



Designation: D7744/D7744M – 20

Standard Test Methods for Tensile Testing of High Performance Polyethylene Films¹

This standard is issued under the fixed designation D7744/D7744M; 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 These test methods cover the tensile testing of high performance polyethylene films. The methods include testing procedure only and include no specifications or tolerances.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

1.3 This standard includes the following test methods:

	Section
Breaking Force	11
Breaking Tenacity	12
Toughness at Break	17
Elongation at Break	13
Force at Specified Elongation (FASE)	14
Linear Density	10
Modulus	15
Work-to-Break	16

1.4 *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.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization 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

[D76 Specification for Tensile Testing Machines for Textiles](#)

¹ This test method is under the jurisdiction of ASTM Committee D13 on Textiles and is the direct responsibility of Subcommittee D13.19 on Industrial Fibers and Metallic Reinforcements.

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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.

[D123 Terminology Relating to Textiles](#)
[D883 Terminology Relating to Plastics](#)
[D1776 Practice for Conditioning and Testing Textiles](#)
[D1907 Test Method for Linear Density of Yarn \(Yarn Number\) by the Skein Method](#)
[D2258 Practice for Sampling Yarn for Testing](#)
[D3800 Test Method for Density of High-Modulus Fibers](#)
[D4848 Terminology Related to Force, Deformation and Related Properties of Textiles](#)
[D5947 Test Methods for Physical Dimensions of Solid Plastics Specimens](#)
[D7269/D7269M Test Methods for Tensile Testing of Aramid Yarns](#)
[E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods](#)
[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

3. Terminology

3.1 Definitions:

3.1.1 *high-performance polyethylene, n*—a manufactured fiber or film made of a polymer prepared by the polymerization of ethylene as the sole monomer which has a minimum of tenacity at break of 20 gpd.

3.1.1.1 *Discussion—General*—The following acronyms are used to describe this category of fibers:

UHMWPE – Ultra high molecular weight polyethylene
HMPE – High modulus polyethylene
HPPE – High performance polyethylene

Specific—For other definitions related to polyethylene refer to Terminology [D883](#).

3.1.2 *film, n—in plastics*, an optional term for sheeting having a nominal thickness not greater than 0.25 mm [0.01 in.].

3.2 For definitions of terms related to force and deformation in textiles, refer to Terminology [D4848](#).

3.3 The following terms are relevant to this standard: breaking force, breaking tenacity, elongation, force at specified elongation (FASE), force-elongation curve, force-extension curve, modulus, toughness at break, and work-to-break.

3.4 For definitions of other terms related to textiles, refer to Terminology [D123](#).