"STRAIGHT LINE" TEXTILE CALCULATIONS.

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WOVEN AND FINISHED WEIGHTS

The following formulas for finding the Woven and Finished Weight and Length of cloth, although applicable to all fabrics, are especially useful in the manufacture of woolen and worsted goods, which undergo important changes in length and weight during the finishing process. These formulas and those for calculating the effect of changes in weight or length on yarn counts are based on the same principle.

There are six factors to be taken into consideration in connection with the shrinkage of wool goods in finishing:

Yards woven Ounces per yd. woven
Yards finished Ounces per yd. finished
Yield in length Yield in weight

The relations between these factors are illustrated by the following formulas:

Ex. A cut of woolen cassimere measures 40 yards woven and 36 yards finished. It weighs 18 ounces per yard woven and 16 ounces per yard finished.

(1) Yds. fin. ÷ yds. wov. = yield length
   \( 36 ÷ 40 = .90 \text{ per cent.} \)

(2) \( (\text{Yds. fin.} \times \text{ozs. fin.}) ÷ (\text{Yds. wov.} \times \text{ozs. wov.}) = \text{yield weight} \)
   \( (36 \times 16) ÷ (40 \times 18) = .80 \text{ per cent.} \)

(3) \( (\text{Yield length} \times \text{ozs. fin.}) ÷ \text{ozs. wov.} = \text{yield weight} \)
   \( (.90 \times 16) ÷ .80 = 18 \text{ ozs.} \)

(4) \( (\text{Yield length} \times \text{ozs. fin.}) ÷ \text{yield wt.} = \text{ozs. woven} \)
   \( (.90 \times 16) ÷ .80 = 16 \text{ ozs.} \)

(5) \( \text{Yield wt.} \times \text{ozs. wov.} = \text{yield length} \)
   \( .80 \times 18 = .80 \)

(6) \( \text{Yield wt.} \times \text{ozs. wov.} \times \text{yds. fin.} = \text{yds. fin.} \)
   \( .80 \times 16 = 36 \text{ yds.} \)

The use of these formulas is illustrated by the following examples:

Ex. Find shrinkage in length for a piece woven 48 yds.

(1) \( 48 ÷ 44 = .916 \text{ yield} = 8.4\% \text{ shrink.} \)

Ex. Find loss of weight for a piece woven 51 yds. 14 ozs.,

(2) \( (48 \times 12) ÷ (51 \times 14) = 80.7\% \text{ yield} = 19.3 \text{ loss in wt.} \)

The yield in length is \( (48 ÷ 51) 94.1\% \). Then:

(3) \( (94.1 \times 12) ÷ 14 = 80.7\% \text{ yield} = 19.3 \text{ loss in wt.} \)

Ex. Find woven weight per yd. of a piece that shrinks 10% in length, loses 15% in weight and weighs 12 ozs. finished.

(4) \( .90 \times 12 ÷ .85 = 12.7 \text{ ozs. woven.} \)

Ex. Find finished weight per yd. of a piece that weighs 18 ozs. woven, shrinks 8% in length and loses 20% in weight.

(5) \( .80 \times 18 ÷ .92 = 15.6 \text{ ozs. finished.} \)

Ex. Find shrinkage in length of a piece that weighs 15 ozs. per yd. woven, 13 ozs. per yd. finished and loses 18% in weight.

(6) \( .82 \times 15 ÷ 13 = 94.6\% \text{ yield} = 5.4\% \text{ shrink in length.} \)

Ex. Find finished yds. of a piece woven 42 yds. 17 ozs. per yd., which loses 22% in weight.

(7) \( 42 \times 17 ÷ .78 ÷ 12.5 = 39.7 \text{ yds. finished.} \)