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WHAT HAPPENED TO THE TYPE I/TYPE II UNIT DESIGNATION IN ASTM C90?

Prior to 2000, ASTM C90 included two different type designations for concrete masonry units: Type I units were defined as moisture-controlled units; Type II units were defined as non-moisture controlled units. The requirements for these two different unit types were identical in all respects with one exception: the moisture content of the unit at the time of delivery. Historically, ASTM C90 stipulated a maximum moisture content for Type I units at the time of delivery. Conversely, no such moisture content requirements were specified for Type II units. Since 2000, the Type I/Type II unit designations no longer appear in ASTM standards covering concrete masonry units.

In theory, by limiting the moisture content of a concrete masonry unit to a relatively low level (based on the environmental conditions at the job site and the physical properties of the unit) would in turn reduce a unit's potential drying shrinkage, which in turn would translate to a reduced potential for shrinkage cracks from forming in the masonry assembly. As such, designers that wanted to maximize the distance between control joints, or possibly remove the need for control joints altogether, would specify the use of Type I concrete masonry units. While sound in theory, the effective use of Type I, moisture-controlled units was difficult to implement primarily because the drying shrinkage potential is largely a function of a unit's moisture content at the time of installation, not the time the unit was delivered to the jobsite.

The phrase "at the time of delivery" contained in ASTM C90 is central to the reason for the removal of moisture-controlled and non-moisture controlled concrete masonry units. Once the concrete masonry units have been delivered to a customer, the producer of the units has lost control over how they will be used or how they will be protected from the environment. Herein lies the disconnect between using ASTM C90 as a manufacturing

specification – as it is intended – and using ASTM C90 as a construction specification – for which it is not intended. Because the "time of delivery" rarely coincides with the time of installation, units delivered within the moisture content limitations of a Type I unit may no longer meet these moisture requirements at the time of installation; having potentially been exposed to a myriad of varying environmental conditions during the time between delivery and installation.

As such, a unit that is delivered to the jobsite meeting the requirements for a Type I unit may in fact be a Type II unit at the time of installation, which could compromise critical design assumptions and result in increased potential for shrinkage cracks from forming. To alleviate the confusion and potential misuse of Type I/Type II concrete masonry units, these designations and their associated requirements were removed from ASTM specifications for concrete masonry units. While they are not designated as such with ASTM standards, this action effectively classifies all concrete masonry units as non-moisture controlled.

One of the most important issues to stress in this discussion is that the removal of the Type I/Type II designation from ASTM C90 has no negative impact the quality of the product being produced or the assembly being constructed. All units must still comply with the requirements for minimum compressive strength, maximum water absorption, maximum variation in dimensions, face shell thickness, web thickness, equivalent web thickness, and maximum linear drying shrinkage exactly as they had before the removal of type designations. Similarly, multiple industry publications have been issued that address the proper methods of spacing and detailing control joints based upon a uniformly and consistently applied set of design criteria, which ensures uniform and consistent quality construction.

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More information on ASTM C90 requirements, recommended maximum moisture content at time of placement, crack control, and control joint criteria can be found in the following CMHA TEK:

TEK 01-01D, *ASTM Specifications for Concrete Masonry Units*

TEK 03-01C, *All-Weather Concrete Masonry Construction*

TEK 10-02B, *Control Joints for Concrete Masonry Walls—Empirical Method*

TEK 10-03, *Control Joints for Concrete Masonry Walls—Alternative Engineered Method*

ABOUT CMHA

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