



# Dow ENDURANCE™ HFDA-0693 BK

## Strippable Semiconductive Insulation Shielding Compound

### Overview

DOW ENDURANCE™ HFDA-0693 BK is a specially formulated semiconductive, vulcanizable compound designed for use in conventional extrusion practices as a strippable insulation shield for medium voltage power cable. HFDA-0693 BK was designed to have excellent processability, while having improved resistance to blocking during storage. HFDA-0693 BK is recommended for use over Dow crosslinked polyethylene compounds. This product provides a moderate strip force over a wide temperature range when used in conjunction with these insulation materials.

### Specifications

DOW ENDURANCE™ HFDA-0693 BK is designed for use in power distribution cables. Cables with conductor and insulation shielding of DOW ENDURANCE™ HFDA-0693 BK, 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: CS 8
- IEC 60502

Physical	Nominal Value (English)	Nominal Value (SI)	Test Method
Density	1.16 g/cm <sup>3</sup>	1.16 g/cm <sup>3</sup>	ASTM D1505
Mechanical	Nominal Value (English)	Nominal Value (SI)	Test Method
Tensile Strength (Break)	1700 psi	11.7 MPa	ASTM D638
Tensile Elongation (Break)	320 %	320 %	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 277°F (136°C)	230 %	230 %	ASTM D638
Retention of Tensile Strength - 1 week 277°F (136°C)	95 %	95 %	ASTM D638
Electrical	Nominal Value (English)	Nominal Value (SI)	Test Method
Volume Resistivity			ASTM D991
73°F (23°C) <sup>1</sup>	25 ohms·cm	25 ohms·cm	
73°F (23°C) <sup>2</sup>	1.0E+2 to 4.0E+2 ohms·cm	1.0E+2 to 4.0E+2 ohms·cm	
194°F (90°C) <sup>1</sup>	50 ohms·cm	50 ohms·cm	
194°F (90°C) <sup>2</sup>	1.0E+2 to 4.0E+2 ohms·cm	1.0E+2 to 4.0E+2 ohms·cm	
230°F (110°C) <sup>1</sup>	50 ohms·cm	50 ohms·cm	
230°F (110°C) <sup>2</sup>	1.0E+2 to 4.0E+2 ohms·cm	1.0E+2 to 4.0E+2 ohms·cm	
Additional Information	Nominal Value (English)	Nominal Value (SI)	Test Method
Cable Adhesion Force - Dry Cure <sup>3</sup> (73°F (23°C))	20 to 32 lbf/in	3.5 to 5.6 kN/m	Dow Method

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

### 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 75°F (10°C and 23°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. Storage at elevated temperatures should be avoided to prevent blocking. Pellets are readily friable should blocking be experienced.

Extrusion	Nominal Value (English)	Nominal Value (SI)
Melt Temperature	239 to 257 °F	115 to 125 °C

---

**Extrusion Notes**

DOW ENDURANCE™ HFDA-0693 BK 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 235 to 255°F (115 to 125°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-0693 BK. Specific machine settings will depend on the extruder design and must be established through conventional practices. The curing temperature should be carefully controlled, and the maximum surface temperature in the CV tube should not exceed 527°F (275°C) for optimum results.

DOW ENDURANCE™ HFDA-0693 BK can be handled in the same fashion as other vulcanizable polyolefin semiconductive materials. It is available in regular or UNICLEAN™ boxes and can be air-conveyed at transport temperatures of 75°F (24°C) or below. Do not use a heated dryer with HFDA-0693 BK as pellets may fuse. During shutdowns exceeding one hour, DOW ENDURANCE™ HFDA-0693 BK pellets should be removed from potentially warm hopper bins to avoid fusing. Extruder feed-throat cooling is recommended to improve feed efficiency.

**Notes**

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

---

<sup>1</sup> on plaques

---

<sup>2</sup> on cables

---

<sup>3</sup> Cable adhesion values are typical for dry cure at room temperature. Values will vary with cable size, insulation type, type of cure, temperature, speed of test, etc.

## Product Stewardship

The Dow Chemical Company and its subsidiaries ("Dow") has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our Product Stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our Product Stewardship program rests with each and every individual involved with Dow products — from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

## Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

## Medical Applications Policy

NOTICE REGARDING MEDICAL APPLICATION RESTRICTIONS: Dow will not knowingly sell or sample any product or service ("Product") into any commercial or developmental application that is intended for:

- long-term or permanent contact with internal bodily fluids or tissues. "Long-term" is contact which exceeds 72 continuous hours;
- use in cardiac prosthetic devices regardless of the length of time involved ("cardiac prosthetic devices" include, but are not limited to, pacemaker leads and devices, artificial hearts, heart valves, intra-aortic balloons and control systems, and ventricular bypass-assisted devices);
- use as a critical component in medical devices that support or sustain human life; or
- use specifically by pregnant women or in applications designed specifically to promote or interfere with human reproduction.

Dow requests that customers considering use of Dow products in medical applications notify Dow so that appropriate assessments may be conducted. Dow does not endorse or claim suitability of its products for specific medical applications. It is the responsibility of the medical device or pharmaceutical manufacturer to determine that the Dow product is safe, lawful, and technically suitable for the intended use. **DOW MAKES NO WARRANTIES, EXPRESS OR IMPLIED, CONCERNING THE SUITABILITY OF ANY DOW PRODUCT FOR USE IN MEDICAL APPLICATIONS.**

## Disclaimer

NOTICE: No freedom from infringement of any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, the Customer is responsible for determining whether products and the information in this document are appropriate for the Customer's use and for ensuring that the Customer's workplace and disposal practices are in compliance with applicable laws and other governmental enactments. Dow assumes no obligation or liability for the information in this document. **NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.**

NOTICE: If products are described as "experimental" or "developmental": (1) product specifications may not be fully determined; (2) analysis of hazards and caution in handling and use are required; (3) there is greater potential for Dow to change specifications and/or discontinue production; and (4) although Dow may from time to time provide samples of such products, Dow is not obligated to supply or otherwise commercialize such products for any use or application whatsoever.

NOTICE: This data is based on information Dow believes to be reliable, as demonstrated in controlled laboratory testing. They are offered in good faith, but without guarantee, as conditions and method of use of Dow products are beyond Dow's control. Dow recommends that the prospective user determine the suitability of these materials and suggestions before adopting them on a commercial scale.

To the best of our knowledge, the information contained herein is accurate and reliable as of the date of publication, however we do not assume any liability for the accuracy and completeness of such information.

## Additional Information

<b>North America</b>		<b>Europe/Middle East</b>	+800-3694-6367
U.S. & Canada:	1-800-441-4369		+31-11567-2626
	1-989-832-1426	Italy:	+800-783-825
Mexico:	+1-800-441-4369		
<b>Latin America</b>		<b>South Africa</b>	+800-99-5078
Argentina:	+54-11-4319-0100		
Brazil:	+55-11-5188-9000		
Colombia:	+57-1-219-6000	<b>Asia Pacific</b>	+800-7776-7776
Mexico:	+52-55-5201-4700		+603-7965-5392

[www.dowplastics.com](http://www.dowplastics.com)

This document is intended for use within Africa & Middle East, Asia Pacific, Europe, Latin America, North America

Published: 2005-11-17

© 2019 The Dow Chemical Company

