



Glen-Gery Extruded Brick

General

Glen-Gery manufactures many sizes of extruded bricks in a multitude of shades and textures to accommodate the visual requirements of most projects. The more popular extruded bricks have a nominal four inch bed depth. These extruded units are often referred to as cored, stiff mud, or wirecut bricks. To differentiate between wirecut bricks and wirecut finishes, Glen-Gery refers to the wirecut finish as a velour texture.



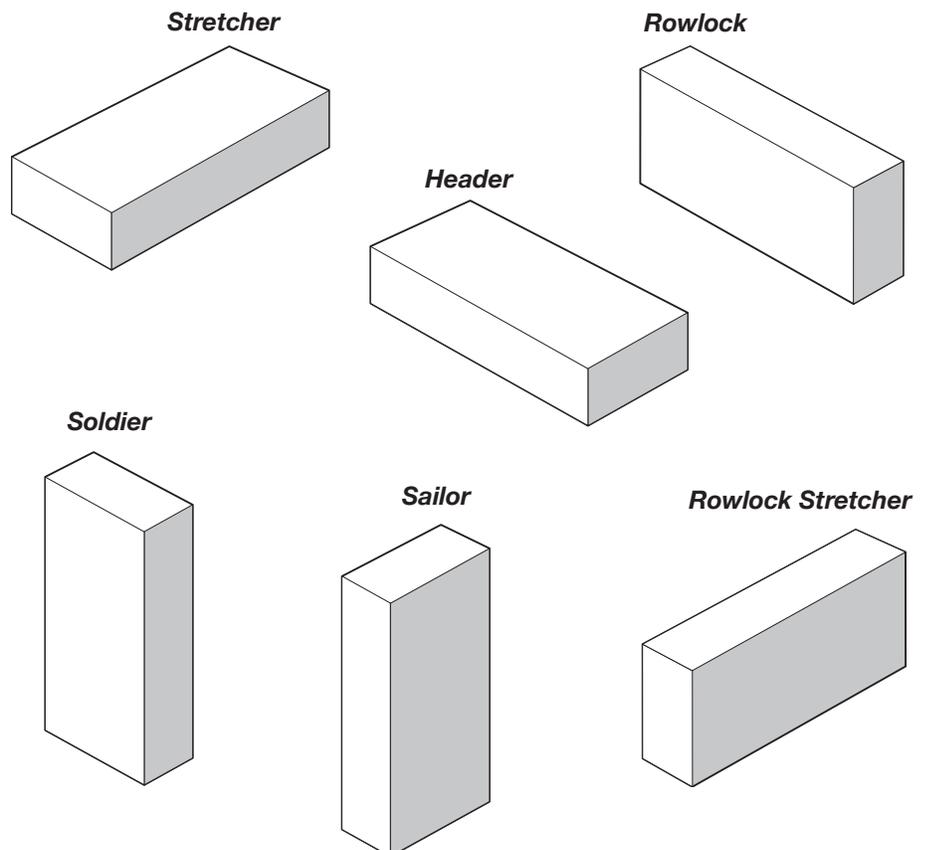
Unit Specifications

Glen-Gery extruded bricks are typically manufactured to conform to the requirements of American Society for Testing and Materials (ASTM) Standard Specification C 216, Grade SW, Type FBS and all grades of ASTM C 62. In some instances brick are manufactured to conform to ASTM C652 which includes increased core volume. These products also conform to the requirements of ASTM C 216, Grade MW. Certain products meet the requirements of ASTM C 216, Type FBX, ASTM C 902, ASTM C 652, 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:

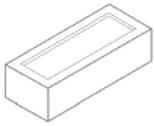
- 1) The product name and state "as manufactured by Glen-Gery Corporation."
- 2) Conformance to the requirements of the appropriate standard, (typically, ASTM C 216 or C652).
- 3) The actual unit dimensions listed as thickness x height x length.

Example: Glenrose Battlefield as manufactured by Glen-Gery Corporation to conform to the requirements of ASTM C 216, Grade SW, Type FBS. The units shall have dimensions of 3-5/8" X 2-1/4" X 7-5/8".

