

Average Pile Yarn Density & the Importance of Correct Pile Measurement

There are various methods of stating relative density specification for pile carpets. The density formula most often used in the U.S. and favored by CRI is average pile yarn density. It is described in the HUD/FHA publication UM-44d as follows:

$$D = \frac{36 W}{(t \text{ or } T)}$$

where t = The average pile thickness computed in accordance with ASTM D-6859 and ASTM D-7241 applies to all carpet textures except textures F and G. UM-44d further defines textures F and G as “cut pile heat set plied” and “cut pile heat set singles” respectively.

T = The average tuft height for textures F and G determined by ASTM D-5823.

W = Average pile yarn weight expressed in ounces/square yard ASTM D-5848*

D = Average pile yarn density expressed as ounces/cubic yard.

Pile thickness and tuft height are laboratory determinations of what is commonly referred to as “pile height.” This term is sometimes used by manufacturing personnel to indicate the tufting machine set-up and may or may not be representative of the finished carpet. Pile height is often measured with a small ruler or “dip stick” to determine the overall height of the pile. This method should only be used for rough determinations and is not accurate enough to use in the average pile yarn density calculation. Either pile thickness or tuft height should be used depending upon the product construction.

* Generally accepted tolerance for pile yarn weight is +/- 7% based on HUD/FHA administrative Advisory Letter No. 4

