



Designation: D8436 – 22

Standard Specification for Fluoropolymer-based Materials for Use for Encapsulation of Downhole Cable¹

This standard is issued under the fixed designation D8436; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers thermoplastic fluoropolymer-based materials, intended for use as an encapsulation material for downhole cables used during well completion by the petroleum and natural gas industries.

1.2 The fluoropolymers covered by this specification include but are not limited to the following: ethylene tetrafluoroethylene (ETFE), polyethylene chlorotetrafluoroethylene (ECTFE), fluorinated ethylene propylene (FEP), polyvinylidene fluoride (PVDF), copolymers of PVDF, polychlorotrifluoroethylene (PCTFE), polytetrafluoroethylene (PTFE), and perfluoroalkoxy alkane (PFA).

1.3 This specification establishes common temperature ratings for the encapsulation materials and also describes requirements for alternative temperature ratings.

1.4 The applications for the encapsulation materials covered by this specification are all associated with downhole cables used during well completion. Such applications include, but are not limited to, the following: control lines (CL), tubing encased conductors (TEC), tubing encased fiber cables (TEF), and tubing encased power cables (TEPC). Other downhole cable products such as surface-controlled sub-surface safety valves (SCSSV or SSSV) and chemical injection lines/chemical injection tubes (CIL/CIT) are also covered by this specification.

1.5 The values stated in SI units are to be regarded as standard. The values given in parentheses after SI units are provided for information only and are not considered standard.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standard-*

ization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

2. Referenced Documents

2.1 ASTM Standards:²

- D543 Practices for Evaluating the Resistance of Plastics to Chemical Reagents
 - D618 Practice for Conditioning Plastics for Testing
 - D638 Test Method for Tensile Properties of Plastics
 - D883 Terminology Relating to Plastics
 - D975 Specification for Diesel Fuel
 - D1708 Test Method for Tensile Properties of Plastics by Use of Microtensile Specimens
 - D1711 Terminology Relating to Electrical Insulation
 - D2633 Test Methods for Thermoplastic Insulations and Jackets for Wire and Cable
 - D2863 Test Method for Measuring the Minimum Oxygen Concentration to Support Candle-Like Combustion of Plastics (Oxygen Index)
 - D3418 Test Method for Transition Temperatures and Enthalpies of Fusion and Crystallization of Polymers by Differential Scanning Calorimetry
 - D3801 Test Method for Measuring the Comparative Burning Characteristics of Solid Plastics in a Vertical Position
 - D4591 Test Method for Determining Temperatures and Heats of Transitions of Fluoropolymers by Differential Scanning Calorimetry
 - D6751 Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels
 - D7869 Practice for Xenon Arc Exposure Test with Enhanced Light and Water Exposure for Transportation Coatings
 - E176 Terminology of Fire Standards
- ### 2.2 UL Standards:³
- UL 94 Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

¹ This specification is under the jurisdiction of ASTM Committee D09 on Electrical and Electronic Insulating Materials and is the direct responsibility of Subcommittee D09.07 on Electrical Insulating Materials.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from Underwriters Laboratories (UL), UL Headquarters, 333 Pfingsten Road, Northbrook, IL, 60062, <http://www.ul.com>.