

**ASTM C652 Lightweight Units**

ASTM C652 units offer significant benefits over C216 units for the Architect, Contractor, and the owner. Most significantly because of the slightly increased void area (30% void vs. 24% void) the open body provides for a better fired and more durable unit.

**ASTM Requirements**

- C216 Units
  - Void area less than or equal to 25%
  - Face shell 3/4" or greater
- C652 Units
  - Void area greater than 25%
  - Face shell 3/4" or greater (cores > 1 1/2 in<sup>2</sup>)
  - Face shell 5/8" or greater (cores ≤ 1 1/2 in<sup>2</sup>)
- Absorption strength and durability, appearance, texture & color, chippage and breakage requirement in ASTM C216 and ASTM C652 are identical.
- ASTM C43 defines facing brick as follows:
  - **facing brick, n**—brick for general purposes where appearance properties such as color, texture, and chippage are important; see Specification **C216** and Specification **C652**.

**Engineer Modular (E/M) Size Units**

- Average Overall Size 3 1/2 x 2 3/4 x 7 5/8"
- ASTM C216 Average Weight 4.6 lb (Void 24%)
- ASTM C652 Average Weight 4.1 lb (Void 30%)

**Modular Size M/S Units**

- Average Overall Size 3 1/2 x 2 1/4 x 7 5/8"
- ASTM C216 Average Weight 3.7 lb (Void 24%)
- ASTM C652 Average Weight 3.4 lb (Void 30%)

**Fire Resistance**

- Because of the slightly larger void area, building codes allow a greater fire resistance rating for C652 units compared to C216 units.

<u>Fire Resistance Ratings – IBC Code</u>	
E/M C652 Unit @ 30% Void Area	65 Minutes
E/M C216 Unit @ 24% Void Area	60 Minutes

## **Building Code Requirements**

- ASTM C 216 Units are called **SOLID** units
- ASTM C 652 Units are called **HOLLOW** Units
- ASTM C 652 and C216 Units both qualify as facing brick and comply with requirements of all building codes including; International Building Code (IBC), the International Residential Code (IRC), and the Masonry Standards Joint Committee (MSJC) Building Code Requirements for Masonry Construction ACI 530.

## **CSI/AIA Specifications –MasterSpec**

- Division 4 Section 04810 Unit Masonry Assemblies includes both C216 and C652
- Model specification used by most architects

## **Sustainability/Green Building Design**

- ASTM C652 units provide many benefits as required by ASTM E2129 *Standard Practice for Data Collection for Sustainability Assessment of Building Products* required by the LEED (Leadership in Energy and Environmental Design Program) including;
  - Minimizes use of raw materials
  - Minimizes energy costs in manufacturing
  - Minimizes stack emissions
  - Minimizes energy lost in transportation

## **Transportation Costs**

- Standard interstate hauler can load 23 cubes of C216 E/M units versus 26 cubes of C652 E/M units

## **Mortar Usage**

- The statement that C652 units require more mortar to lay is a myth. Independent studies at Clemson University and at General Shale show the following:

	<b><u>Clemson</u></b>		<b><u>General Shale</u></b>
25% - 10 Hole	5.6 bags/M	25% - 10 Hole	6.1 bags/M
30% - 5 Hole	6.0 bags/M	30% - 5 Hole	6.9 bags/M
35% - 3 Hole	6.8 bags/M	35% - 3 Hole	5.9 bags/M

The conclusion of both studies show the industry standard estimate of 7-bags/M will not change.

For questions or additional information pertaining to this, or any other General Shale Technical Bulletin, please contact Jim Bryja @ (423) 952-4214 (jbryja@generalshale.com)