

Brickwork Design Profile

Glen-Gery Glazed Brick

General

Glen-Gery manufactures many sizes of glazed bricks in a variety of shades to accommodate the visual requirements of most projects. Unlike structural glazed tile, glazed brick have an actual 3-5/8" inch bed depth (thickness). Glazes are applied to the brick before firing and become an integral part of the unit during the firing process. This process produces a finished surface which is impervious to both liquids and gasses. Bricks with engobe coatings such as Glen-Gery Claycoat bricks are not glazed bricks because they are not impervious to liquids and gasses. All glazed brick and glazed brick shapes are made specifically for each project.

Unit Specifications

Glen-Gery solid ($\leq 25\%$ core area) glazed bricks are manufactured to conform to American Society for Testing and Materials (ASTM) Standard Specification C 1405, Class Exterior, Grade S, Type I. Bricks meeting the requirements of ASTM C 1405, Class Interior may be available on special order. Hollow core units meeting the requirements of ASTM C 1405, except for coring meeting the requirements of Paragraph 10 of ASTM C 652, Grade HW, may also be available on special order. Inquiries should be made about the availability of products which conform to the requirements of standards other than ASTM C1405 and ASTM C 652.

When specifying glazed bricks, the specification should cite:

- 1) The product name and "... as manufactured by Glen-Gery Corporation."
- 2) Conformance with the requirements of the appropriate specification, including the Class, Grade and Type.
- 3) The actual unit dimensions listed as thickness x height x length.



For example: #G957 (Maroon) as manufactured by Glen-Gery Corporation to conform to the requirements of ASTM C 1405, Class Exterior, Grade S, Type 1. The actual size of the brick shall be 3-5/8" x 2-1/4" x 7-5/8".

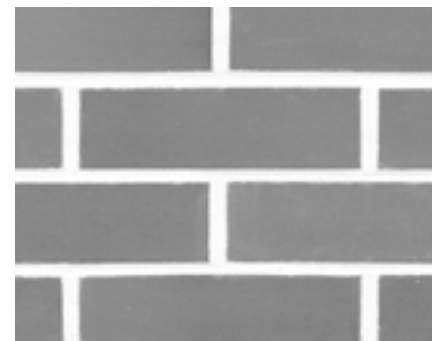
Design Criteria

Review of Specifications, Plans and Details:

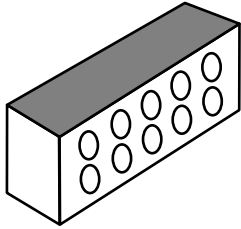
Glen-Gery offers free reviews of the relevant portions of the contract documents for all projects using or considering the use of Glen-Gery Glazed Bricks. Reviews can be arranged through Glen-Gery Distributors or Glen-Gery District Sales Managers.

Size:

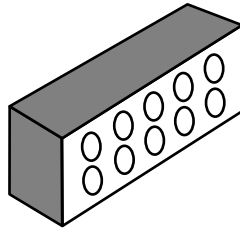
Glen-Gery glazed bricks are available in six sizes.



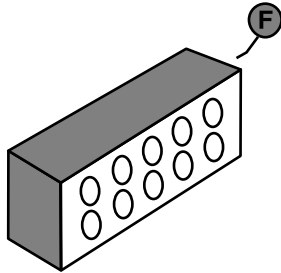
Description	Thickness x Height x Length		
	(in.)	(in.)	(in.)
Standard	3 ⁵ / ₈	x 2 ¹ / ₄	x 8
Econo	3 ⁵ / ₈	x 3 ⁵ / ₈	x 7 ⁵ / ₈
Utility	3 ⁵ / ₈	x 3 ⁵ / ₈	x 11 ⁵ / ₈
8-Square	3 ⁵ / ₈	x 7 ⁵ / ₈	x 7 ⁵ / ₈
Modular	3 ⁵ / ₈	x 2 ¹ / ₄	x 7 ⁵ / ₈
70 Series			
Modular	3 ⁵ / ₈	x 2 ³ / ₄	x 7 ⁵ / ₈



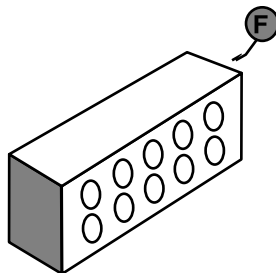
STANDARD SGR
Facebrick
3⁵/₈" x 2¹/₄" x 8"



