



Revised 3/2011

Glen-Gery Handmade Brick

General

Adapted from the ancient art of hand-molding brick, Glen-Gery handmade brick allow unusual architectural effects because of their irregularity in form and texture, including the folds which appear on the faces of the units.

Unit Specifications

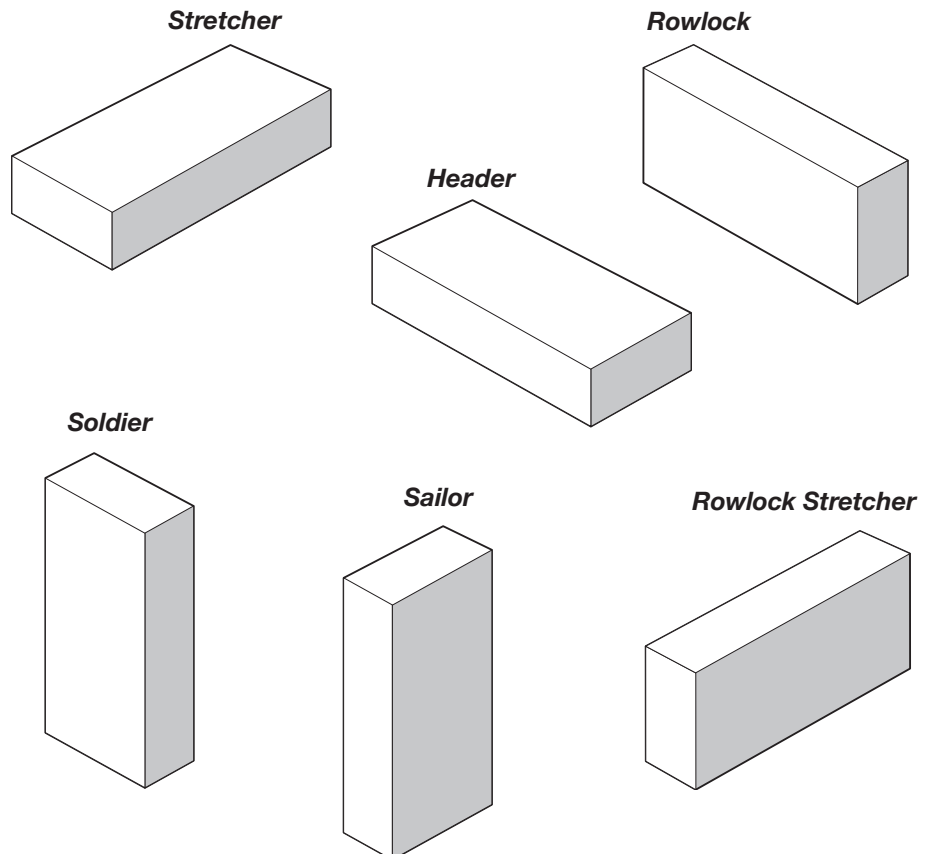
Glen-Gery handmade bricks are typically manufactured to conform to the requirements of American Society for Testing and Materials (ASTM) Standard Specification C 216, Grade SW, Type FBA and all grades of ASTM C 62. These products also conform to the requirements of ASTM C 216, Grade MW. Certain products meet the requirements of ASTM C 902 or ASTM C 32. Inquiries should be made for specific applications or conformance to standards other than ASTM C 216 or C 62. When specifying this product, the specifications should cite:

- 1) The product name and state "as manufactured by Glen-Gery Corporation."
- 2) Conformance to the requirements of the appropriate standard, (typically, ASTM C 216).
- 3) The actual unit dimensions listed as thickness x height x length.

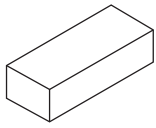
Example: Brandywine handmade oversized as manufactured by Glen-Gery Corporation to conform to the requirements of ASTM C 216, Grade SW, Type FBA. The units shall have dimensions of 4" X 2-3/4" X 8-1/2".



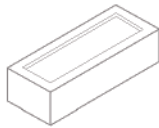
Brick Positions in a Wall



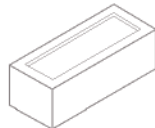
Glen-Gery Brick Sizes



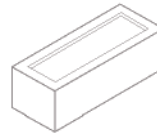
Modular
3-5/8 x 2-1/4 x 7-5/8
6.75 units/sq. ft.



