

"STRAIGHT LINE" TEXTILE CALCULATIONS.

BY SAMUEL S. DALE.

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) $\text{Yds. fin.} \div \text{yds. wov.} = \text{yield length}$
 $36 \div 40 = 90 \text{ per cent.}$
- (2) $(\text{Yds. fin.} \times \text{ozs. fin.}) \div (\text{Yds. wov.} \times \text{ozs. wov.}) = \text{yield weight}$
 $(36 \times 16) \div (40 \times 18) = 80 \text{ per cent.}$
- (3) $(\text{Yield length} \times \text{ozs. fin.}) \div \text{ozs. wov.} = \text{yield weight}$
 $(.90 \times 16) \div 18 = 80 \text{ per cent.}$
- (4) $(\text{Yield length} \times \text{ozs. fin.}) \div \text{yield wt.} = \text{ozs. woven}$
 $(.90 \times 16) \div .80 = 18 \text{ ozs.}$
- (5) $\text{Yield wt.} \times \text{ozs. wov.} \div \text{yield length} = \text{ozs. fin.}$
 $(.80 \times 18) \div .90 = 16 \text{ ozs.}$
- (6) $(\text{Yield wt.} \times \text{ozs. wov.}) \div \text{ozs. fin.} = \text{yield length}$
 $(.80 \times 18) \div 16 = 90 \text{ per cent.}$
- (7) $(\text{Yds. wov.} \times \text{ozs. wov.} \times \text{yield wt.}) \div \text{ozs. fin.} = \text{yds. fin.}$
 $(40 \times 18 \times .80) \div 16 = 36 \text{ yds.}$

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

Ex. Find shrinkage in length for a piece woven 48 yds. and finished 44 yds.

- (1) $44 \div 48 = 91.6\% \text{ yield} = 8.4\% \text{ shrink.}$

Ex. Find loss of weight for a piece woven 51 yds. 14 ozs., and finished 48 yds. 12 ozs.

- (2) $(48 \times 12) \div (51 \times 14) = 80.7\% \text{ yield} = 19.3 \text{ loss in wt.}$
The yield in length is $(48 \div 51) 94.1\%$. Then:
- (3) $(94.1 \times 12) \div 14 = 80.7\% \text{ yield} = 19.3 \text{ loss in wt.}$

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

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

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

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

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

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

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