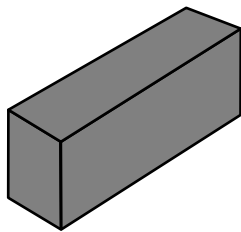
STANDARD S2
Quoin
3⁵/₈" x 2¹/₄" x 8"



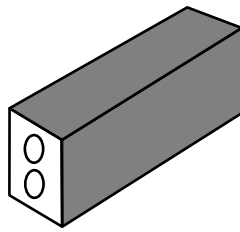
STANDARD S83
Double Quoin
3⁵/₈" x 2¹/₄" x 8"



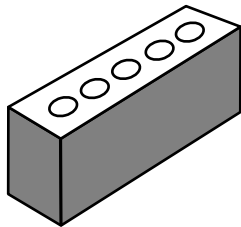
STANDARD S80D
No Face, Two Headers
3⁵/₈" x 2¹/₄" x 8"



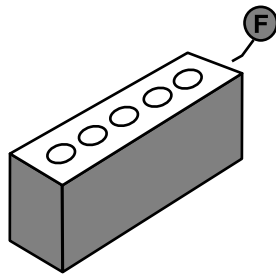
STANDARD S12C (left/right)
One Each Finished Bed,
Face & Header
3⁵/₈" x 2¹/₄" x 8"



STANDARD S10 *
One Finished Bed & One Face
3⁵/₈" x 2¹/₄" x 8"



STANDARD S180
One Finished Bed & One Header
3⁵/₈" x 2¹/₄" x 8"



STANDARD S180D
One Finished Bed & Two Headers
3⁵/₈" x 2¹/₄" x 8"

Actual coring patterns may not match the illustrations.

* Glazed utilized as substitute for solids.

Dimensional Tolerances:

Glen-Gery solid glazed bricks are manufactured to meet the tolerances cited in ASTM C 1405, Grade S. Generally, the average size of the bricks delivered to the site will be greater or lesser than the specified dimension. These differences are caused by the inherent variations in the raw materials and the day-to-day variations of the forming, drying, and firing processes. If the project detailing requires precise vertical or horizontal coursing, inquiries should be made regarding the dimensional variations which might be expected. It may be necessary to gauge the bricks one or more times in these circumstances.

Configuration:

All solid glazed bricks are manufactured to meet the coring requirements of ASTM C 1405. These bricks have multiple cores which will create a void space which will not exceed twenty-five percent of the gross cross-sectional area in every plane parallel to the bedding surface. Other cores sizes and configurations may be available on special order. Note that Glen-Gery glazed bricks must contain cores; one hundred percent solid units cannot be manufactured.

Weight:

The weights of bricks vary with the specific raw material, size, manufacturing process and the amount of corning. Typically, for bricks meeting the requirements of ASTM C 1405.

Description	Cored Units Typical Weight (lb/unit)
Standard	4.0
Econo	6.7
Utility	9.0
8-Square	14.1
Modular	3.9
70 Series Modular	4.8

Finishes:

Glen-Gery glazed bricks are manufactured with a smooth (die-skin) body with only smooth, mottled, or speckled finishes. Note that only one face of each glazed brick is finished. If both a finished stretcher face (standard production) and a finished header are required on the same brick, a quoin (S2 shape) must be specially ordered.

Other combinations of finished faces are also available on special order. Many of these combinations are shown in Glen-Gery's Brick Shapes Catalog [and on the flap of this document].

Color:

Glen-Gery glazed bricks are available in a number of standard color blends. Please consult Glen-Gery's Price List for the specific colors available. Other colors may be available on special order. Since the glazes can only be applied to the surfaces of the bricks, through body colors are not possible. There is some range to all glazed brick colors.

