

# AMG Standard 107-20

## Levels of Quality

### 1.0 INTRODUCTION

- 1.1 The use of Standard 107 Levels of Quality assumes the reader has copies of the International Building Code **2018** (IBC) as well as the Building Code Requirements for Masonry Structures, its Commentary, Specification for Masonry Structures and its Commentary (**TMS 402/602 -16**).
- 1.2 Every Specifier has a basic desire to specify materials and workmanship so that the ultimate user of the structure will have the best possible job. Specifiers can sometimes develop a habit of selecting the most expensive, the most exacting, the most lasting and the most beautiful so the best possible job is achieved. Many times this ultimate and highest quality specification goes out to a bidder, even though the project may be of the most ordinary nature with a limited budget.
- 1.3 Budgets and end-use considerations, therefore, warrant the establishment of more than a single Level of Quality for masonry work. The basic cost and quality variables are, of course, the material selected and the labor required to install that material.
- 1.4 It is not the intent of this Standard to "label" a particular material type as "the minimum" or "the best." Likewise, it is also not the intent of this Standard to "label" an individual craftsperson or contracting firm as "the minimum or the best." The intent of this Standard is to match the level of workmanship and materials with the requirements of each specific project.
- 1.5 This Standard is primarily concerned with the aesthetic quality of the work as viewed in the field. Typically, structural capacities of the masonry are determined by the Structural Engineer and have limited impact upon the aesthetic appearance. The building codes and other industry standards (see **REFERENCES** at the end of this

document) for various masonry construction methods and materials establish minimum structural quality, finish and appearance, and should be specified in addition to the inclusion of this Standard within the Contract Documents.

- 1.6 Construction Integrity: See applicable building codes, specifications and standards for minimum requirements of allowable cracking, weather resistance of the exterior wall envelope and/or other requirements.
- 1.7 When used alone, this Standard is advisory, and its use is optional. When this Standard is included by reference in the Contract Document specifications, this Standard becomes a part thereof.
- 1.8 The authority to utilize sample panels and/or grout demonstration panels ("mock-ups", generically) as a means, to discern quality is found within the Contract Documents.
- 1.9 Specification ASTM C 90 describes (within **Section 8. Sampling and Testing**), the time and place to inspect units. In short, units are to be inspected before placement and not after.

### **2.0 LEVELS OF QUALITY**

- 2.1 In an effort to define the quality of workmanship and materials, the Arizona Masonry Council has developed three levels of quality: **ECONOMY, STANDARD, and CUSTOM.**
- 2.2 This Standard establishes tolerances in the completed construction and the tolerances for the manufacture of materials. It is important to note that workmanship at the CUSTOM Level of Quality cannot be attained with ECONOMY Level materials; therefore, the Level of Quality specified for workmanship is applied to the materials unless otherwise noted. A baseline for minimum materials quality is addressed within ASTM C 90 Specification.

- A. The Contract Documents shall specify that the Level of Quality for workmanship shall be equal to that of the materials.
- B. If the Contract Documents include differences between the Level of Quality for workmanship and the Level of Quality for materials, then the Contractor shall notify the Owner or Architect of this discrepancy prior to the start of construction.
- C. On any projects requiring special colors, patterns, textures and/or CUSTOM Level of Quality, a sample panel ("mock-up") is **required**. Sample panels may include special aesthetic masonry features such as coursing, special jointing, lintels etc. The Architect must provide an inspection of this sample panel by an individual who has the authority to approve. A separate, stand-alone sample panel or grout demonstration panel is **required**. Sample panels or grout demonstration panels ("mock-ups") which use a portion of "in-place" masonry work should be used as a last resort since rejection of these walls will delay the work. CUSTOM Level of Quality projects may require one or more sample panels. Excessive building of sample panels is costly and inefficient.

**2.3** It is the intent of the Arizona Masonry Council that when this Standard is included by reference in the masonry specification(s) for a specific project, the Level shall be specified and the appropriate viewing distance shall be followed so as to view the finish and appearance of the workmanship and materials. If no Level of Quality is included when this Standard is specified, STANDARD quality is to be provided.

