



Designation: D8448/D8448M – 22

Standard Specification for Basalt Fiber Strands¹

This standard is issued under the fixed designation D8448/D8448M; 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 the requirements for basalt fiber, including rovings and chopped strands. This specification is intended to assist ultimate users by designating the general nomenclature for the strand products that are generally manufactured in the basalt fiber industry.

1.2 Basalt fibers are produced by melting naturally occurring volcanic rocks, being primarily basalt or other basaltic rocks. The melt is drawn through a bushing and, typically, a sizing is applied to the fiber as it is cooled.

1.3 Basalt fiber strands have a variety of general uses under specific conditions, such as high physical or chemical stress, high moisture, or high temperature. Property requirements under specific conditions are agreed upon between the purchaser and the supplier.

1.4 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 exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems will result in non-conformance with the standard.

1.5 *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.*

1.6 *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.*

¹ This specification 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.

Current edition approved Sept. 1, 2022. Published October 2022. DOI: 10.1520/D8448-22.

2. Referenced Documents

2.1 ASTM Standards:²

- D123 Terminology Relating to Textiles
- D578 Specification for Glass Fiber Strands
- D1907/D1907M Test Method for Linear Density of Yarn (Yarn Number) by the Skein Method
- D2256/D2256M Test Method for Tensile Properties of Yarns by the Single-Strand Method
- D2258/D2258M Practice for Sampling Yarn for Testing
- D4963/D4963M Test Method for Ignition Loss of Glass Fiber Strands and Fabrics
- D7018/D7018M Terminology Relating to Glass Fiber and Its Products (Withdrawn 2021)³

2.2 ANSI Standard:

- ANSI/ASQC Z1.4 Sampling Procedures for Inspection by Attributes⁴

3. Terminology

3.1 For all terminology applying to this specification and related to glass fiber and its products, refer to Terminology D7018/D7018M.

3.1.1 The following terms are relevant to this standard: atmosphere for testing textiles, chopped strand, roving, strand.

3.2 For all other terminology related to textiles, refer to Terminology D123.

4. Composition of Basalt Fiber

4.1 Basalt fiber is composed primarily of oxides of silicon, aluminum, calcium, magnesium, titanium, sodium, potassium, and iron with a certified chemical composition.

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 The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.



4.2 The primary certified chemical composition that applies to basalt fiber products used in general applications is summarized in **Table 1**.

DESCRIPTION OF BASALT PRODUCTS

5. General

5.1 Basalt products are specified using a series of segments of alphabetical or numerical characters.

5.2 For the description of basalt products, SI units and inch-pound units are used.

6. Rovings

6.1 *Descriptions of Rovings*—The description of rovings consists of five segments.

Segment 1	Segment 2	Segment 3	Segment 4	Segment 5
Product type	Yarn number	Filament diameter	Sizing type	Type of pull

6.1.1 *Segment One*—The first segment of the description of basalt rovings represents the product type. The type of roving consists of letters BDR for basalt direct rovings, or BAR for basalt assembled rovings.

6.1.2 *Segment Two*—The second segment of the description defines the yarn number of the roving. For rovings described in SI units, the yarn number is specified in tex. For such rovings described in inch-pound units, the yarn number is specified in yards per pound.

6.1.3 *Segment Three*—The third segment of the description specifies the filament diameter. When using SI units, this segment consists of a number specifying the nominal filament diameter range in micrometres as directed in **Table 2**. When using inch-pound units, this segment consists of one or two letters as directed in **Table 2**.

6.1.4 *Segment Four*—The fourth segment of the description of basalt rovings represents the sizing type as defined by a manufacturer's code, providing further identification as necessary by manufacturer to define sizing.

6.1.5 *Segment Five*—The fifth segment of the description of basalt rovings specifies the type of pull. It shall be defined as either internal pull (I) or external pull (E).

6.2 *Example of Descriptions of Rovings:*

6.2.1 *Example of description of rovings using SI units:*

BAR-3000-17-5X1-I

where:

BAR = basalt assembled roving,

3000 = yarn number in tex,

17 = filament diameter in micrometres (μm),

5X1 = codification of the sizing, and

I = internal pull.

TABLE 1 Primary Chemical Composition of Basalt Fiber Products

Chemical	% by Weight
SiO ₂	45 to 57
CaO	5 to 11
MgO	3 to 7
Al ₂ O ₃	10 to 19
Na ₂ O + K ₂ O	3 to 6
TiO ₂	0.5 to 4
Fe ₂ O ₃ + FeO	8 to 16

TABLE 2 Letter Designations for Basalt Strand Filament Diameters

Filament Size Designation		Nominal Range for Filament Diameter Average	
Inch-Pound System, Letter	SI System, Number	in.	μm^A
B	3.5	0.00013 to 0.000159	3.30 to 4.05
C	4.5	0.00016 to 0.000189	4.06 to 4.82
D	5	0.00019 to 0.000229	4.83 to 5.83
DE	6	0.00023 to 0.000269	5.84 to 6.85
E	7	0.00025 to 0.000299	6.35 to 7.61
F	8	0.00030 to 0.000345	7.62 to 8.88
G	9	0.00035 to 0.000399	8.89 to 10.15
H	11	0.00040 to 0.000449	10.16 to 11.42
J	12	0.00045 to 0.000499	11.43 to 12.69
K	13	0.00050 to 0.000549	12.70 to 13.96
L	14	0.00055 to 0.000599	13.97 to 15.23
M	16	0.00060 to 0.000649	15.24 to 16.50
N	17	0.00065 to 0.000699	16.51 to 17.77
P	18	0.00070 to 0.000749	17.78 to 19.04
Q	20	0.00075 to 0.000799	19.05 to 20.31
R	21	0.00080 to 0.000849	20.32 to 21.58
S	22	0.00085 to 0.000899	21.59 to 22.85
T	23	0.00090 to 0.000949	22.86 to 24.12
U	24	0.00095 to 0.000999	24.13 to 25.40

^A The low values stated for each micrometre range are exact equivalents to inches, rounded to the nearest hundredth micrometre. The high values stated for each micrometre range are slightly higher than exact equivalents to inches to provide continuation between ranges. They are consistent for inch-pound and SI filament size descriptions commonly used in the industry. In some publications, the SI designation for H filament size has been shown as 10.

6.2.2 *Example of description of rovings using inch-pound units (equivalent to example 6.2.1):*

BAR-165-N-5X1-I

where:

BAR = basalt assembled roving,

165 = yarn number in yards per pound,

N = designation of the filament diameter, average range
0.000 65 to 0.000 699 in.,

5X1 = codification of the sizing, and

I = internal pull.

7. Chopped Strands from Continuous Filament Strands

7.1 *Descriptions of Chopped Strands from Continuous Filament Strands*—The description of chopped strands from continuous filament strands consists of four segments.

Segment 1	Segment 2	Segment 3	Segment 4
Product type	Strand length	Filament diameter	Sizing type

7.1.1 *Segment One*—The first segment of the description of chopped strands from continuous filament strands, represents the product type. The type of product consists of letters BCS for basalt chopped strands.

7.1.2 *Segment Two*—The second segment of the description of the chopped strands specifies the strand length. For chopped strands described in SI units, the nominal chopped length is specified in millimetres. For chopped strands described in inch-pound units the nominal chopped length is specified in inches.

7.1.3 *Segment Three*—The third segment of the description specifies the filament diameter. When using SI units, this segment consists of a number specifying the nominal filament