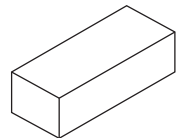
Standard
3-5/8 x 2-1/4 x 8
6.55 units/sq. ft.



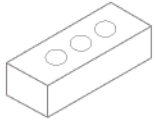
Engineer Modular
3-5/8 x 2-3/4 x 7-5/8
5.63 units/sq. ft.



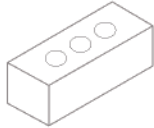
Engineer Standard
3-5/8 x 2-3/4 x 8
5.39 units/sq. ft.



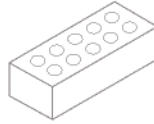
Handmade Oversized
4 x 2-3/4 x 8-1/2
5.00 units/sq. ft.



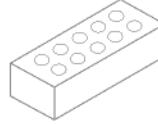
Lightweight Modular
3-1/2 x 2-1/4 x 7-5/8
6.75 units/sq. ft.



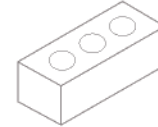
Lightweight Engineer Modular
3-1/2 x 2-3/4 x 7-5/8
5.63 units/sq. ft.



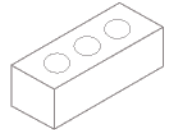
Modular
3-5/8 x 2-1/4 x 7-5/8
6.75 units/sq. ft.



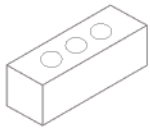
Standard
3-5/8 x 2-1/4 x 8
6.55 units/sq. ft.



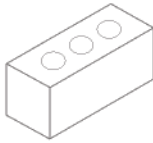
Engineer Modular
3-5/8 x 2-3/4 x 7-5/8
5.63 units/sq. ft.



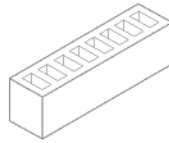
Engineer Standard
3-5/8 x 2-3/4 x 8
5.39 units/sq. ft.



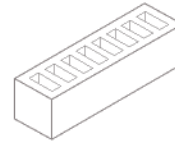
Queen
3 x 2-3/4 x 7-5/8
5.63 units/sq. ft.



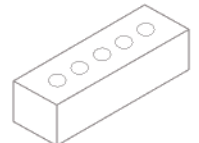
Econo
3-5/8 x 3-5/8 x 7-5/8
4.50 units/sq. ft.



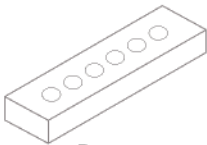
Engineer King
2-13/16 x 2-13/16 x 9-5/8
4.55 units/sq. ft.



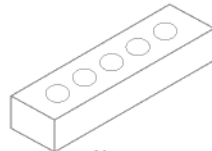
King Narrow-Bed
3-1/8 x 2-3/4 x 9-5/8
4.55 units/sq. ft.



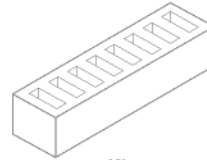
King
3-5/8 x 2-3/4 x 9-5/8
4.55 units/sq. ft.



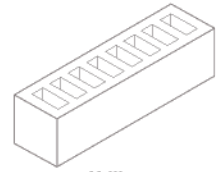
Roman
3-5/8 x 1-5/8 x 11-5/8
6.00 units/sq. ft.



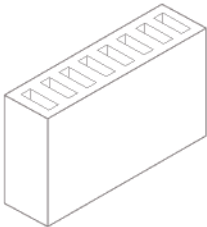
Norman
3-5/8 x 2-1/4 x 11-5/8
4.50 units/sq. ft.



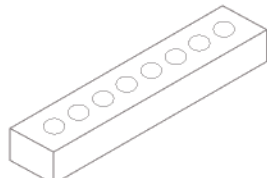
Kingston
3-5/8 x 2-3/4 x 11-5/8
3.75 units/sq. ft.