#### **2.4 CUSTOM Level of Quality:**

- A. This is the highest Level of Quality for workmanship and is intended for the finest work. This is naturally the most expensive Level of Quality and should only be specified for projects or portions of the project requiring a superlative product and having an ample budget.
- B. Workmanship and materials under this designation are only achieved with the utmost attention to detail. This

designation is the excellence goal sought by many, but achieved only by the most skillful craftsman or the most discerning manufacturer. In the case of glass unit masonry, CUSTOM Level of Quality can only be applied to aesthetic enhancements such as mortar or bonding agent color and/or texture as well as fine architectural details.

- C. This Level of Quality might be used throughout an entire building on rare occasions, but most often is used in selected spaces within a building, or for selected portions of a building. To save costs, it also may be desirable to limit the use of CUSTOM workmanship and materials to that portion of the building which will be at "eye level".
- D. General Material Considerations: Top rank, nearly free of defects, are a rarity that commands a higher value. The exposed face or faces shall be nearly free of chips, cracks or other imperfections detracting from the appearance while viewed under **diffused lighting**<sup>1,2</sup> from a distance of not less than 15 feet. CUSTOM Level cannot be achieved with concrete masonry units which meet only ASTM C 90 requirements. For instance, when using Architectural Faced units, it will be necessary for the owner or agent to make pre-arrangements as an addition to the contract documents for the additional time and labor needed to pre-select groups of units to be used in CUSTOM Level of Quality.
- E. General Workmanship Considerations: Workmanship of the exposed masonry construction shall be of superior excellence, obtainable only by a skilled journeyman, while viewed under **diffused**<sup>1,2</sup> lighting at a distance of not less than 15 feet.
- F. Tolerances for CUSTOM Level work are more exacting than those allowed for the STANDARD Level which is detailed in Section 2.5 of this Standard; however, it is the responsibility of the Specifier, Architect/ Engineer to establish the allowable placement tolerances for CUSTOM Level work on a project-by-project basis. If the Specifier, Architect/Engineer does not establish allowable tolerances for CUSTOM Level

work, then STANDARD Level of Quality for workmanship and materials applies. Exacting tolerances for glass unit masonry are referenced in Table 2.5-1B of this Standard and should not be specified to be any more exacting.

- G. Only single-sided construction is allowed in CUSTOM Level. Double-wythe construction is required on two-sided masonry walls.
- H. Cost Considerations: CUSTOM Level masonry typically could cost as much as 50 to 100 percent or more, than STANDARD Level.

**2.5 STANDARD Level of Quality:**

- A. An acceptable Level of Quality for workmanship and materials which is intended for the most widely used and median quality work is known as the STANDARD Level of Quality.
- B. In assigning quantitative criteria to a qualitative description for this designation, it is sufficient to state that workmanship and materials under this designation are: easily achieved, are basic to the trade or industry, are average, are normal, are median, and are acceptable on most projects.
- C. If no Level of Quality is selected or specified in the Contract Documents incorporating AMC Standard 107, then it shall be assumed that STANDARD Level of Quality is intended.

- D. General Material Considerations: The exposed face or faces shall be nearly free of chips, cracks or other imperfections detracting from the appearance while viewed under **diffused**<sup>1,2</sup> lighting from a distance of not less than 20 feet.
- E. General Workmanship Considerations: Workmanship of the exposed masonry construction shall be of normal caliber as required by the trade in elevating workmen to journeyman rank while viewed under **diffused**<sup>1,2</sup> lighting at a distance of not less than 20 feet.
- F. Definitions and Tolerances designated in TMS 402-16 Building Code Requirements for Masonry Structures as well as TMS 602-16 Specification for Masonry Structures are representative of STANDARD Level of Quality (see **REFERENCES**) and are listed below. For glass unit masonry, see reference Table 2.5-1B. Should a higher Level of Quality such as CUSTOM Level be desired, it is necessary to specify the required tolerances and assume additional costs. For example, the ±1/8-inch mortar bed joint thickness allows for a variation from 1/4 to 1/2 inch in a 3/8-inch bed joint. Erect masonry within the tolerances listed in Tables 2.5-1A, 2.5-2, and 2.5-3 and apply to buildings or structures.

