



Designation: D2475 – 22

Standard Specification for Felt¹

This standard is issued under the fixed designation D2475; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This specification covers all standard types of felt in the form of rolls and sheets that are suitable for mechanical use. Certain special-purpose felts are also covered.

1.2 This specification is not applicable to felt-like products that utilize weaving, knitting, stitching, or bonding such as papermaker's felt.

1.3 Trade practice in the felt industry deals in pounds, yards, and inches, therefore the values stated in inch-pound units are to be regarded as standard. The values in SI units are provided as information only.

1.3.1 The specification referenced in 2.2 uses only inch-pound units.

1.4 *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 D13.13 on Wool and Felt. Current edition approved June 1, 2022. Published July 2022. Originally approved in 1965. Last previous edition approved in 2013 as D2475 – 01(2013) which was withdrawn in January 2022 and reinstated in June 2022. DOI: 10.1520/D2475-22.

2. Referenced Documents

- 2.1 *ASTM Standards*:²
 - D123 Terminology Relating to Textiles
 - D461 Test Methods for Felt (Withdrawn 2003)³
 - D4845 Terminology Relating to Wool
- 2.2 *Federal Standard*:
 - C-F-206, Felt Sheet: Cloth Felt, Wool, Pressed⁴
- 2.3 *Felt Manufacturers Council*:
 - FS14-68/71 Wool Felt Standard Specifications⁵
- 2.4 *SAE Standard*:⁶
 - J314b Felts-Wool and Part Wool

3. Terminology

3.1 Definitions:

3.1.1 *felt, n*—a textile structure characterized by interlocking and consolidation of its constituent fibers.

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 Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

⁵ Available from the Northern Textile Association, 230 Congress Street, Boston, MA 02110.

⁶ Available from the Society of Automotive Engineers, 2 Pennsylvania Plaza, New York, NY 10001.

TABLE 1 Wool Sheet Felt: Thickness and Mass (Weight)

| ASTM (NTA) Class | Color | Thickness, in. | | | Thickness, mm | | | Mass (Weight) lb/yd ² | | Mass (Weight) kg/m ² | |
|------------------|-------|----------------|------------|-----------|---------------|------------|-----------|----------------------------------|------------|---------------------------------|------------|
| | | Nominal | Tolerances | | Nominal | Tolerances | | Nominal | Tolerances | Nominal | Tolerances |
| | | | Sheets | Cut Parts | | Sheets | Cut Parts | | | | |
| 26S1 | White | 0.125 | ± 0.014 | ± 0.016 | 3.17 | ± 0.35 | ± 0.41 | 1.50 | ± 0.10 | 0.81 | ± 0.05 |
| | Gray | 0.188 | 0.016 | 0.018 | 4.78 | 0.41 | 0.46 | 2.25 | 0.15 | 1.22 | 0.08 |
| 26S4 | | 0.250 | 0.020 | 0.022 | 6.35 | 0.51 | 0.56 | 3.00 | 0.20 | 1.63 | 0.11 |
| | | 0.313 | 0.022 | 0.024 | 7.95 | 0.56 | 0.61 | 3.75 | 0.25 | 2.04 | 0.14 |
| | | 0.375 | 0.024 | 0.026 | 9.52 | 0.61 | 0.66 | 4.50 | 0.30 | 2.44 | 0.16 |
| | | 0.500 | 0.030 | 0.032 | 12.70 | 0.76 | 0.81 | 6.00 | 0.40 | 3.26 | 0.22 |
| | | 0.625 | 0.035 | 0.037 | 15.88 | 0.89 | 0.94 | 7.50 | 0.45 | 4.07 | 0.24 |
| | | 0.750 | 0.040 | 0.042 | 19.05 | 1.02 | 1.07 | 9.00 | 0.50 | 4.89 | 0.27 |
| | | 0.875 | 0.046 | 0.048 | 22.23 | 1.17 | 1.22 | 10.50 | 0.55 | 5.70 | 0.30 |
| | | 1.000 | 0.051 | 0.053 | 25.40 | 1.30 | 1.35 | 12.00 | 0.60 | 6.52 | 0.33 |
| | | 1.250 | 0.062 | 0.065 | 31.75 | 1.57 | 1.65 | 15.00 | 0.70 | 8.15 | 0.38 |
| | | 1.500 | 0.072 | 0.075 | 38.10 | 1.83 | 1.91 | 18.00 | 0.80 | 9.77 | 0.43 |
| | | 1.750 | 0.083 | 0.085 | 44.45 | 2.11 | 2.16 | 21.00 | 0.90 | 11.40 | 0.49 |

