| **Elastomers** | **Nominal Value** | **Unit** | **Test Method** |
| Tensile Elongation (Break) | 300 | % | ASTM D412 |
| **Aging** | **Nominal Value** | **Unit** | **Test Method** |
| Tensile strength retention-1 week (150°C) | 90 | % | ASTM D638 |
| Elongation retention rate-1 week (150°C) | 90 | % | ASTM D412 |
| **Thermal** | **Nominal Value** | **Unit** | **Test Method** |
| Brittleness Temperature | -40.0 | °C | ASTM D746 |
| **Electrical** | **Nominal Value** | **Unit** | **Test Method** |
| Volume Resistivity | | | ASTM D991 |
| 23°C | 20 | ohms·cm | ASTM D991 |
| 90°C | 75 | ohms·cm | ASTM D991 |
| 130°C | 1.1E+2 | ohms·cm | ASTM D991 |
| **Fill Analysis** | **Nominal Value** | **Unit** | **Test Method** |
| Melt Viscosity [3] | | | ASTM D3835 |
| 125°C, 180 sec^-1 | 1900 | Pa·s | ASTM D3835 |
| 125°C, 360 sec^-1 | 1200 | Pa·s | ASTM D3835 |
| 125°C, 900 sec^-1 | 650 | Pa·s | ASTM D3835 |
| 125°C, 1800 sec^-1 | 420 | Pa·s | ASTM D3835 |

**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™ HFDB-0801 BK EC is extra-clean. While many semiconductive products contain about 0.3% sulfur and 0.1% inorganic ash, DOW ENDURANCE™ HFDB-0801 BK EC typically has less than 0.005% sulfur and less than 0.01% ash. The raw materials used for DOW ENDURANCE™ HFDB-0801 BK EC are cleaner by design than those used for conventional semiconductive materials. Additional precautions are employed during the manufacture of DOW ENDURANCE™ HFDB-0801 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™ HFDB-0801 BK EC meets strict standards of smoothness established for a crosslinkable semiconductive shield compound. The extruded surface of DOW ENDURANCE™ HFDB-0801 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™ HFDB-0801 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 HFDB-0801 BK EC meets the following smoothness requirement:
Protrusion Height / Maximum Allowable
60-74 µm / 0 per $m^2$
> 75 µm / 0 per $m^2$
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 | Unit |
|---|---|---|
| Drying Temperature | 60.0 - 70.0 | °C |
| Drying Time | < 6.0 | hr |
| Melt Temperature | 121 - 140 | °C |

**Extrusion instructions**

DOW ENDURANCE™ HFDB-0801 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. DOW ENDURANCE™ HFDB-0801 BK EC contains a high temperature peroxide and offers a broad processing latitude. Extruder barrel settings of 110°C (230°F) are suggested as a starting point while learning to process DOW ENDURANCE™ HFDB-0801 BK EC. Specific machine settings will depend on the extruder design and must be established through conventional practices. DOW ENDURANCE™ HFDB-0801 BK EC is designed for ease of processing and with viscosity within the range of DOW ENDURANCE™ HFDA-0587 BK.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™ HFDB-0801 BK EC due to the lower moisture absorption characteristics relative to conventional semiconductive products.

| NOTE | |
|---|---|
| 1. | 5.0 mm/min |
| 2. | 510 mm/min |
| 3. | Göttfert Capillary Rheometer, D=1 mm, L=20D |



## Recommended distributors for this material

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