Table 2.5-1A Dimension of Members (Not for Glass Unit Masonry) TMS 602 - Specification Section 3.3 F

Members	Tolerance	
	Minus	Plus
Cross Section, Elevation	¼ in. (6.4mm)	½ in. (12.7mm)
Mortar Joint Thickness: ⅜ in. thickness		
Bed*	⅛ in. (3.2mm)	⅛ in. (3.2mm)
Head	¼ in. (6.4mm)	⅜ in. (9.5mm)
Collar	¼ in. (6.4mm)	⅜ in. (9.5mm)
Grout Space or Cavity Width	¼ in. (6.4mm)	⅜ in. (9.5mm)

**\*Initial (starting course) bed joint thickness may have a thickness of ¼ inch minimum and ¾ inch maximum for ungrouted or partially grouted, or a maximum of 1 ¼ inches when the first course is solid grouted, and supported by a concrete foundation. (TMS 602-16 - Specification Article 3.3 B.).**

Table 2.5-1B Dimension of Members for Glass Unit Masonry (TMS 602 - Specification Section 3.3B.7,c)

Member	Tolerance	
	Minus	Plus
Cross Section, Elevation	¼ in. (6.4mm)	½ in. (12.7mm)
Mortar Joint Thickness: ¼ in. thickness (Head & Bed)		
Bed	1/16 in. (1.6mm)	⅛ in. (3.2mm)
Head	⅛ in. (3.2mm)	⅛ in. (3.2mm)
Radial Panels Vertical Joint (Head); ¼ in. thickness	⅛ in. (3.2mm)	⅛ in. (3.2mm)
Expansion Joint Thickness: ⅜ in. minimum	—	—

Table 2.5-2 Members (TMS 602 - Specification 3.3 F.2)

Element	Tolerance
Variation From Level:	
Bed Joints	±¼ in. (6.4mm) in 10 ft.
	±½ in. (12.7mm) max.
Top Surface of Bearing Wall	±¼ in. (6.4mm) in 10 ft.
	±½ in. (12.7mm) max.
Variation From Plumb	±¼ in. (6.4mm) in 10 ft.
	±¾ in. (9.5mm) in 20 ft.
	±½ in. (12.7mm) max.
True to a Line	±¼ in. (6.4mm) in 10 ft.
	±¾ in. (9.5mm) in 20 ft.
	±½ in. (12.7mm) max.
Alignment of Columns and Walls (top vs. bottom)	±½ in. (12.7mm) for bearing walls
	±¾ in. (19.1mm) for non-bearing walls

Table 2.5-3 Location of Members – TMS 602 - Specification 3.3 F.3

Location	Tolerance
Indicated in Plan	±½ in. (12.7mm) in 20 ft.
	±¾ in. (19.1mm) max.
Indicated in Elevation	±¼ in. (6.4mm) in story height
	±¾ in. (19.1mm) max.

G. Only single-sided construction is assumed in STANDARD Level, unless the manufacturer can substantiate to the Architect that their masonry units can provide the Level of Quality in double-sided construction. Exposed double-sided single-wythe construction is allowed in STANDARD Level; however,

there will be only one GOOD side relative to tolerance

H. Cost Considerations: STANDARD Level is that which is typically listed in cost estimating databases.

## 2.6 **ECONOMY** Level of Quality:

- A. This is the lowest Level of Quality for workmanship and materials which is allowable and is intended for work where price outweighs quality considerations.
- B. Workmanship and materials under this designation are not highly valued, and are only acceptable to accomplish a finished project under the frugality of the more modest budget.
- C. The purchasers of workmanship and materials under this designation must be prepared to overlook aesthetic defects.
- D. General Material Considerations: Some mismatching of textures and colors is permissible in exposed masonry work while viewed under **diffused**<sup>1,2</sup> lighting from a distance of not less than 25 feet, and is not of concern for concealed work.
- E. General Workmanship Considerations: Workmanship of the exposed masonry construction shall be of a less exacting nature that permits labor-saving techniques and promotes speedier fabrication at some detriment to quality while viewed under **diffused**<sup>1,2</sup> lighting at a distance of not less than 25 feet.
- F. Tolerances for ECONOMY Level work are the same as those allowed for STANDARD Level.
- G. Double-sided single-wythe construction is allowed in Economy Level; however, there is only one GOOD side relative to tolerances.