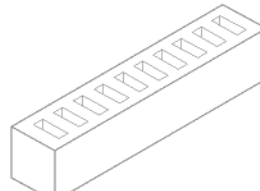
Utility
3-5/8 x 3-5/8 x 11-5/8
3.00 units/sq. ft.



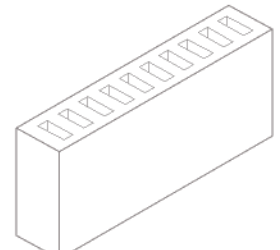
Double Utility
3-5/8 x 7-5/8 x 11-5/8
1.50 units/sq. ft.



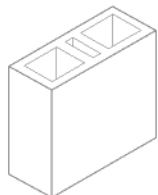
Saxon
3-5/8 x 2-1/4 x 15-5/8
3.38 units/sq. ft.



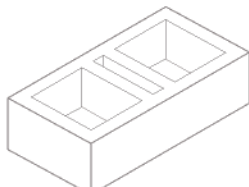
Titan
3-5/8 x 3-5/8 x 15-5/8
2.25 units/sq. ft.



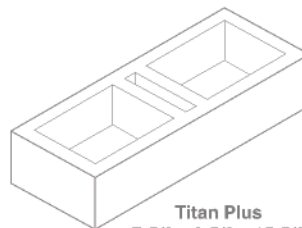
Double Titan
3-5/8 x 7-5/8 x 15-5/8
2.25 units/sq. ft.



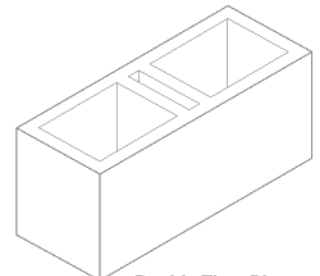
8-Square
3-5/8 x 7-5/8 x 7-5/8
2.25 units/sq. ft.



Regent
7-5/8 x 3-5/8 x 11-5/8
3.00 units/sq. ft.



Titan Plus
7-5/8 x 3-5/8 x 15-5/8
2.25 units/sq. ft.



Double Titan Plus
7-5/8 x 7-5/8 x 15-5/8
1.13 units/sq. ft.

Coring and frogs are at the manufacturer's option. Actual coring patterns may not match the illustrations.

**TABLE 1
Brick Size, Coverage and Weight**

Brick Size	Specified Dimension						Brick per square foot	Average Weight per unit (kg)	
	Thickness (inches) (mm)		Height (inches) (mm)		Length (inches) (mm)				
Modular	3-5/8	92	2-1/4	57	7-5/8	194	6.75	4.6	2.1
Handmade Oversized	4	102	2-3/4	70	8-1/2	216	5.00	6.4	2.9

Design Criteria

Size:

Glen-Gery manufactures handmade brick in two sizes shown in Table 1.

Dimensional Tolerances:

Glen-Gery handmade bricks are manufactured to provide a unique appearance resulting from nonuniformity in size. For this reason, ASTM C 216, Type FBS maximum permissible dimensional variations are not applicable. These brick are manufactured as Type FBA brick. The product ordered will generally contain a number of units which are over or under the specified dimensions. The dimensional variations are part of the handmolded process coupled with the raw materials as well as the drying and firing processes which gives each application a unique appearance. Thus, for some products, all the units may be slightly over or slightly under the specified dimensions.

Configurations:

Handmade bricks are manufactured as solid bricks to conform to the requirements of applicable ASTM standards and are manufactured as one hundred percent solid (unfrogged) units. Since the bed face is finished and unfrogged, handmade brick can be laid in the sailor or rowlock stretcher position for additional customization.

Weight:

The weight of the brick units varies with the raw material, size, manufacturing processes, and the presence or absence of frogs. While actual weight of specific brick should be confirmed, average weight of each size handmade brick

manufactured by Glen-Gery is included in Table 1.

Finishes:

Glen-Gery handmade molded brick are often referred to as ‘sand struck’ meaning that sand is used as a lubricant to release the clay from the molds and as a way to provide different colors. These “sand-struck” brick are produced with varying degrees of sand on all surfaces except one bedding surface.