Shapes:

"Standard" brick shapes are shapes whose dimensions course properly with bricks with standard-modular dimensions (3-5/8" x 2-1/4" x 7-5/8") and which are shown in Glen-Gery's Brick Shapes Catalog. These shapes include the S2 quoin and the S80 single header. Like glazed stretchers, standard brick shapes are not stock items and must be specially ordered in the quantities required. Approved shop drawings must be received by Glen-Gery before both stretcher and shapes production are scheduled. Other brick shapes are described in Glen-Gery's Brick Shapes Catalog. These shapes include various configurations of bullnose, watertable, octagon, and shelf-angle units. Shapes dimensioned for coursing with brick sizes other than standard-modular and shapes having configurations to fit specific project requirements are also available. As with all other shapes, approved shop drawings must be received before manufacture will be scheduled.

All shapes must be identified early in the project because certain shape configurations may require special forming, drying, or firing procedures. These procedures may require more time or different scheduling than the glazed stretchers. 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 1405.

Avoid sawing glazed bricks or glazed shapes. While field cutting of the glazed surface is possible, such cutting is not recommended. Even

diamond saw blades often cause chipping along the glazed surface. This damage not only affects the appearance of the unit but may also affect the durability of the brick. This damage cannot be repaired. For this reason, it is important to specify and detail dedicated left-handed and right-handed units, inside and outside corner units, glazed headers and rowlocks, shorter than normal units, and all similar bricks.

Physical Properties of Units

Compressive Strength:

The average gross compressive strength of Glen-Gery glazed bricks exceeds 8,000 psi when tested with the load applied normal to the bedding surfaces. The actual compressive strength will depend upon the specific product tested. Bricks with this characteristic comply with the requirements of ASTM C 1405, Class Exterior.

Water Absorption:

The cold water absorption of an individual brick is less than or equal to 7%. The average saturation coefficient will often exceed 0.78. When the average saturation coefficient exceeds 0.78, the individual cold water absorption is less than or equal to 6% and is usually less than 4%. Bricks with these characteristics comply with the requirements of ASTM C 1405, Class Exterior.

Initial Rate of Absorption:

The initial rate of absorption (suction) of Glen-Gery glazed bricks normally does not exceed 10 grams per 30 square inches per minute under laboratory conditions. Because of the low suction of glazed bricks, wetting is rarely, if ever, necessary.

Properties of Walls

Compressive Strengths:

The minimum assumed compressive strength of a wall constructed of a wall constructed of Glen-Gery glazed bricks, using good workmanship and Type N Portland Cement-Lime Mortar, will typically exceed 1,340 psi. Assemblies including Glen-Gery

glazed bricks may provide minimum assumed compressive strengths over 2,100 psi when used with good workmanship and Type N Portland Cement-Lime Mortar. Reference: Brick Industry Association (BIA) Recommended Practice for Engineered Brick Masonry.

Thermal Performance:

The thermal resistivity of Glen-Gery's extruded bricks 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 benefits 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, the effects of mass, specific heat and the color of the brick should be considered.

Reference: BIA Technical Notes on Brick Construction: 4, Rev., "Heat Transmission Coefficient for Brick Masonry Walls"; and 4A, Rev. "Heat Gain."

Sound Transmission:

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

Fire Resistance:

A nominal four-inch wythe of load bearing brickwork has an ultimate fire resistance period of 1-1/4 hours. This provides a one-hour rating. Reference: BIA Technical Notes on Brick Construction: 16 Rev., "Fire Resistance."

Coefficient of Thermal Expansion:

Brick walls constructed of Glen-Gery glazed bricks have a coefficient of thermal expansion of approximately 0.000004 in./in./deg F. A wall one hundred feet long exposed to an annual extreme temperature difference of 100° is expected to experience a total thermal movement of approximately one-half of an inch.

Coefficient of Moisture Expansion:

The coefficient of moisture expansion of Glen-Gery glazed bricks is typically less than 0.0065 in./in. Although most moisture expansion of all bricks occurs immediately after the bricks are fired, and before the bricks arrive on the job site, the maximum design moisture expansion of a wall 100 feet long (or high) is three-quarters of an inch.

Construction

Storage and Protection:

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

Handling:

Handle glazed bricks with care. Maintain them in their protective packaging for as long as possible. Remember, the glaze is just like glass and contact with metal objects (tongs, trowels, scaffolding) or adjacent bricks will likely cause chipping of the glaze. Chipped glazes cannot be repaired.

Wetting:

Because of the low initial rate of absorption of glazed bricks, wetting is rarely, if ever, necessary.

