In late 2011 ASTM C90, the material specification for hollow loadbearing CMU, was modified to permit the cross-webs of units to be configured in different ways to meet specific project needs and performance requirements. As this allowance works its way into local construction, here is a short review of how this new flexibility on unit configurations can benefit your next project.

**What’s changed?**

Under new C90 requirements, web configurations are no longer regulated by their thickness, but rather the cross-sectional area of the web connecting the face shells of a unit.

Literally, this new requirement means that for every square foot of unit surface, no less than 6.5 in.\(^2\) (4193 mm\(^2\)) of web must connect the front and back face shells, with no web measuring less than 0.75 in. (19 mm) in thickness.

**Examples of acceptable web configurations**

Allowing the option to reduce the cross-web thickness and/or area, allows for a greater array of unit configurations. Not every unit configuration is available in every market. Contact your local CMU manufacturer to explore the range of possibilities available.

**Potential impact of ASTM C90 change**

Smaller webs = Larger R-values

Reducing the cross-webs has the potential to substantially increase the energy efficiency of concrete masonry assemblies by reducing the thermal bridges that result from the cross-webs. R-values can increase 2 to 3 times above baseline; while retaining all the intrinsic benefits of thermal mass.

**Increased R-Values**

**Sustainable Attributes**

Using less material in production reduces: the demand on resources; the energy necessary to manufacture products; and the fuel required to transport units to job sites—while maintaining the high durability, low impact solution inherent in concrete masonry.

**Structural**

This change does not reduce the structural performance for load bearing masonry. Other unit properties such as face shell thickness and unit compressive strength remain unchanged.

In addition, larger cell areas reduce the reinforcement congestion and facilitates grout placement.

**Impact on Wall Cost**

Lighter weight units can increase construction productivity and reduce worker fatigue and injuries. This can lead to lower costs for concrete masonry wall systems.

**Fire Ratings**

Because the most common method of determining fire ratings is based on the Code-approved method of equivalent thickness (the amount of concrete that remains if the unit was recast without voids), reducing the size and thickness of cross-webs reduces the equivalent thickness of the unit, which for a given mix design will reduce the calculated fire resistance rating of the assembly. Nevertheless, units can be produced to meet any fire resistance rating required by code and can always use the equivalent thickness method to calculate the fire resistance rating.

To assure wall performance, specific fire ratings for walls should be identified on drawings/wall sections and listed in project specifications.
**What are the exact changes to ASTM C90?**

Here is the old table showing revisions to be incorporated.

<table>
<thead>
<tr>
<th>Nominal Width (W) of Units, in. (mm)</th>
<th>Face Shell Thickness (t&lt;sub&gt;fs&lt;/sub&gt;) min, in. (mm)&lt;sup&gt;a,b,c&lt;/sup&gt;</th>
<th>Webs Thickness (t&lt;sub&gt;w&lt;/sub&gt;) min, in. (mm)&lt;sup&gt;a,b,c&lt;/sup&gt;</th>
<th>Equivalent Web Thickness&lt;sup&gt;d&lt;/sup&gt;, min, in. (mm)</th>
<th>Web Area (A&lt;sub&gt;Aw&lt;/sub&gt;), min, in.&lt;sup&gt;2&lt;/sup&gt;/ft&lt;sup&gt;2&lt;/sup&gt; (mm&lt;sup&gt;2&lt;/sup&gt;/m&lt;sup&gt;2&lt;/sup&gt;)&lt;sup&gt;d&lt;/sup&gt;</th>
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<sup>a</sup> Average of measurements on a minimum of 3 units when measured as described in Test Methods C140.

<sup>b</sup> When this standard is used for units having split surfaces, a maximum of 10 % of the split surface is permitted to have thickness less than those shown, but not less than 3/8 in. (19.1 mm). When the units are to be solid grouted, the 10 % limit does not apply and Footnote C establishes a thickness requirement for the entire face shell.

<sup>c</sup> When the units are to be solid grouted, minimum face shell and web thickness shall be not less than 5/8 in. (16 mm).

<sup>d</sup> The minimum web thickness for units with webs closer than 1 in. (25.4 mm) apart shall be 3/8 in. (19.1 mm).

<sup>e</sup> Minimum web cross-sectional area equivalent web thickness does not apply to the portion of the unit to be filled with grout. The length of that portion shall be deducted from the overall length of the unit for the calculation of the minimum web cross-sectional area equivalent web thickness.

And here is the final approved table reflected in ASTM C90-11b.

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<sup>d</sup> Minimum normalized web area does not apply to the portion of the unit to be filled with grout. The length of that portion shall be deducted from the overall length of the unit for the calculation of the minimum web cross-sectional area equivalent web thickness.