TABLE 1 *Continued*

| ASTM (NTA) Class | Color | Thickness, in. | | | Thickness, mm | | | Mass (Weight) lb/yd ² | | Mass (Weight) kg/m ² | |
|---------------------|-------|----------------|------------|-----------|---------------|------------|-----------|----------------------------------|------------|---------------------------------|------------|
| | | Nominal | Tolerances | | Nominal | Tolerances | | Nominal | Tolerances | Nominal | Tolerances |
| | | | Sheets | Cut Parts | | Sheets | Cut Parts | | | | |
| 34S1 | White | 2.000 | 0.094 | 0.098 | 50.80 | 2.39 | 2.49 | 24.00 | 1.00 | 13.03 | 0.54 |
| | | 2.500 | 0.115 | 0.119 | 63.50 | 2.92 | 3.02 | 30.00 | 1.05 | 16.29 | 0.57 |
| | | 3.000 | 0.136 | 0.141 | 76.20 | 3.45 | 3.58 | 36.00 | 1.10 | 19.55 | 0.60 |
| | | 0.125 | 0.012 | 0.014 | 3.17 | 0.30 | 0.36 | 2.00 | 0.10 | 1.09 | 0.05 |
| | | 0.188 | 0.012 | 0.014 | 4.78 | 0.30 | 0.36 | 3.00 | 0.15 | 1.63 | 0.08 |
| | | 0.250 | 0.016 | 0.018 | 6.35 | 0.41 | 0.46 | 4.00 | 0.30 | 2.17 | 0.16 |
| | | 0.313 | 0.017 | 0.019 | 7.95 | 0.43 | 0.48 | 5.00 | 0.35 | 2.71 | 0.19 |
| | | 0.375 | 0.019 | 0.021 | 9.52 | 0.48 | 0.53 | 6.00 | 0.40 | 3.26 | 0.22 |
| | | 0.500 | 0.022 | 0.024 | 12.70 | 0.56 | 0.61 | 8.00 | 0.50 | 4.34 | 0.27 |
| | | 0.625 | 0.026 | 0.028 | 15.88 | 0.66 | 0.71 | 10.00 | 0.60 | 5.43 | 0.33 |
| | | 0.750 | 0.029 | 0.031 | 19.05 | 0.74 | 0.79 | 12.00 | 0.70 | 6.52 | 0.38 |
| | | 0.875 | 0.032 | 0.034 | 22.23 | 0.87 | 0.86 | 14.00 | 0.75 | 7.60 | 0.41 |
| | | 1.000 | 0.036 | 0.038 | 25.40 | 0.91 | 0.97 | 16.00 | 0.80 | 8.69 | 0.43 |
| | | 1.250 | 0.042 | 0.045 | 31.25 | 1.07 | 1.14 | 20.00 | 0.90 | 10.86 | 0.49 |
| | | 1.500 | 0.049 | 0.052 | 38.10 | 1.24 | 1.32 | 24.00 | 1.00 | 13.03 | 0.54 |
| | | 1.750 | 0.056 | 0.059 | 44.45 | 1.42 | 1.50 | 28.00 | 1.10 | 15.20 | 0.60 |
| | | 2.000 | 0.063 | 0.067 | 50.80 | 1.60 | 1.70 | 32.00 | 1.20 | 17.38 | 0.65 |
| | | 2.500 | 0.076 | 0.080 | 63.50 | 1.93 | 2.03 | 40.00 | 1.25 | 21.72 | 0.68 |
| | | 3.000 | 0.090 | 0.095 | 76.20 | 2.29 | 2.41 | 48.00 | 1.30 | 26.06 | 0.71 |
| 43S1 | White | 0.125 | 0.012 | 0.014 | 3.17 | 0.30 | 0.36 | 2.50 | 0.30 | 1.36 | 0.16 |
| 43S2 | White | 0.188 | 0.012 | 0.014 | 4.78 | 0.30 | 0.36 | 3.75 | 0.35 | 2.04 | 0.19 |
| 43S3 | White | 0.250 | 0.014 | 0.016 | 6.35 | 0.36 | 0.41 | 5.00 | 0.40 | 2.71 | 0.22 |
| 43S4 | Gray | 0.375 | 0.016 | 0.019 | 9.52 | 0.41 | 0.48 | 7.50 | 0.50 | 4.07 | 0.27 |
| 56S1 | White | 0.500 | 0.019 | 0.022 | 12.70 | 0.48 | 0.56 | 10.00 | 0.60 | 5.43 | 0.33 |
| | | 0.625 | 0.022 | 0.025 | 15.88 | 0.56 | 0.64 | 12.50 | 0.70 | 6.79 | 0.38 |
| | | 0.750 | 0.025 | 0.028 | 19.05 | 0.63 | 0.71 | 15.00 | 0.80 | 8.15 | 0.43 |
| | | 0.875 | 0.027 | 0.030 | 22.23 | 0.69 | 0.76 | 17.50 | 0.90 | 9.50 | 0.49 |
| | | 1.000 | 0.030 | 0.033 | 25.40 | 0.76 | 0.84 | 20.00 | 1.00 | 10.86 | 0.54 |
| | | 1.250 | 0.036 | 0.040 | 31.15 | 0.91 | 1.02 | 25.00 | 1.10 | 13.56 | 0.60 |
| | | 1.500 | 0.041 | 0.045 | 38.10 | 1.04 | 1.14 | 30.00 | 1.20 | 16.29 | 0.65 |
