

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 $\frac{3}{4}$ " or greater
- C652 Units
 - Void area greater than 25%
 - Face shell $\frac{3}{4}$ " or greater (cores > $1\frac{1}{2}$ in²)
 - Face shell $\frac{5}{8}$ " or greater (cores $\leq 1\frac{1}{2}$ in²)
- 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 $3\frac{1}{2} \times 2\frac{3}{4} \times 7\frac{5}{8}$ "
- 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 $3\frac{1}{2} \times 2\frac{1}{4} \times 7\frac{5}{8}$ "
- 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.

Fire Resistance Ratings – IBC Code

| | |
|-------------------------------|------------|
| 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:

| | <u>Clemson</u> | | <u>General Shale</u> |
|---------------|-----------------------|---------------|-----------------------------|
| 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)