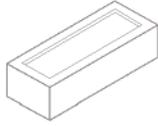
Brick Positions in a Wall



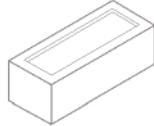
Glen-Gery Brick Sizes



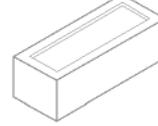
Modular
3-5/8 x 2-1/4 x 7-5/8
6.75 units/sq. ft.



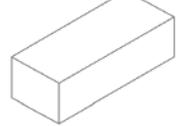
Standard
3-5/8 x 2-1/4 x 8
6.55 units/sq. ft.



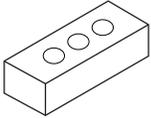
Engineer Modular
3-5/8 x 2-3/4 x 7-5/8
5.63 units/sq. ft.



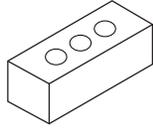
Engineer Standard
3-5/8 x 2-3/4 x 8
5.39 units/sq. ft.



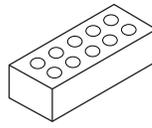
Handmade Oversized
4 x 2-3/4 x 8-1/2
5.00 units/sq. ft.



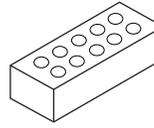
Lightweight Modular
3-1/2 x 2-1/4 x 7-5/8
6.75 units/sq. ft.



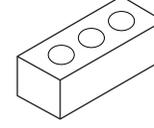
Lightweight Engineer Modular
3-1/2 x 2-3/4 x 7-5/8
5.63 units/sq. ft.



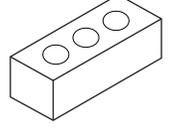
Modular
3-5/8 x 2-1/4 x 7-5/8
6.75 units/sq. ft.



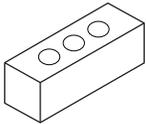
Standard
3-5/8 x 2-1/4 x 8
6.55 units/sq. ft.



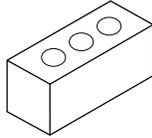
Engineer Modular
3-5/8 x 2-3/4 x 7-5/8
5.63 units/sq. ft.



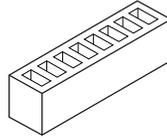
Engineer Standard
3-5/8 x 2-3/4 x 8
5.39 units/sq. ft.



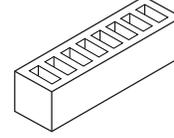
Queen
3 x 2-3/4 x 7-5/8
5.63 units/sq. ft.



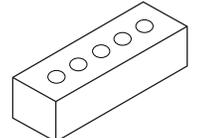
Econo
3-5/8 x 3-5/8 x 7-5/8
4.50 units/sq. ft.



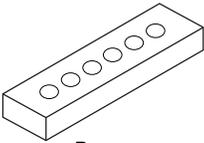
Engineer King
2-13/16 x 2-13/16 x 9-5/8
4.55 units/sq. ft.



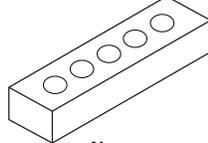
King Narrow-Bed
3-1/8 x 2-3/4 x 9-5/8
4.55 units/sq. ft.



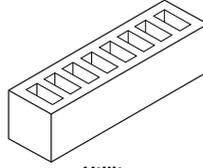
King
3-5/8 x 2-3/4 x 9-5/8
4.55 units/sq. ft.



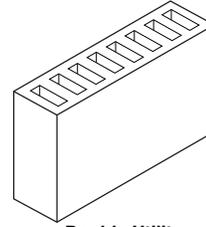
Roman
3-5/8 x 1-5/8 x 11-5/8
6.00 units/sq. ft.



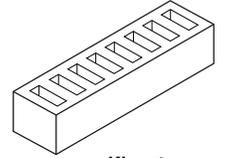
Norman
3-5/8 x 2-1/4 x 11-5/8
4.50 units/sq. ft.



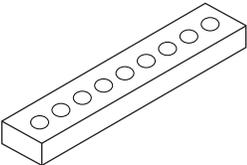
Utility
3-5/8 x 3-5/8 x 11-5/8
3.00 units/sq. ft.