| | | 1.750 | 0.047 | 0.051 | 44.45 | 1.19 | 1.30 | 35.00 | 1.30 | 19.00 | 0.71 |
| | | 2.000 | 0.053 | 0.058 | 50.80 | 1.35 | 1.47 | 40.00 | 1.40 | 21.72 | 0.76 |
| | | 2.500 | 0.064 | 0.070 | 63.50 | 1.63 | 1.78 | 50.00 | 1.45 | 27.15 | 0.79 |
| | | 3.000 | 0.075 | 0.082 | 76.20 | 1.90 | 2.08 | 60.00 | 1.50 | 32.58 | 0.81 |
| | | 0.125 | 0.010 | 0.014 | 3.17 | 0.25 | 0.36 | 3.25 | 0.40 | 1.76 | 0.22 |
| | | 0.188 | 0.010 | 0.014 | 4.78 | 0.25 | 0.36 | 4.90 | 0.50 | 2.66 | 0.27 |
| | | 0.250 | 0.011 | 0.016 | 6.35 | 0.28 | 0.41 | 6.50 | 0.60 | 3.53 | 0.33 |
| | | 0.375 | 0.013 | 0.018 | 9.52 | 0.33 | 0.46 | 9.75 | 0.80 | 5.29 | 0.43 |
| | | 0.500 | 0.016 | 0.022 | 12.70 | 0.41 | 0.56 | 13.00 | 1.00 | 7.06 | 0.54 |
| | | 0.625 | 0.018 | 0.024 | 15.88 | 0.46 | 0.61 | 16.25 | 1.10 | 8.82 | 0.60 |
| | | 0.750 | 0.020 | 0.026 | 19.05 | 0.51 | 0.66 | 19.50 | 1.20 | 10.59 | 0.65 |
| | | 0.875 | 0.022 | 0.028 | 22.23 | 0.56 | 0.71 | 22.75 | 1.30 | 12.35 | 0.70 |
| 1.000 | 0.025 | 0.031 | 25.40 | 0.63 | 0.79 | 26.00 | 1.40 | 14.12 | 0.76 | | |
| 1.250 | 0.029 | 0.036 | 31.75 | 0.74 | 0.91 | 32.50 | 1.50 | 17.65 | 0.81 | | |
| 1.500 | 0.033 | 0.040 | 38.10 | 0.84 | 1.02 | 39.00 | 1.60 | 21.18 | 0.87 | | |
| 1.750 | 0.038 | 0.046 | 44.45 | 0.97 | 1.17 | 45.50 | 1.70 | 24.71 | 0.92 | | |
| 2.000 | 0.042 | 0.051 | 50.80 | 1.07 | 1.30 | 52.00 | 1.80 | 28.24 | 0.98 | | |
| 2.500 | 0.050 | 0.061 | 63.50 | 1.27 | 1.55 | 65.00 | 1.85 | 35.29 | 1.00 | | |
| 3.000 | 0.058 | 0.070 | 76.20 | 1.47 | 1.78 | 78.00 | 1.90 | 42.35 | 1.03 | | |
| 68S1 | White | 0.125 | 0.007 | 0.013 | 3.17 | 0.18 | 0.33 | 4.00 | 0.50 | 2.17 | 0.27 |
| 68S2 | White | 0.188 | 0.007 | 0.014 | 4.78 | 0.18 | 0.36 | 6.00 | 0.75 | 3.26 | 0.41 |
| 68S3 | White | 0.250 | 0.007 | 0.015 | 6.35 | 0.18 | 0.38 | 8.00 | 1.00 | 4.34 | 0.54 |
| 68S4 | Gray | 0.375 | 0.009 | 0.018 | 9.52 | 0.23 | 0.46 | 12.00 | 1.10 | 6.52 | 0.60 |
| 68S4 | Gray | 0.500 | 0.011 | 0.020 | 12.70 | 0.28 | 0.51 | 16.00 | 1.20 | 8.69 | 0.65 |
| | | 0.625 | 0.013 | 0.022 | 15.88 | 0.33 | 0.56 | 20.00 | 1.30 | 10.86 | 0.71 |
| | | 0.750 | 0.015 | 0.024 | 19.05 | 0.38 | 0.61 | 24.00 | 1.40 | 13.03 | 0.76 |
| | | 0.875 | 0.017 | 0.026 | 22.23 | 0.43 | 0.66 | 28.00 | 1.50 | 15.20 | 0.81 |
| | | 1.000 | ±0.019 | ±0.028 | 25.40 | ±0.48 | ±0.71 | 32.00 | ±1.60 | 17.38 | ±0.87 |
| | | 1.250 | 0.022 | 0.032 | 31.75 | 0.56 | 0.81 | 40.00 | 1.70 | 21.72 | 0.92 |
| | | 1.500 | 0.026 | 0.036 | 38.10 | 0.66 | 0.91 | 48.00 | 1.80 | 26.06 | 0.98 |
| | | 1.750 | 0.029 | 0.041 | 44.45 | 0.74 | 1.04 | 56.00 | 1.90 | 30.41 | 1.03 |
| | | 2.000 | 0.032 | 0.046 | 50.80 | 0.81 | 1.17 | 64.00 | 2.00 | 34.75 | 1.09 |
| | | 2.500 | 0.038 | 0.055 | 63.50 | 0.97 | 1.40 | 80.00 | 2.05 | 43.44 | 1.11 |

3.1.2 *machined felt, n*—a felt structure achieved by the interaction of a suitable combination of mechanical energy, chemical action, moisture and heat causing the constituent fibers to migrate and interlock.

