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 ¾" or greater
- C652 Units
  - Void area greater than 25%
  - Face shell ¾" or greater (cores > 1½ in^2)
  - Face shell ⅝" or greater (cores ≤ 1½ in^2)
- 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 ½ x 2 ¾ x 7 ⅝"
- 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 ½ x 2 ¼ x 7 ⅝"
- 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:

	Clemson		**General Shale**
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 (jim.bryja@generalshale.com)