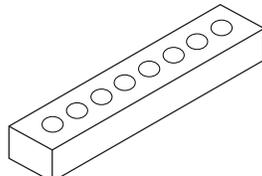
Double Utility
3-5/8 x 7-5/8 x 11-5/8
1.50 units/sq. ft.



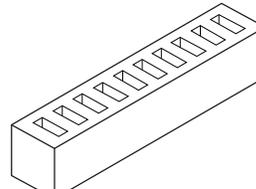
Kingston
3-5/8 x 2-3/4 x 11-5/8
3.75 units/sq. ft.



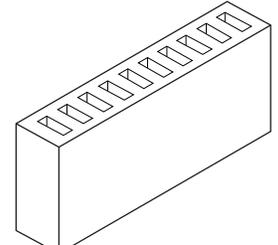
Viking
3-1/2 x 1-5/8 x 15-5/8
4.50 units/sq. ft.



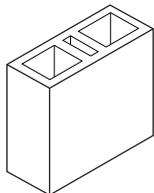
Saxon
3-5/8 x 2-1/4 x 15-5/8
3.38 units/sq. ft.



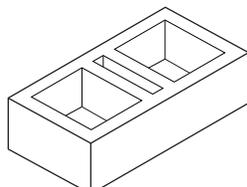
Titan
3-5/8 x 3-5/8 x 15-5/8
2.25 units/sq. ft.



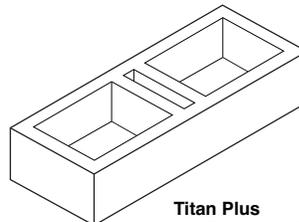
Double Titan
3-5/8 x 7-5/8 x 15-5/8
2.25 units/sq. ft.



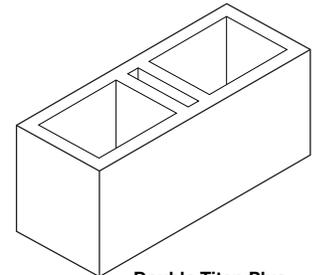
8-Square
3-5/8 x 7-5/8 x 7-5/8
2.25 units/sq. ft.



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. Contact plant for specific information on sizing and coring.

**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)						
Queen	3	76	2-3/4	70	7-5/8	194	5.63	4.0	1.8
Lightweight Modular	3-1/2	89	2-1/4	57	7-5/8	194	6.75	3.4	1.5
Lightweight Engineer Modular	3-1/2	89	2-3/4	70	7-5/8	194	5.63	4.0	1.8
Modular	3-5/8	92	2-1/4	57	7-5/8	194	6.75	4.0	1.8
Engineer Modular	3-5/8	92	2-3/4	70	7-5/8	194	5.63	4.8	2.2
Econo	3-5/8	92	3-5/8	92	7-5/8	194	4.50	6.2	2.8
8-Square	3-5/8	92	7-5/8	194	7-5/8	194	2.25	14.1	6.4
Standard	3-5/8	92	2-1/4	57	8	203	6.55	4.2	1.9
Engineer Standard	3-5/8	92	2-3/4	70	8	203	5.39	5.0	2.3
King Narrow-Bed	3-1/8	79	2-3/4	70	9-5/8	244	4.55	4.8	2.2
Engineer King	2-13/16	71	2-13/16	71	9-5/8	244	4.55	5.0	2.3
King	3-5/8	92	2-3/4	70	9-5/8	244	4.55	7.5	3.4
Roman	3-5/8	92	1-5/8	41	11-5/8	295	6.00	3.0	1.4
Norman	3-5/8	92	2-1/4	57	11-5/8	295	4.50	6.0	2.7
Utility	3-5/8	92	3-5/8	92	11-5/8	295	3.00	9.6	4.4
Double Utility	3-5/8	92	7-5/8	194	11-5/8	295	1.50	19.2	8.7
Kingston	3-5/8	92	2-3/4	70	11-5/8	295	3.75	7.0	3.2
Viking	3-1/2	89	1-5/8	41	15-5/8	397	4.50	5.9	2.7
Saxon	3-5/8	92	2-1/4	57	15-5/8	397	3.38	7.7	3.5
Titan	3-5/8	92	3-5/8	92	15-5/8	397	2.25	14.1	6.4
Double Titan	3-5/8	92	7-5/8	194	15-5/8	397	1.13	27.0	12.2
Regent*	7-5/8	194	3-5/8	92	11-5/8	295	3.00	15.5	7.0
Titan Plus*	7-5/8	194	3-5/8	92	15-5/8	397	2.25	20.0	9.1
Double Titan Plus*	7-5/8	194	7-5/8	184	15-5/8	397	1.13	40.0	18.1