3.1.3 *needled felt, n*—a structure composed entirely of fibers physically interlocked and reoriented through the action of felting needles.

3.1.4 For standard terminology relating to wool, refer to Terminology **D4845**.

3.1.5 For definitions of other textile terms used in these test methods, refer to Terminology **D123**.

3.1.5.1 *Discussion*—For the purpose of this document, there are only two types of felt, machined and needled. All other terms alluded to as types of felt, such as papermakers, black, unsupported, supported, part wool, wool, etc. are considered to be simply terms describing attributes of these two types of felts.

3.1.6 *relative density, n*—the ratio of the mass of a volume of felt to the mass of an equivalent volume of water, alternatively, use density.

4. Types of Felts

4.1 ASTM Classification:

4.1.1 The ASTM Classification number in **Tables 1-3** is the percent specific gravity of that class. It may be computed from the mass (weight), thickness, and area values in these tables. This number is followed by the letter R or S, which designates the method of manufacture as roll or sheet form, respectively. The last digit is the overall quality index in decreasing order of quality from one to four (see **Note 1**).

4.1.2 To obtain the average density of the different felts in lb/ft³, multiply the percent specific gravity number of the first column of **Tables 1-4** by 0.6243.

TABLE 2 Roll and Sheet Felt Corresponding Classifications—Properties and General Description

| ASTM (NTA) Classification ^A | Corresponding Classifications | | Physical Requirements | | | | | General Description | | | |
|--|-------------------------------|--------------------|------------------------|------|-----------------------|---------------|-----------------|---------------------|------------|----------------------------|-----------|
| | SAE J314b | Fed. Spec. C-F-206 | Min. Tensile Strength, | | Min. Split Resistance | | Color | Normal Width | | Thickness: Available Range | |
| | | | psi | kPa | lbf/2 in. width | N/50 mm width | | in. | cm | in. | mm |
| 14R1 | ... | ... | ... | ... | ... | ... | white | 72 | 183 | 0.125–0.500 | 3.17–12.7 |
| 17R1 | ... | ... | ... | ... | ... | ... | white | 72 | 183 | 0.125–1.000 | 3.17–25.4 |
| 17R2 | F26 | 8R5 | ... | ... | ... | ... | gray | 72 | 183 | 0.125–1.000 | 3.17–25.4 |
| 18R1 | F10 | 9R1 | 225 | 1551 | 8 | 35 | white | 72 | 183 | 0.063–1.000 | 1.60–25.4 |
| 18R2 | F11 | 9R2 | 200 | 1379 | 6 | 26 | gray | 72 | 183 | 0.063–1.000 | 1.60–25.4 |
| 18R3 | F12 | 9R3 | 100 | 690 | 3 | 13 | gray | 72 | 183 | 0.063–1.000 | 1.60–25.4 |
| 18R4 | F13 | 9R4 | 75 | 517 | 2 | 9 | gray | 72 | 183 | 0.063–1.000 | 1.60–25.4 |
| 18R5 | F15 | 9R5 | 75 | 517 | 2 | 9 | gray | 72 | 183 | 0.063–1.000 | 1.60–25.4 |
| 26R1 | F5 | 12R1 | 400 | 2758 | 18 | 79 | white | 60 | 152 | 0.063–1.000 | 1.60–25.4 |
| 26R2 | F6 | 12R2 | 275 | 1896 | 16 | 71 | gray | 60 or 72 | 152 or 183 | 0.063–1.000 | 1.60–25.4 |
| 26R3 | F7 | 12R3 | 250 | 1724 | 12 | 53 | gray | 72 | 183 | 0.063–1.000 | 1.60–25.4 |
| 26R3X | F55 | 12R3X | 200 | 1379 | ... | ... | gray | 60 or 72 | 152 or 183 | 0.063–0.094 | 1.60–2.39 |
| 34R1 | F1 | 16R1 | 500 | 3448 | 33 | 147 | white | 60 | 152 | 0.125–1.000 | 3.17–25.4 |
| 34R1X | F50 | 16R1X | 500 | 3448 | ... | ... | white | 60 | 152 | 0.047–0.092 | 1.19–2.39 |
| 34R2 | F2 | 16R2 | 500 | 3448 | 28 | 124 | not blk or gray | 60 | 152 | 0.047–1.000 | 1.19–25.4 |
| 34R3 | F3 | 16R3 | 400 | 2758 | 22 | 97 | gray | 60 | 152 | 0.125–1.000 | 3.17–25.4 |
| 34R3X | F51 | 16R3X | 300 | 2069 | ... | ... | gray | 60 or 72 | 152 or 183 | 0.047–0.094 | 1.19–2.39 |
| 38R1 | ... | 18R1 | 600 | 4137 | 35 | 154 | white | 60 | 152 | 0.125–0.500 | 3.17–12.7 |
| 38R2 | ... | ... | 550 | 3792 | 30 | 132 | gray | 60 | 152 | 0.125–0.500 | 3.17–12.7 |
| 26S1 | ... | 12S1 | 400 | 2758 | 18 | 79 | white | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 26S4 | ... | ... | 300 | 2069 | 16 | 71 | gray | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 34S1 | ... | 16S1 | 500 | 3448 | 32 | 141 | white | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 34S2 | ... | 16S3 | 400 | 2758 | 28 | 124 | white | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 34S3 | ... | 16S4 | 300 | 2069 | 20 | 89 | white | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 34S4 | ... | ... | 400 | 2758 | 22 | 97 | gray | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 43S1 | ... | 20S1 | 500 | 3448 | 44 | 196 | white | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 43S2 | ... | 20S3 | 400 | 2758 | 40 | 178 | white | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 43S3 | ... | 20S4 | 300 | 2069 | 32 | 142 | white | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 43S4 | ... | ... | 400 | 2758 | 36 | 160 | gray | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 56S1 | ... | 26S1 | 600 | 4137 | 48 | 212 | white | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 56S2 | ... | 26S3 | 500 | 3448 | 46 | 205 | white | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 56S3 | ... | 26S4 | 400 | 2758 | 36 | 160 | white | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 56S4 | ... | ... | 400 | 2758 | 40 | 178 | gray | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 68S1 | ... | 32S1 | 600 | 4137 | 50 | 222 | white | 36 | 91 | 0.125–2.500 | 3.17–63.5 |
| 68S2 | ... | 32S3 | 500 | 3448 | 48 | 212 | natural | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 68S3 | ... | 32S4 | 400 | 2758 | 40 | 178 | natural | 36 | 91 | 0.125–3.000 | 3.17–76.2 |
| 68S4 | ... | ... | 400 | 2758 | 46 | 205 | gray | 36 | 91 | 0.125–2.500 | 3.17–63.5 |