Color:

Glen-Gery handmade brick are available in a multitude of colors and blends, including white. Along with the color of the bodies of the bricks, the sands applied to five of the faces during manufacture give handmade bricks their intriguing colors. The appearance of handmade bricks is also affected by the size of the sand particles. The availability of a particular finish is usually dependent on the specific product.

Shapes:

Standard brick shapes are dimensioned to course properly with nominal 4" thick brick sizes. While the ‘standard’ brick shapes are described in the Glen-Gery Standard Shapes Catalog, “Brick Shapes”, they are not stock items. Typical handmade brick shapes, as described in the catalogue, include various configurations of bullnose, watertable, corner, radial, shelf angle, sill, and coping units.

Shapes dimensioned for coursing with other brick sizes, and shapes having configurations to fit specific project requirements are also available. These nonstandard shapes require detailed

dimension drawings which must be submitted to and approved by Glen-Gery. In order to achieve the effects desired by the designer, some shape designs may require coring which does not meet the requirements of ASTM C 216.

All shapes should be identified early in the project design because certain shape configurations may require special forming, drying, or firing processes. These processes may require more time or different scheduling than the non-shape brick.

Physical Properties of Units

Compressive Strength:

Average gross compressive strength of handmade brick exceeds 3,000 psi when tested with the loads applied normal to the bedding surface. Typically, the average compressive strength exceeds 4,000 psi for handmade brick manufactured to meet ASTM C216. The actual compressive strength depends upon the specific product and size selected.

Water Absorption:

The average maximum hot-water absorption by submersion in boiling water for five hours is less than 17% and will typically be less than 15% for machine molded brick. The average saturation coefficient is generally less than 0.65.

Initial Rate of Absorption (IRA):

The initial rate of absorption (suction) may exceed 30 grams per 30 square inches per minute under laboratory conditions. handmade brick can be checked on the site to determine if wetting is necessary prior to laying unless familiarity with the

CONTINUED FROM PAGE 3

product has demonstrated that wetting is not required. The procedure for determining wetting requirements is the field test procedure described in ASTM C 67. If this test is not practical, the need for wetting may be estimated by the following field test:

- 1) Place a \$.25 piece on a bearing surface of a typical unit.
- 2) Draw a ring around the quarter with a wax pencil.
- 3) Place twenty drops of water within the ring.
- 4) If unabsorbed water remains after 1-1/2 minutes, the units likely do not require wetting. If all the water is absorbed into the unit, the units should be wetted prior to laying.

Properties of Walls

Compressive Strength:

The minimum assumed compressive strength for a brick wall, using good workmanship and ASTM C270 Type N mortar, is 1,000 psi. Assemblies constructed with most Glen-Gery handmade bricks manufactured to meet ASTM C216 will provide a minimum assumed compressive strength of 1,500 psi, when used with good workmanship and Type N mortar. Reference: Specification for Masonry Structures (TMS 602/ACI 530.1/ASCE 6).

Thermal Performances:

The thermal resistivity of Glen-Gery handmade brick is approximately 0.11 (hr • sq. ft. • deg f)/(Btu • in.). A nominal four-inch wythe, excluding air films, will provide a thermal resistance of approximately 0.40 (hr • sq. ft. • deg f)/(Btu). For handmade oversized units, the thermal resistance will be approximately 0.44 (hr • sq. ft. • deg f)/(Btu). The thermal resistivity is used to predict the thermal performance of wall elements under steady-state conditions. The mass and specific heat of this product provide additional benefit when subjected to the dynamic conditions of the natural environment. As described in the American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1, the effects of mass, specific heat, and the color of the brick

should be considered. Reference: BIA Technical Notes on Brick Construction 4 Revised, "Heat Transmission Coefficients of Brick Masonry Walls", 4B Revised, "Energy Code Compliance of Brick Masonry Walls" and 43D, "Brick Passive Solar Heating Systems, Part IV – Material Properties."

Sound Transmission:

A nominal four-inch wythe of brick masonry has a sound transmission classification (STC) of approximately 45. Reference: BIA Technical Notes on Brick Construction 5A, "Sound Insulation – Clay Masonry Walls."