*Manufactured to meet ASTM C652 H40V

Design Criteria

Size:

Table 1 provides the many sizes in which Glen-Gery manufacturers extruded brick.

Dimensional Tolerances:

Glen-Gery extruded bricks are manufactured to provide specific dimensional tolerances. The dimensional tolerances of the product are intended to be within the requirements of ASTM C 216, Type FBS for general use. Some products (including but not limited to those manufactured at the Hanley Plant) are manufactured to meet Type FBX. The product ordered will generally contain a number of units which are over or under the specified dimensions. The dimensional variations are related to

the raw materials, forming, drying and firing processes, and the desired finish and color. Thus, for some products, all the units may be slightly over or slightly under the specified dimensions. Inquiries should be made regarding the dimensional variations which might be expected if project detailing requires precise coursing. Specialty products or gauged products may be desirable for such applications.

Configurations:

These units are manufactured to conform to the requirements of applicable ASTM standards. The solid units (meeting ASTM C216 or C62) may have cores which create an aggregate void space of up to 25% of the gross cross-sectional area in every plane parallel to the bearing surface. Hollow

Units, meeting ASTM C652 H40V, may be cored up to 40% of the gross cross sectional area parallel to the bearing surface. Core size, shape and location are determined by the manufacturing facility. The units may also be available as 100% solid units. If 100% solid units are desired, availability must be confirmed when ordering. In addition to 100% solid units, variations in core size and configuration may be available on special order.

Weight:

The weight of the brick units varies with the raw material, size, manufacturing processes, and the amount and configuration of the coring. While actual weight of specific brick should be confirmed, average weight of each size extruded brick manufactured by Glen-Gery is included in Table 1.

Finishes:

Glen-Gery extruded bricks are available in a variety of textures. The textures include smooth, velour, bar, rug, matt, paper cut, scored, rockface, slurry and sand finishes. The availability of a particular finish is usually dependent on the specific product. Certain finishes (i.e. bark) are not available on shapes.

Color:

Glen-Gery extruded brick are available in a multitude of color blends. The colors available include various shades of red, brown, gray, buff, and white. Some colors are the natural colors of the fired raw materials, while others are produced by fusing a surface treatment onto the surface of the brick during firing or adding minerals to the bodies of the brick. If through body colors are desired, inquiries should be made regarding the availability of the desired colors. The color selection may also be limited by the product selected and the desired finish.

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 extruded 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 exceeds 3,000 psi when tested with the loads applied normal to the bedding surface. Typically, the average compressive strength exceeds 7,000 psi and may be as high as 30,000 psi for 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 9%. The average saturation coefficient is generally less than 0.78. In instances where the saturation coefficient exceeds 0.78, the cold water absorption for Glen-Gery brick is less than 8% and the units meet the requirements of ASTM C216, Grade SW.

Initial Rate of Absorption (IRA):

The initial rate of absorption (suction) normally does not exceed 30 grams per 30 square inches per minute under laboratory conditions. However, brick can be checked on the site to determine if wetting is necessary prior to laying unless familiarity with the 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 extruded bricks manufactured to meet ASTM C216 will provide a minimum assumed compressive strength of 2,000 psi, when used with good workmanship and Type N mortar. Specific products may provide assumed wall compressive strengths as high as 3,000 psi when used with good workmanship and Type N mortar. For grouted clay masonry, use grout that conforms to ASTM C476 with a minimum compressive strength of 2,000 psi. Reference: Specification for Masonry Structures (TMS 602/ACI 530.1/ASCE 6).