^A NTA refers to Northern Textile Association.

TABLE 3 Roll Felt Thicknesses and Weights

NOTE 1—The F-50, F-51, and F-55 classifications are available in limited thickness ranges. See Table 2.

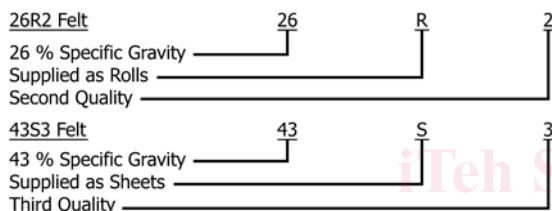
| ASTM (NTA) Classification | SAE J314b | Fed. Spec. C-F-206 | Color | Trade Designation | Thickness Tolerances | | | | | | Mass (Weight) Per Unit Area | | | |
|--|--------------------------------------|--|--|---|----------------------|---------|----------|---------|-------------|----------|-----------------------------|-------------------|------|--------|
| | | | | | Nominal | Inches | | Nominal | Millimetres | | Nominal Tolerances | | | |
| | | | | | | Roll | Cutparts | | Roll | Cutparts | lb/yd ² | kg/m ² | | |
| 14R1 | ... | ... | White | Soft Pad | 0.125 | ± 0.040 | ± 0.048 | 3.18 | ± 1.02 | ± 1.22 | 0.83 | ± 0.10 | 0.45 | ± 0.05 |
| | | | | | 0.250 | 0.056 | 0.064 | 6.35 | 1.42 | 1.63 | 1.65 | 0.20 | 0.90 | 0.11 |
| | | | | | 0.375 | 0.072 | 0.082 | 9.53 | 1.83 | 2.08 | 2.48 | 0.30 | 1.35 | 0.16 |
| | | | | | 0.500 | 0.088 | 0.098 | 12.70 | 2.24 | 2.49 | 3.30 | 0.40 | 1.79 | 0.22 |
| 17R1 17R2 | ... | ... | White Gray | Soft Pad | 0.125 | 0.040 | 0.044 | 3.18 | 1.02 | 1.12 | 0.9 | 0.09 | 0.49 | 0.05 |
| | | | | | 0.250 | 0.056 | 0.062 | 6.35 | 1.42 | 1.58 | 1.8 | 0.18 | 0.98 | 0.10 |
| | | | | | 0.375 | 0.072 | 0.079 | 9.53 | 1.83 | 2.01 | 2.7 | 0.27 | 1.47 | 0.15 |
| | | | | | 0.500 | 0.088 | 0.098 | 12.70 | 2.24 | 2.49 | 3.6 | 0.36 | 1.95 | 0.20 |
| | | | | | 0.750 | 0.120 | 0.135 | 19.05 | 3.05 | 3.43 | 5.4 | 0.54 | 2.93 | 0.29 |
| 18R1 18R2 18R3 18R4 18R5 | F-10 F-11 F-12 F-13 F-15 | 9R1 9R2 9R3 9R4 9R5 | White Gray Gray Gray Gray | Firm Pad Firm Pad Firm Pad Firm Pad Firm Pad | 0.125 | 0.020 | 0.023 | 3.18 | 0.51 | 0.58 | 1.06 | 0.08 | 0.58 | 0.04 |
| | | | | | 0.188 | 0.023 | 0.026 | 4.78 | 0.58 | 0.66 | 1.59 | 0.12 | 0.86 | 0.07 |
| | | | | | 0.250 | 0.026 | 0.031 | 6.35 | 0.66 | 0.79 | 2.12 | 0.16 | 1.15 | 0.09 |
| | | | | | 0.313 | 0.029 | 0.033 | 7.95 | 0.74 | 0.84 | 2.65 | 0.20 | 1.44 | 0.11 |
| | | | | | 0.375 | 0.032 | 0.036 | 9.53 | 0.81 | 0.91 | 3.18 | 0.24 | 1.73 | 0.13 |
| | | | | | 0.500 | 0.038 | 0.044 | 12.70 | 0.97 | 1.12 | 4.24 | 0.32 | 2.31 | 0.18 |
| | | | | | 0.625 | 0.044 | 0.050 | 15.88 | 1.12 | 1.27 | 5.30 | 0.40 | 2.89 | 0.22 |
| | | | | | 0.750 | 0.050 | 0.060 | 19.05 | 1.27 | 1.52 | 6.36 | 0.48 | 3.46 | 0.26 |
| | | | | | 0.875 | 0.056 | 0.065 | 22.23 | 1.42 | 1.65 | 7.42 | 0.56 | 4.03 | 0.30 |
| | | | | | 1.000 | 0.062 | 0.070 | 25.40 | 1.58 | 1.78 | 8.48 | 0.64 | 4.62 | 0.35 |
