Dow ENDURANCE™ HFDB-4201 SC
Crosslinkable Power Cable Insulation Compound

Overview

DOW ENDURANCE™ HFDB-4201 SC is a long-life, unfilled, crosslinkable, low density, super clean polyethylene insulation compound developed especially for the insulation of high voltage power cables. DOW ENDURANCE™ HFDB-4201 SC has been designed with a non-migrating stabilizer providing high thermal stability and optimum crosslinking behavior. It has an enhanced degree of scorch retardance for fine mesh filtering and long production run lengths during cable manufacture.

DOW ENDURANCE™ HFDB-4201 SC is recommended for the insulation of high voltage power transmission cables rated up to 230 kV.

Specifications

HFDB-4201 SC is designed for use in power distribution and transmission cables. Cables insulated with HFDB-4201 SC, using sound commercial manufacturing practice, would be expected to meet the latest editions of the following specifications and regulations:

- IEC 62067, 60840
- CENELEC HD 632 S3
- AEIC* CS9
- ANSI/ICEA*: S-108-720
- GB/T 11017, GB/Z 18890

*Applicable to USA manufactured product only.

Physical	Nominal Value	(English)	Nominal Value	(SI)	Test Method
Density [1] (73°F (23°C))	0.920	g/cm³	0.920	g/cm³	ASTM D972
Moisture	< 200	ppm	< 200	ppm	Dow Method
Mechanical	**Nominal Value**	**(English)**	**Nominal Value**	**(SI)**	**Test Method**
Tensile Strength [2]	2900	psi	20.0	MPa	ASTM D638
Tensile Elongation [2]	500	%	500	%	ASTM D638
Thermal	**Nominal Value**	**(English)**	**Nominal Value**	**(SI)**	**Test Method**
Hot Set - Under Load/Without Load @ 392°F (392°F (200°C))	<100%/<5%	%	<100%/<5%	%	IEC 60811-2-1
Aging	**Nominal Value**	**(English)**	**Nominal Value**	**(SI)**	**Test Method**
Change in Tensile Properties - (7 days @320°F) [2] (320°F (160°C))	< 25	%	< 25	%	ASTM D638
Electrical	**Nominal Value**	**(English)**	**Nominal Value**	**(SI)**	**Test Method**
Volume Resistivity [3] (73°F (23°C))	> 1.0E+16	ohms·cm	> 1.0E+16	ohms·cm	ASTM D257
Dielectric Strength [4]					ASTM D149
0.125 in (3.18 mm), Method A (Short-Time)	> 760	V/mil	> 30	kV/mm	
0.125 in (3.18 mm), Method B (Step-by-Step)	> 580	V/mil	> 23	kV/mm	
0.125 in (3.18 mm), Method C (Slow Rate-of-Rise)	> 990	V/mil	> 39	kV/mm	
Dielectric Constant [5] (73°F (23°C))	2.30		2.30		ASTM D150
Dissipation Factor [5] (73°F (23°C))	3.0E-4		3.0E-4		ASTM D150

Form No. 400-00088985en
Rev: 2020-03-04

Additional Information

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

Tests are made in accordance with current ASTM, IEC, ISO or Dow Methods.

Cleanliness Requirements

DOW ENDURANCE™ HFDB-4201 SC meets very high standards for cleanliness (super clean) established for an unfilled, crosslinkable cable insulation compound. Throughout the production process, the product is tested to ensure a high level of cleanliness. Extruded tapes are scanned by an automatic inspection system in a clean room. The purity data is managed using an acceptance sampling procedure, which ensures that the product meets or exceeds Dow super-clean standards.

In addition, a continuous stream of pellets is analyzed using a high resolution pellet inspector system designed for Dow's quality standard that exceeds industry requirements. A review of the detected contamination is incorporated into our SC quality program

Storage

The environment or conditions of storage greatly influences the recommended storage time. Storage under extreme conditions may affect the quality, processing, or performance of the product. Storage should be in accordance with good manufacturing practices. The recommended storage conditions, in the original unopened packages, are dry conditions with temperatures between 50ºF and 86ºF (10°C and 30°C). When stored between 50°F and 86°F (10°C and 30°C), the product may be used for up to one year from the date of sale or two years from the date of manufacture, whichever comes first. The recommended maximum storage time is 1 year at 104°F (40°C). It is recommended that the practice of using the product on a first-in / first-out basis be established.

Packaging

DOW ENDURANCE™ HFDB-4201 SC can be delivered in different packaging types dependent on the specific material handling needs. This includes 1300lb/590kg UNICLEAN™ octabins, 1000kg UNICLEAN™ octabins, or in 1000kg bottom unloading octabins.

Extrusion Notes

DOW ENDURANCE HFDB-4201 SC provides excellent surface finish and outstanding output rates over a broad range of conditions. For optimum results, melt extrusion temperatures in the range of 240 to 280°F (116 to 140°C) are recommended, although higher melt temperatures are possible on certain equipment with due care. Generally, a minimum 100-60-40-20 screen pack is recommended. However, specific recommendations for processing conditions can be determined when the application and type of processing equipment are known.

Notes

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

[1] ASTM D792/ISO 1183

[2] ASTM D638/IEC 60811-1-1

[3] ASTM D257/IEC 60093

[4] ASTM D149/IEC 60243-1

[5] ASTM D150/IEC 60250

Form No. 400-00088985en
Rev: 2020-03-04

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:

a. long-term or permanent contact with internal bodily fluids or tissues. "Long-term" is contact which exceeds 72 continuous hours;
b. 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);
c. use as a critical component in medical devices that support or sustain human life; or
d. 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

North America		**Europe/Middle East**	+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		
Latin America		**South Africa**	+800-99-5078
Argentina:	+54-11-4319-0100		
Brazil:	+55-11-5188-9000		
Colombia:	+57-1-219-6000	**Asia Pacific**	+800-7776-7776
Mexico:	+52-55-5201-4700		+603-7965-5392

www.dow.com

This document is intended for use within Asia Pacific, Europe, Latin America, North America

Published: 2005-11-17

Form No. 400-00088985en
Rev: 2020-03-04