



## Standard Practice for Calculation of Commercial Weight and Yield of Scoured Wool, Top, and Noil for Various Commercial Compositions<sup>1</sup>

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<sup>ε1</sup> NOTE—The terminology section was updated in July 2012.

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### 1. Scope

1.1 This practice includes, in [Table 1](#), the commercial composition corresponding to different commercial designations for scoured wool, wool top, and wool noil, all of which contain, in addition to wool base, various percentages of moisture, material extractable with alcohol, and mineral matter.

1.2 This practice includes directions for the calculation of the commercial weight of wool corresponding to different commercial designations for several forms of wool, and for converting the commercial weight (mass) calculated on one basis to the commercial weight calculated on a different basis.

1.3 This practice also includes directions for calculating the yield, on various commercial designation bases, obtained by processing raw wool, and for converting the yield calculated on one commercial designation basis to the yield on another commercial designation basis.

NOTE 1—Because of trade practice the term “weight” is used in this practice instead of the technically correct term “mass”.

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 and health practices and determine the applicability of regulatory limitations prior to use.*

### 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[D123 Terminology Relating to Textiles](#)

[D4845 Terminology Relating to Wool](#)

[D584 Test Method for Wool Content of Raw Wool—Laboratory Scale](#)

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<sup>1</sup> This practice is under the jurisdiction of ASTM Committee [D13](#) on Textiles and is the direct responsibility of Subcommittee [D13.13](#) on Wool and Felt.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

### 3. Terminology

3.1 For all terminology related to D13.13, refer to Terminology [D4845](#).

3.1.1 The following terms are relevant to this standard: commercial composition, commercial designation, commercial weight, oven dried, vegetable matter base, wool base, yield.

3.2 For all other terminology related to textiles, refer to [D123](#).

### 4. Commercial Compositions of Commercially Designated Wool

4.1 *Significance and Use*—Commercial scoured wool, top, and clean noil contain, in addition to wool base, varying percentages of moisture, oil or fat, other solvent-extractable material, mineral matter, and perhaps other impurities. To establish a basis for commercial or legal weights for these commodities, various organizations representing interested groups use specific commercial designations, such as Clean Wool Fiber Present, for each of which a commercial composition is specified.

4.2 A number of commercial designations widely used in the wool trade are listed in [Table 1](#) with their commercial compositions.

### 5. Commercial Weight of Lots of Commercially Designated Wool

5.1 *Significance and Use:*

5.1.1 The observed composition of a lot of wool to which a named commercial designation is applied, such as a shipment of American Dry Combed Top, may and usually does differ from the commercial composition, in which case the observed weight of the lot is adjusted to secure the commercial weight.

5.1.2 The commercial compositions are used also in calculations to convert the commercial weight of a lot of wool having a named commercial designation (for example, American Oil Combed Top) to the equivalent commercial weight on a different commercial designation basis (for example, Bradford Dry Combed Top).

5.2 *Calculation of Commercial Weight*—To adjust the observed weight of a lot of wool to which a named commercial

**TABLE 1 Commercial Composition of Commercially Designated Scoured Wool, Wool Top, and Wool Noil**

|                                                  | Percentage |          |                  |
|--------------------------------------------------|------------|----------|------------------|
|                                                  | Wool Base  | Moisture | Other Components |
| ASTM Clean Wool Fiber Present <sup>A</sup>       | 86.0000    | 12.0000  | 2.0000           |
| U.S. Customs Absolute Clean Content <sup>B</sup> | 86.0000    | 12.0000  | 2.0000           |
| IWTO Clean Wool Content <sup>C</sup>             | 83.5299    | 14.5299  | 1.9402           |
| American Oil Combed Top <sup>D,E</sup>           | 82.4222    | 13.0435  | 4.5343           |
| American Oil Combed Noil <sup>D,E</sup>          | 83.4113    | 12.0000  | 4.5887           |
| American Dry Combed Top <sup>D,E</sup>           | 84.1454    | 13.0435  | 2.8111           |
| American Dry Combed Noil <sup>D,E</sup>          | 85.1552    | 12.0000  | 2.8448           |
| Bradford Oil Combed Top <sup>D,E</sup>           | 79.2980    | 15.9664  | 4.7356           |
| Bradford Oil Combed Noil <sup>D,E</sup>          | 82.7760    | 12.2807  | 4.9433           |
| Bradford Dry Combed Top <sup>D,E</sup>           | 82.6449    | 15.4334  | 1.9217           |
| Bradford Dry Combed Noil <sup>D,E</sup>          | 85.7260    | 12.2807  | 1.9933           |
| IWTO Noble Oil Combed Top <sup>C</sup>           | 79.2995    | 15.9664  | 4.7341           |
| IWTO Noble Oil Combed Noil <sup>C</sup>          | 82.7775    | 12.2807  | 4.9418           |
| IWTO Noble Dry Combed Top <sup>C</sup>           | 82.6469    | 15.4334  | 1.9197           |
| IWTO Noble Dry Combed Noil <sup>C</sup>          | 85.7281    | 12.2807  | 1.9912           |
| Schlumberger Oil Combed Top <sup>C</sup>         | 79.2995    | 15.9664  | 4.7341           |
| Schlumberger Oil Combed Noil <sup>C</sup>        | 81.3503    | 13.7931  | 4.8566           |
| Schlumberger Dry Combed Top <sup>C</sup>         | 82.6469    | 15.4334  | 1.9197           |
| Schlumberger Dry Combed Noil <sup>C</sup>        | 84.2500    | 13.7931  | 1.9569           |

<sup>A</sup> ASTM Method **D584**, Test for Wool Content of Raw Wool, Laboratory Scale.