| 26R1 26R2 26R3 26R3X | F-5 F-6 F-7 F-55 | 12R1 12R2 12R3 12R3X | White Gray Gray ... | Ex Firm Pad Ex Firm Pad Ex Firm Pad & Lining | 0.063 | 0.007 | 0.012 | 1.60 | 0.18 | 0.31 | 0.75 | 0.04 | 0.41 | 0.02 |
| | | | | | 0.094 | 0.007 | 0.012 | 2.39 | 0.18 | 0.31 | 1.12 | 0.05 | 0.61 | 0.03 |
| | | | | | 0.125 | 0.014 | 0.016 | 3.18 | 0.36 | 0.41 | 1.53 | 0.08 | 0.83 | 0.04 |
| | | | | | 0.188 | 0.016 | 0.018 | 4.78 | 0.41 | 0.46 | 2.29 | 0.12 | 1.24 | 0.07 |
| | | | | | 0.250 | 0.018 | 0.020 | 6.35 | 0.46 | 0.51 | 3.06 | 0.16 | 1.66 | 0.09 |
| | | | | | 0.313 | 0.020 | 0.022 | 7.95 | 0.51 | 0.56 | 3.82 | 0.20 | 2.07 | 0.11 |
| | | | | | 0.375 | 0.022 | 0.025 | 9.53 | 0.56 | 0.64 | 4.59 | 0.24 | 2.49 | 0.13 |
| | | | | | 0.500 | 0.026 | 0.029 | 12.70 | 0.66 | 0.74 | 6.12 | 0.32 | 3.32 | 0.18 |
| | | | | | 0.625 | 0.030 | 0.033 | 15.88 | 0.76 | 0.84 | 7.65 | 0.40 | 4.15 | 0.22 |
| | | | | | 0.750 | 0.034 | 0.038 | 19.05 | 0.86 | 0.97 | 9.18 | 0.48 | 4.98 | 0.26 |
| 34R1 34R1X 34R2 34R3 34R3X | F-1 F-50 F-2 F-3 F-51 | 16R1 16R1X 16R2 16R3 16R3X | White White Not Black or Gray Gray Gray | Backcheck & Ball Bearing Backcheck Backcheck & Ball Bearing | 0.047 | 0.007 | 0.010 | 1.19 | 0.18 | 0.25 | 0.75 | 0.04 | 0.41 | 0.02 |
| | | | | | 0.063 | 0.007 | 0.010 | 1.60 | 0.18 | 0.25 | 0.98 | 0.04 | 0.53 | 0.02 |
| | | | | | 0.078 | 0.007 | 0.010 | 1.98 | 0.18 | 0.25 | 1.20 | 0.04 | 0.65 | 0.02 |
| | | | | | 0.094 | 0.007 | 0.011 | 2.39 | 0.18 | 0.28 | 1.43 | 0.04 | 0.78 | 0.02 |
| | | | | | 0.125 | 0.012 | 0.015 | 3.18 | 0.31 | 0.38 | 2.00 | 0.10 | 1.09 | 0.05 |
| | | | | | 0.188 | 0.013 | 0.017 | 4.78 | 0.33 | 0.43 | 3.00 | 0.15 | 1.63 | 0.08 |
| | | | | | 0.250 | 0.014 | 0.020 | 6.35 | 0.36 | 0.51 | 4.00 | 0.20 | 2.17 | 0.11 |
| | | | | | 0.313 | 0.015 | 0.021 | 7.95 | 0.38 | 0.53 | 5.00 | 0.25 | 2.72 | 0.14 |
| | | | | | 0.375 | 0.016 | 0.023 | 9.53 | 0.41 | 0.58 | 6.00 | 0.30 | 3.26 | 0.16 |
| | | | | | 0.500 | 0.019 | 0.025 | 12.70 | 0.48 | 0.64 | 8.00 | 0.40 | 4.34 | 0.22 |
| 38R1 38R2 | ... | 18R1 ... | White Gray | Laundry | 0.125 | 0.012 | 0.015 | 3.18 | 0.31 | 0.38 | 2.25 | 0.10 | 1.22 | 0.05 |
| | | | | | 0.188 | 0.013 | 0.017 | 4.78 | 0.33 | 0.43 | 3.38 | 0.15 | 1.84 | 0.08 |
| | | | | | 0.250 | 0.014 | 0.020 | 6.35 | 0.36 | 0.51 | 4.50 | 0.20 | 2.44 | 0.11 |
| | | | | | 0.313 | 0.015 | 0.021 | 7.95 | 0.38 | 0.53 | 5.63 | 0.25 | 3.06 | 0.14 |
| | | | | | 0.375 | 0.016 | 0.023 | 9.53 | 0.41 | 0.58 | 6.75 | 0.30 | 3.67 | 0.16 |
| | | | | | 0.500 | 0.019 | 0.025 | 12.70 | 0.48 | 0.64 | 9.00 | 0.40 | 4.89 | 0.22 |