Fire Resistance:

Fire resistance ratings are directly related to wall assembly including the equivalent thickness of masonry. For example: A nominal 4-inch wythe of clay masonry alone provides a one hour fire rating. Fire ratings can be determined through Testing (per ASTM E119) or calculated in accordance with the International Building Code (IBC) or Code Requirements for Determining Fire Resistance of Concrete Masonry Construction Assemblies ACI 216.1/TMS 0216. Reference: BIA Technical Notes on Brick Construction 16 Revised, "Fire Resistance of Brick Masonry."

Coefficient of Thermal Expansion:

Brick walls constructed of Glen-Gery handmade brick have a coefficient of thermal expansion of approximately 0.000004 in. (in. • °F) as listed in The Building Code Requirements for Masonry Structures (TMS 402/ACI 530/ASCE 5). A one hundred foot length (or height) of wall constructed of Glen-Gery handmade brick, and exposed to an annual extreme temperature difference of 100 °F, is expected to experience a total thermal movement of approximately one-half inch.

Coefficient of Moisture Expansion:

The coefficient of moisture expansion of Glen-Gery handmade brick veneer is typically less than 0.0006 in./in. Although most of the moisture expansion of Glen-Gery handmade brick occurs immediately after the brick are fired, before the brick arrive at the job site, the maximum design moisture expansion of one-hundred foot long (or high) wall constructed of these products is less than five-eighths of an inch.

Construction

Storage and Protection:

Store brick off ground to avoid contamination by water, mud, dust or materials likely to cause staining or other defects. Do not use cubes of brick as supports or work surfaces. Cover units with a weather resistant membrane held securely in place or otherwise protect units from the elements.

Wetting:

As deemed necessary (see IRA), wet units prior to laying. Wetting typically consists of saturating the units three to twenty four hours before laying the units. Units should be saturated but surface dry when laid.

Weather Extremes:

Follow the procedures required by The International Building Code (IBC) references cold and hot weather construction provisions for masonry that are based on those found in Specification for Masonry Structures (TMS 602/ACI 530.1/ASCE 6) and required by Building Code Requirements for Masonry Structures (TMS 402/ACI 530/ASCE 5). While specific cold and hot weather provisions are not included within the International Residential Code (IRC) the IRC states that mortar for use in masonry construction shall comply with ASTM C 270, which requires mortar for other than masonry veneer to be prepared in accordance with the Masonry Industry Council's "Hot and Cold Weather Masonry Construction Manual." Further information is also available in the BIA Technical Notes on Brick Construction 1, "Cold and Hot Weather Construction."

Installation:

Place units in full mortar joints, taking special care to assure that the head joints are full. Use a Portland cement lime mortar conforming to ASTM C 270. A prepackaged mortar mix conforming to these specifications is Glen-Gery Color Mortar Blend. Reference: Glen-Gery Product Profile "Glen-Gery Color Mortar Blend."

Tooling:

When thumbprint hard, tool all joints to produce a concave, grapevine, or vee joint finish.

Protection of Work:

At the end of each day and at the beginning of each shut down period, cover all work with a strong weather resistant membrane which is held in place securely. Scaffold boards closest to the wall should be tilted up at days end to prevent splatter during rain. Care should also be taken to protect brickwork located near the ground from mud and dirt.

Cleaning:

Tips to reduce the need for cleaning:

- Protect the base of the wall from mortar or mud splatter by spreading plastic sheets, straw or other protection on the ground adjacent to the wall and 2-3 ft. up the face of the wall.
- Scaffolding should be set far enough away from the wall to allow mortar droppings to fall to the ground.
- At the end of each shift, remove excess mortar with a stiff bristle brush. Clean with wooden paddles and stiff fiber brushes using clean water.

If a cleaning agent is necessary, presoak the wall with clean water prior to applying

the cleaning agent and thoroughly rinse the wall with clean water after cleaning. Prior to determining a final cleaning solution, test the procedure and cleaning agent on a small sample area to observe the effectiveness of the overall cleaning solution and, most importantly, to detect any possible deleterious effects or changes in appearance of the brick. Additional information is available in the Glen-Gery Technical Profile "Cleaning New Brickwork." Some handmade bricks should not be cleaned; Check with your Glen-Gery Distributor or District Sales Manager prior to making a final selection of a cleaning procedure and solution. Reference: BIA Technical Notes on Brick Construction 20, "Cleaning Brickwork."