<sup>B</sup> *Tariff Schedules of the United States of America* (1975), Schedule 3, Part 1, Subpart C, Headnote 1(c).

<sup>C</sup> *IWTO Core Test Regulations*, 1974, International Wool Textile Organization.

<sup>D</sup> *Circular No. 3267*, Nov. 10, 1954, Boston Wool Trade Assn.

<sup>E</sup> *Circular No. 4899*, Nov. 2, 1967, Boston Wool Trade Assn.

designation is applied to its commercial weight, determine the composition of the lot of wool at the time of weighing and use **Eq 1**:

$$W = O \times (b/B) \quad (1)$$

where:

$W$  = commercial weight of the lot,

$O$  = observed weight of the lot,

$B$  = percentage of wool base specified in the applicable commercial composition (**Table 1**), and

$b$  = observed wool base content, as a percentage of the observed weight of the lot.

**5.3 Conversion of Commercial Weights**— To convert the commercial weight of a lot of wool (**5.2**) from one commercial designation basis to another, use **Eq 2**:

$$W_2 = W_1 \times B_1/B_2 \quad (2)$$

where:

$W_1, W_2$  = commercial weights of a lot of wool on the bases of commercial designations 1 and 2, respectively, and

$B_1, B_2$  = percentages of wool base specified in the commercial compositions for commercial designations 1 and 2, respectively (**Table 1**).

**Example 1**—The commercial weight of a lot of Bradford Oil Combed Top is 16 249 lb. What is the equivalent commercial weight of the lot in terms of American Oil Combed Top?

Equivalent commercial weight of American Oil Combed Top, lb

$$= 16\,249 \times 79.2980/82.4222$$

$$= 15\,633$$

## 6. Estimated Yield

### 6.1 Significance and Use:

6.1.1 The U.S. Customs duty on a lot of imported raw wool, and commercial transactions, are based on the total commercial weight of wool in one or more named commercially designated forms which is expected to be obtained when the lot of raw wool is processed in a specified manner. The expected yield is often estimated visually by experts. A growing practice is to base the estimate on the observed content of wool base in the lot, with a specified allowance for that portion of the wool base content not expected to be recovered in one of the designated forms, and on specified proportions for the weights of wool base in the several forms of wool included in the estimate of yield.

6.1.2 For commercial purposes it is often necessary to convert an estimated yield from one commercial designation basis to another. Under certain conditions convenient conversion factors may be used for this purpose.

**6.2 Calculation of Estimated Yield**— To calculate, from the observed wool base content of a lot of raw wool, the estimated yield of wool in one or more forms to which commercial designations are applied, use **Eq 3**:

$$Y = (b - A)(f_1/B_1 + f_2/B_2 + \dots) \times 100 \quad (3)$$

where:

$Y$  = estimated yield of wool in named commercially designated forms, as a percentage of the observed weight of the raw wool,

$b$  = observed wool base content, as a percentage of the observed weight of the raw wool,

$A$  = specified allowance for the fraction of  $b$  that is not expected to be obtained in one of the forms included in the estimated yield,

$f_1, f_2, \dots$  = specified fractions of  $(b - A)$  that are expected to be obtained in forms 1, 2, . . . , respectively, included in the yield,

$B_1, B_2, \dots$  = percentages of wool base specified in the commercial compositions for commercial designations 1, 2, . . . , respectively (**Table 1**).

**Example 2**—A lot of raw wool has an observed wool base content of  $b$  %. What are its estimated American Oil Combed Yield (AOCY) and its U.S. Customs Clean Yield (USCCY), if the agreed allowance is  $A$  % in both cases and the agreed ratio of the weight of wool base in the form of top to the weight of wool base in the form of noil is 88 to 12?

$$\text{AOCY, \%} = 100(b - A)(0.88/82.4222 + 0.12/83.4113) = 1.21154(b - A)$$

$$\text{USCCY, \%} = 100(b - A)(1/86) = 1.16279(b - A)$$

$$\text{USCCY, \%} = \text{AOCY, \%} \times 1.16279(b - A) / 1.21154(b - A) = 0.9598 \times \text{AOCY, \%}$$

6.2.1 If  $A$  in **Eq 3** is zero, the calculated value of  $Y$  is termed the Theoretical Commercial Yield, that is, the yield of commercially designated products that would be obtained if all the wool base were converted to those products without loss of wool base.