Weather Extremes:

Follow the procedures developed by the International Masonry Industry All-Weather Council (MIAC). Reference: IMIAC "Recommended Practices and Guide Specifications for Cold Weather Masonry Construction" and BIA Technical Notes on Brick Construction 1; "All Weather Construction."

Laying and Mortars:

Place units with head and bed joints full of mortar. The mortar used to lay glazed brick should be mixed from ASTM C 150 portland cement, ASTM C 207, Type S, hydrated lime, and ASTM C 144 sand. Except for pigments

meeting the requirements of ASTM C 979, mineral aggregate pigments, there should be no substitutions, additions or deletions to this list of ingredients. Depending upon the design assumptions and the installation conditions, such as weather, the mortar may be proportioned to meet the requirements of ASTM C 270, Types N or S, or BIA M1-88, Types N or S. Type N mortars tend to produce walls with the best water penetration resistance. Type S mortars provide greater flexural tensile strength. Type S mortars may also be used in place of Type N mortars when there is the possibility of floating. When glazed bricks are used in areas where sanitary conditions must be maintained, special mortars are must be used. These special mortars are beyond the scope of this publication. A prepackaged mortar mix conforming to the ASTM C 270, Type N, proportion specification is Glen-Gery Color Mortar Blend. Reference: Brickwork Design Profile 4p1.

Designing Structures Clad with Glazed Bricks:

Because the finished (glazed) faces of glazed bricks are impervious to water, other liquids, water vapor, and other gasses, water which may find its way into the wall system cannot evaporate through the faces of glazed brick. Thus, excess water must be prevented from entering the air space (cavity) and water that does enter the air space must be eliminated quickly. This can be accomplished by following the recommendations contained in Brick Industry Association Technical Notes on Bricks Construction #13, "Ceramic Glazed Brick Facing for Exterior Walls," #21, "Brick Masonry Cavity Walls," #28, "Anchored Brick Veneer, Wood Frame Construction," and #28B, "Brick Veneer, Steel Stud Wall Panels" in addition to the following recommendations:

1. Cavity wall or veneer wall construction (Tech Notes #21, #28, or #28B) is mandatory. The clear width of all air spaces must be at least two inches.
2. Detail flashings at all window, louver, and door heads and sills, at the bases of air spaces, at lintels and shelf angles, at brick shelves, at the tops of walls, at any change in cross-section or construction and at all similar points in the construction.
3. In addition to detailing open-head-joint weepholes twenty-four inches

**Table 1
Brick and Mortar Quantities**

Nominal 3/8 Inch Mortar Joints

Descriptive Unit Size	Vertical Coursing in courses per inch	Units Per Square Foot	Cubic Foot Per Square Foot	Quantities of Mortar Per 1000 Units
Standard	3 courses per 8 in.	6.45	0.058	9.00
Econo	1 course per 4 in.	4.50	0.041	9.15
Utility	1 course per 4 in.	3.00	0.037	12.29
8-Square	1 course per 8 in.	2.25	0.028	12.44
Modular	3 courses per 8 in.	6.75	0.060	8.90
70 Series	5 courses per 16 in.	5.63	0.058	10.03

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

**Table 2
Units Per Linear Foot In Various Positions**

Nominal 3/8 Inch Mortar Joints

Descriptive Unit Size	Stretcher	Rowlock	Soldier	Header
Standard	1.43	4.50	4.50	3.00
Econo	1.50	3.00	3.00	3.00
Utility	1.00	3.00	3.00	3.00
8-Square	1.50	1.50	3.00	1.50
Modular	1.50	4.50	4.50	3.00
70 Series Mod.	1.50	3.85	3.05	3.00

on centers above every flashing, vent the tops of all air spaces. Use open head joints spaced no more than twenty-four inches apart in the course immediately below the top of the wall panel (below the flashing). Stagger these openings to reduce the possibility of water exiting the weephole above the flashing and entering the vent below the flashing. If there are concerns about mortar droppings preventing the easy flow of air, a second set of vents may be added in the course immediately above course containing the weepholes.