4.1.3 To obtain the average density in kg/m³, (1) multiply the percent specific gravity of the first column in Tables 1-4 by 10, or (2) multiply the average density in lb/ft³ by 16.02.

4.1.4 Examples of ASTM classifications are as follows:
26R2 Felt

TABLE 4 Specialty Felt: Corresponding Classifications, Properties and Descriptions

| ASTM (NTA) Class | Federal Spec. C-F-206 | Std. Color | Trade Designation | Min. Breaking Strength | | Std. Width | | Thickness | | | | Mass (weight) | | | |
|------------------|-----------------------|------------|--------------------|------------------------|-----|------------|---------|-----------|---------|------|--------|--------------------|--------|-------------------|---------|
| | | | | lbf | N | in. | m | in. | | mm | | oz/yd ² | | kg/m ² | |
| | | | | | | | | Nom. | Tol. | Nom. | Tol. | Nom. | Tol. | Nom. | Tol. |
| CF1 | 11A1 | White | Coat Front | ... | ... | 80 | 2.0 | 0.030 | ± 0.005 | 0.76 | ± 0.12 | 3.04 | ± 0.12 | 0.103 | ± 0.004 |
| CF2 | 11A2 | Gray | Coat Front | ... | ... | 80 | 2.0 | 0.030 | 0.005 | 0.76 | 0.12 | 3.04 | 0.12 | 0.103 | 0.004 |
| L1 | 10A2 | Gray | Lining Gray | 8 | 36 | 72 | 1.8 | 0.065 | 0.010 | 1.65 | 0.25 | 6.00 | 0.25 | 0.204 | 0.008 |
| L2 | 9A2 | Gray | Lining Gray | 10 | 44 | 72 | 1.8 | 0.075 | 0.015 | 1.90 | 0.38 | 7.00 | 0.25 | 0.238 | 0.008 |
| LS1 | 10A1 | White | Lining-Shoe Tongue | 10 | 44 | 72 | 1.8 | 0.065 | 0.010 | 1.65 | 0.25 | 6.00 | 0.25 | 0.204 | 0.008 |
| DA1 | 6A1 | All Colors | Decor & Apparel | 30 | 133 | 72 | 1.8 | 0.063 | 0.010 | 1.60 | 0.25 | 12.00 | 1.00 | 0.407 | 0.034 |
| DA2 | 7A1 | All Colors | Decor & Apparel | 45 | 200 | 72 | 1.8 | 0.040 | 0.010 | 1.02 | 0.25 | 10.00 | 0.75 | 0.340 | 0.025 |
| DA3 | 8A1 | All Colors | Decor & Apparel | 30 | 133 | 72 | 1.8 | 0.040 | 0.010 | 1.02 | 0.25 | 8.00 | 0.50 | 0.272 | 0.017 |
| DA4 | ... | All Colors | Decor & Apparel | 20 | 89 | 72 | 1.8 | 0.040 | 0.010 | 1.02 | 0.25 | 7.00 | 1.00 | 0.238 | 0.034 |
| DA5 | ... | All Colors | Decor & Apparel | 10 | 44 | 72 | 1.8 | 0.040 | 0.010 | 1.02 | 0.25 | 6.00 | 1.00 | 0.204 | 0.034 |
| OS1 | ... | White | Ortho & Surgical | 20 | 89 | 72 | 1.8 | 0.063 | 0.015 | 1.60 | 0.38 | 0.50 | 0.03 | 0.27 | 0.016 |
| OS2 | ... | White | Ortho & Surgical | 40 | 178 | 72 | 1.8 | 0.125 | 0.040 | 3.17 | 1.02 | 1.00 | 0.06 | 0.54 | 0.033 |
| OS3 | ... | White | Ortho & Surgical | ... | ... | 72 | 1.8 | 0.250 | 0.050 | 6.35 | 1.27 | 2.00 | 0.12 | 1.08 | 0.065 |
| OS4 | ... | White | Ortho & Surgical | ... | ... | 72 | 1.8 | 0.375 | 0.065 | 9.52 | 1.65 | 3.00 | 0.18 | 1.63 | 0.098 |
| OS5 | ... | White | Ortho & Surgical | ... | ... | 72 | 1.8 | 0.500 | 0.075 | 12.7 | 1.90 | 4.00 | 0.25 | 2.17 | 0.136 |
| M1 | 3A1 | Gray | Midsole | ... | ... | 40 × 60 | 1 × 1.5 | 0.258 | 0.008 | 6.55 | 0.20 | 7.15 | 0.65 | 3.88 | 0.353 |