Thermal Performances:

The thermal resistivity of Glen-Gery extruded 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). 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 while a fully grouted regent size unit (7-5/8" thick) can provide a 4-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 extruded 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 extruded 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 extruded brick veneer is less than 0.0005 in./in. Although most of the

moisture expansion of Glen-Gery extruded 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.

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
Queen	5 Courses per 16"	5.63	3.97	7.05
Lightweight Modular	3 Courses per 8"	6.75	5.28	7.82
Lightweight Engineer Modular	5 Courses per 16"	5.63	4.63	8.22
Modular	3 Courses per 8"	6.75	5.46	8.10
Engineer Modular	5 Courses per 16"	5.63	4.79	8.52
Econo	1 Course per 4"	4.50	4.12	9.15
8-Square	1 Course per 8"	2.25	2.77	12.29
Standard	3 Courses per 8"	6.55	4.12	6.29
Engineer Standard	5 Courses per 16"	5.39	4.75	8.81
King Narrow-Bed	5 Courses per 16"	4.55	3.96	8.70
Engineer King	5 Courses per 16"	4.55	2.67	5.87
King	5 Courses per 16"	4.55	4.59	10.09
Roman	4 Courses per 8"	6.00	6.43	10.72
Norman	3 Courses per 8"	4.50	5.06	11.24
Utility	1 Course per 4"	3.00	3.69	12.29
Double Utility	1 Course per 8"	1.50	2.32	15.44
Kingston	5 Courses per 16"	3.75	4.37	11.66
Viking	4 Courses per 8"	4.50	5.06	11.24
Saxon	3 Courses per 8"	3.38	4.86	14.39
Titan	1 Course per 4"	2.25	3.47	15.44
Double Titan	1 Course per 8"	1.13	2.10	18.59
Regent*	1 Course per 4"	3.00	6.98	23.27
Titan Plus*	1 Course per 4"	2.25	6.58	29.23
Double Titan Plus*	2 Courses per 16"	1.13	2.63	23.27

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

*Manufactured to meet ASTM C652 H40V

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 developed 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 or 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

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

Brick Size	Stretcher	Rowlock	Soldier	Header
Queen	1.50	3.75	3.75	3.55
Lightweight Modular	1.50	4.50	4.50	3.09
Lightweight Engineer Modular	1.50	3.75	3.75	3.09
Modular	1.50	4.50	4.50	3.00
Engineer Modular	1.50	3.75	3.75	3.00
Econo	1.50	3.00	3.00	3.00
8-Square	1.50	1.50	1.50	3.00
Standard	1.43	4.50	4.50	3.00
Engineer Standard	1.43	3.75	3.75	3.00
King Narrow-Bed	1.20	3.75	3.75	3.42
Engineer King	1.20	4.26	4.26	4.26
King	1.20	3.75	3.75	3.00
Roman	1.00	6.00	6.00	3.00
Norman	1.00	4.50	4.50	3.00
Utility	1.00	3.00	3.00	3.00
Double Utility	1.00	1.50	1.50	3.00
Kingston	1.00	3.75	3.75	3.00
Viking	0.75	6.00	6.00	3.00
Saxon	0.75	4.50	4.50	3.00
Titan	0.75	3.00	3.00	3.00
Double Titan	0.75	1.50	1.50	3.00
Regent	1.00	3.00	3.00	1.50
Titan Plus	0.75	3.00	3.00	1.50
Double Titan Plus	0.75	1.65	1.65	1.50

days end to prevent splatter during rain. Care should also be taken to protect brickwork located near the ground from mud and dirt.

Cleaning:

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." Check with your Glen-Gery Distributor or District Sales Manager prior to making a final selection of a cleaning procedure and solution. When using Type N mortars, clean down should never occur prior to 7 days after work is completed to assure appropriate curing of the mortar. 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, the coring configuration of the units, 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. The values are based on a nominal three-eighth inch mortar joint. Reference: BIA Technical Notes on Brick Construction 10, "Dimensioning and Estimating Brick Masonry."

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