4. Detail expansion joints (movement joints) in accordance with Tech Notes #18 and #18A and Equation 2 of Tech-Note 18A. Use the coefficient of moisture expansion listed above.
5. Consider the occupancy: Gymnasiums, locker rooms, kitchens, laundries, swimming pools, and similar occupancies may require the installation of a vapor barrier on the heated side of the back-up and may require special HVAC systems.

6. Avoid using glazed brick in free-standing walls, garden walls, wing walls, and parapet walls.
7. Do not use glazed brick to form sills for windows, louvers, wainscots, or in similar situations.
8. Do not use glazed brick to cap walls.
9. Do not use glazed brick below grade.
10. Note that the use of full-height drainage mats in the air space may prevent the flow of air necessary for the drying of a wall clad with glazed bricks.

Tooling:

When thumbprint hard, tool mortar joints to produce a concave 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 securely attached. Care should be taken to protect brickwork located near the ground from mud and dirt.

Cleaning:

Immediately after tooling the joints, wipe the masonry units with a wet sponge to remove soft mortar. If necessary, remove mortar with a stiff bristle brush at the end of each shift. Clean with wooden paddles and a stiff bristle brush, using clean water. Metal tools and broken bricks will damage the glaze. If a cleaning agent is used, test the cleaning agent on a small sample area – the field panel works well for this – to observe the effectiveness of the cleaning agent and to determine if the cleaning agent damages the glaze, the mortar, or the brick body. Always pre-soak the wall prior to applying the cleaning agent and thoroughly rinse the wall after cleaning is completed. Sure Klean® VanaTrol®, manufactured by

ProSoCo, Inc, will generally perform well. Detailed cleaning instructions are available from Glen-Gery distributors, factories, sales offices, and Glen-Gery Brickwork Design Profile 4t1, "Cleaning New Brickwork."

Estimating:

The quantities of glazed bricks, shapes, and mortar required for a project will vary with the size of the brick, the wall construction, specific detailing, the size and location of shapes, the coring of the units, and workmanship. Because the glaze will likely be damaged if the bricks are sawn, do not assume glazed bricks may be sawn to form shapes. Order shapes when they are needed. Table 1 pro-

vides the quantities of brick and mortar per square foot of wall and mortar quantities per 1000 bricks. These 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. The values provided are estimates of the quantities in the finished wall and do not account for waste. The factors provided in Table 2 may be useful for approximating the number of units for bands and accents. These factors 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 factors are based upon a mortar joint which has a nominal width of three-eighth inch. The factors do not include waste.



Sales/Service Centers

Illinois

Chicago Sales Office
273 W. 83rd. St.
Suite B-1
Burr Ridge, IL 60521
TEL (630) 655-1121
FAX (630) 655-0163

Michigan

Midwest Regional Sales Office
37720 Hills Tech Drive
Farmington Hills, MI 48331
TEL (248) 489-9338
FAX (248) 489-8028

New Jersey

Northeast Regional Sales Office
75 Hamilton Road
Somerville, NJ 08876
TEL (908) 359-7305
FAX (908) 359-5116

Ohio

Ohio Sales Office
County Road #9
P O Box 208
Iberia, OH 43325
TEL (419) 468-4890
FAX (419) 468-6037

Pennsylvania

Lehigh Valley Sales Office
1960 Weaversville Road
Allentown, PA 18103
TEL (610) 264-5565
FAX (610) 264-2860

Brick Centers

Iowa

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

Kansas

Kansas City Brick Showroom
9343 W. 74th. Street
Merriam, KS 66204
TEL (913) 677-4680
FAX N/A

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

Pennsylvania

Glen-Gery Brick Center
299 Brickyard Road
P O Box 337
New Oxford, PA 17350
TEL (717) 624-2144
FAX (717) 624-2720

Glen-Gery Brick Center
744 S. 23rd. Street
Harrisburg, PA 17104
TEL (717) 561-2651
FAX (717) 561-0284

Glen-Gery Brick Center
1166 Spring Street
P O Box 6305
Wyomissing, PA 19610
TEL (610) 372-7826
FAX (610) 378-0918

Glen-Gery Brick Center
RR # 2 Susquehanna Trail
Box 223-G
Watsonstown, PA 17777
TEL (570) 742-4721
FAX (570) 742-7112

Glen-Gery Brick Center
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P O Box 2903
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FAX (717) 854-1251

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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.