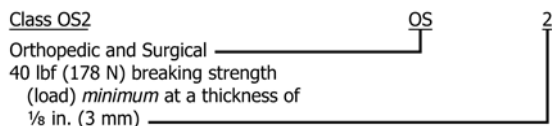


NOTE 1—The terms “Second Quality” and “Third Quality” do not refer to sub-standard levels of quality. Each classification has distinct specifications which are less demanding than its higher classification. See Table 2.

4.2 Corresponding SAE and DoD Classification—For convenience, Table 2 includes the corresponding classifications based on the Society of Automotive Engineers Specification J314b and the U.S. Department of Defense Federal Specification C-F-206.

NOTE 2—The classification codes of this specification and those of Federal Specification C-F-206 are similar in appearance, but the first elements of the codes have entirely different meanings. Instead of a percent specific gravity, the first element of the federal specification code represents the pounds per square yard of material that is 1 in. thick. When using one of these classification systems, be sure to identify the system.

4.3 Special-Purpose Classification—The various types of special-purpose felts appearing in Table 4 are classified by one or two letters, standing for the initial letters of the trade designation, followed by a number indicating the quality index, weight, or both. There is no specific order of presentation intended in this table; for example:



5. Forms of Felt

5.1 In general, less dense and thinner felts are produced in roll form; more dense and thicker felts are produced in sheet form.

5.1.1 Roll felts are usually supplied in lengths of 20 yd to 60 yd (18 m to 55 m).

5.1.2 Sheet felts are usually supplied in flat pieces approximately 1 yd² (0.84 m²). Sheet felts are specified to closer tolerance because of the smaller quantities per unit of manufacture.

5.2 Specialty Felts—Specific trade designations for specialty felts are not intended to limit their use solely to these applications.

6. Sampling

6.1 Lot Sampling—As a lot sample for acceptance testing, take the number of rolls or sheets specified in the following schedule:

| Lot size in yards (metres) or sheets | Sample size in | |
|---|----------------|--------|
| | Rolls | Sheets |
| 800 or less (732 m) | 2 | 2 |
| 801 up to and including 22 000 (20 115 m) | 3 | 3 |
| 22 001 and over | 5 | 5 |

6.2 Laboratory Sample—Take a laboratory sample as follows:

6.2.1 For testing width and length, use the rolls or sheets in the lot sample as the laboratory sample.

6.2.2 For testing other properties, take from each lot sampling unit a full-width piece 1 yd (1 m) long. Before taking a laboratory sampling unit of roll felt, skip a length at the end of the roll equal to the width of the roll. Mark the pieces to indicate the lengthwise direction of the original roll or sheet.

6.3 Test Specimens—Except for testing length or width for which the specimens are the rolls or sheets in the lot sample, take specimens as follows:

6.3.1 From each laboratory sampling unit, cut three specimens at least 5 in. by 8 in. (13 cm by 20 cm). Take one specimen from each edge and from the center of the width of the laboratory sampling unit with no specimens being taken less than 6 in. (150 mm) from the edge of the laboratory sampling unit. Identify the specimens as “Edge 1, Lab.