

CALIFORNIA COUNCIL OF TESTING & INSPECTION AGENCIES

FAQ_{10.041}

Clarification ASTM E605 SFRM Density

Q A fireproofing contractor contends that when measuring SFRM thickness on a density sample, the minimum maximum of 25%-1/4 inch rule (ASTM Section 8.1.2.1) applies when averaging the 12-thickness measurements. As a laboratory we believe the measurements should be actual not allowables.

Submitted by Bob McCormick, Field Service Manager at *Raney Geotechnical, Inc.*

A You are correct, the averaging calculations for thickness measurements as mentioned in ASTM E605 section 8.1.2.1 do not apply when measuring thickness for a density sample. Section 8.1 of E605 specifies how to correctly measure the thickness of SFRM for the purpose of determining the average thickness, and areas of excessive thickness are dealt with in section 8.1.2.1. By limiting the measured thickness to a maximum of " over the design thickness, uneven application will not significantly skew the average thickness calculation to a "false high" reading.

When measuring density, IBC 2006 refers us to section 8.2 of E605. Section 8.2.3 deals with thickness measurements for determining density, and quizzically refers to section 7.1, which has no practical meaning on thickness measurement. However, this section does note that 12 thickness measurements are to be taken, and no statement is made regarding adjusting the average of the 12 measurements.

From a practical viewpoint, the use of actual measurements for density calculations prevents "false high" density calculations. For a given weight of SFRM, a limited average thickness/lower volume (as determined by section 8.1.2.1) would generate an erroneous higher density than the actual higher thickness/higher volume measurements would. Thickness measurements are concerned with the **application** of the SFRM, while the density measurements pertain to the **product** itself.

For SFRM to provide the required level of protection both the minium average thickness and the density requirements must be met. "Understating" the average thickness by disregarding a false high point does not result in an understatement of protection. However, if we use thicknesses as determined by a maximum of the design thickness +1/4" (as used for average thickness determination) and not the actual thickness, we would be overstating the density. This would result in an overstatement of the protection level, which must be avoided.

When this question was asked of Luke Woods of W.R. Grace & Co. – Conn. He stated the following:

"The density test in Section 8.2 states that the thickness of the sample shall be determined by averaging the thickness of 12 measurements. I do not believe the 25% - inch allowance is applicable to these measurements. Also I would encourage you and your team to use the displacement method for determining density, Section 8.3."

It's very appropriate to mention the alternate displacement method for determining the in-place density stated, in ASTM E605 Section 8.3 as a referee method. *This method measures the volume of the material without the need for thickness or area measurements. It can be used to retest a sample that may be in question. It reduces some of the measuring and sampling variables that are inherent with other methods.*

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