Estimating:

The quantities of brick and mortar required for a project vary with the size of the brick unit, the wall construction, the number of field cuts necessary and the workmanship. Table 2 provides the quantities of brick and mortar quantities per 1,000 brick units. The figures are based on the units being placed in the wall as stretchers in stack or running

bond. The quantities are provided for a single wythe of brickwork. Additional information regarding mortar or grout for collar joint or grouted applications can be found in the referenced BIA Technical Notes. The values provided are estimates of the quantities in the finished wall and do not account for waste. The values provided in Table 3 may be useful in approximating the number of units for caps, sills, bands, etc. These values represent the actual number of units per linear foot for the various brick sizes placed on the four most frequently used positions in the wall. For 3-5/8" x 2-1/4" x 7-5/8" bricks, the values are based on a nominal three-eighth inch mortar joint. For 4" x 2- 3/4" x 8-1/2" bricks, the values are based on a nominal one-half inch mortar joint Reference: BIA Technical Notes on Brick Construction 10, "Dimensioning and Estimating Brick Masonry."

For further information contact:
 Glen-Gery Technical Services
 423 South Pottsville Pike
 Shoemakersville, PA 19555
 (610) 562-3076
 glengerytech@oldcastleapg.com

TABLE 2
Brick and Mortar Quantities¹
 Nominal 3/8 Inch Mortar Joints

Brick Size	Vertical Coursing in courses per inch	Units per square foot	Cubic Foot per 100 square foot	Quantity of Mortar per 1000 units
Modular	3 Courses per 8"	6.75	5.46	8.10
Handmade Oversized	5 Courses per 16"	5.00	4.92	9.84

¹ These values are actual quantities and must be increased for waste and any possible construction requirements which may necessitate additional quantities.

TABLE 3
Units Per Linear Foot in Various Positions
 Nominal 3/8 Inch Mortar Joints

Brick Size	Stretcher	Rowlock	Soldier	Header
Modular	1.50	4.50	4.50	3.00
Handmade Oversized	1.33	3.75	3.75	2.67



Brick Centers

Iowa

Glen-Gery Brick Center
101 Ashworth Road
W. Des Moines, IA 50265
TEL (515) 224-4110
FAX (515) 224-4057

Kansas

Glen-Gery Brick Center
336 S. 42nd. Street
Kansas City, KS 66106
TEL (913) 281-2800
FAX (913) 281-2992

Michigan

Glen-Gery Brick Center
6315 Highland Road
Waterford MI 48327
TEL (248) 666-2411
FAX (248) 666-4263

Pennsylvania

Glen-Gery Brick Center
Turnpike Industrial Park
2750 Commerce Drive
Middletown, PA 17057
TEL (717) 939-6061
FAX (717) 939-8035

Glen-Gery Brick Center
200 Hartman Road
Reading, PA 19605
TEL (610) 939-1721
FAX (610) 939-2317

Glen-Gery Brick Center
423 Susquehanna Trail
Watsontown, PA 17777
TEL (570) 742-4721
FAX (570) 742-7112

Glen-Gery Brick Center
1090 E. Boundary Avenue
P O Box 2903
York, PA 17403
TEL (717) 854-8802
FAX (717) 854-1251

Virginia

Glen-Gery Brick Center
9905 Godwin Drive
Manassas, VA 22110
TEL (703) 368-3178
FAX (703) 368-1280

Corporate Office

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1166 Spring Street
P O Box 7001
Wyomissing, PA 19610-6001
TEL (610) 374-4011
FAX (610) 374-1622

e-mail: gg@glengerybrick.com
<http://www.glengerybrick.com>

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Seller warrants title to said goods and that the goods supplied shall meet applicable specifications where such are designated in the Buyer's order. Should the said goods fail to conform to the foregoing warranty, Seller will, at its option replace the same, F.O.B. job site or refund the portion of purchase price paid for such non-conforming goods. SELLER SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR ANY BREACH OF THESE WARRANTIES. THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, INCLUDING, WITHOUT LIMITATION, WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.