## 3.0 ENFORCEMENT

- 3.1 Enforcement of this Standard is to be done by the Architect or Engineer of Record. Any other individuals acting as the Architect's or Engineer's project representative shall have the authority and responsibility for enforcing this Standard, and therefore accepting the workmanship and materials.
- 3.2 Enforcement shall be done during the construction of the masonry work and prior to the installation of other work (i.e. roof framing), which would otherwise prohibit the masonry contractor from correcting the work in an economical manner.

- 3.3 Enforcement of this Standard "after the fact," such as during the time a "punch-list" is compiled, is not deemed to be proper enforcement of this Standard.
- 3.4 The review of material samples by the Architect or Engineer of Record prior to ordering of materials is recommended. In addition, because of the variable factors involved, there are typically some variations in color and texture among units and at variance to the minimum 4 units used as a color and texture specification reference (ASTM C 90 (latest version), NCMA TEKs 02-03a and 02-06). The Architect's or Engineer of Record review of the material samples constitutes an implicit acknowledgement that the actual materials delivered to the site may contain some variations in color and texture from the specification reference material samples. To address this variability, pre-arrangements shall be made with the Masonry Contractor as an addition to the contract for the additional time and labor needed to appropriately locate the units at variance to the reference units, prior to placement.
- 3.5 The use of jobsite sample panels or grout demonstration panels ("mock-ups") to establish the quality of WORKMANSHIP is **required**, as this is the only way to identify the quality that is acceptable for each individual project. As is further mentioned in **TMS 602-16** Specification, Section 1.6 D) and its Commentary, a 4' x 4' (1.2m x 1.2m) square is the minimum sample panel size. The recommended size of a sample panel by consensus of the Arizona Masonry **Council** is a minimum 6 ft. long by 4 ft. high with a 2 ft return. The Specifier, and/or Architect/Engineer shall specify if the sample panel is to be a stand alone panel or part of the masonry construction as confirmed by **TMS 402/602-16**. Sample panels and grout demonstration panels should be maintained intact for the duration of construction or until the Architect or Engineer of Record gives written instructions authorizing removal.
- 3.6 Although enforcement of this Standard is the responsibility of the Architect or Engineer of Record, each party involved in the masonry work, Architect, Engineer, Contractor and Supplier, shall be responsible for understanding and meeting the requirements of this Standard.

<sup>1</sup> **Diffused Lighting:** “Diffuse. to cause (light) to be soft and spread out” Merriam-Webster.com Dictionary – Lighting that is applied indirectly, or is applied so that it does not create shadows.

<sup>2</sup> **ASTM E284-17-Definitions:** diffusion, *n*—change of the angular distribution of a beam or radiant flux by a transmitting material or a reflecting surface such that flux incident in one direction is continuously distributed in many directions.

## REFERENCES:

1. 2018 International Building Code. International Code Council, Inc., 2018, Falls Church, VA 22041.
2. Architectural Concrete Masonry Units, e-TEK 02-03A. National Concrete Masonry Association, 2001, Herndon, VA 20171.
3. Building Code Requirements for Masonry Structures, TMS 402-16. The Masonry Society, Boulder, CO, 80304.
4. Density-Related Properties of Concrete Masonry Assemblies, e-TEK 02-06. National Concrete Masonry Association, 2008, Herndon, VA 20171.
5. Specification for Masonry Structures, TMS 602-16. Reported by The Masonry Society, Boulder, CO, 80304.
6. Commentary on Building Code Requirements for Masonry Structures, TMS 402-16 - The Masonry Society, Boulder, CO, 80304.
7. Commentary on Specification for Masonry Structures, TMS 602-16. Reported by The Masonry Society, Boulder, CO, 80304.
8. Standard Specification for Loadbearing Concrete Masonry Units, ASTM C 90-16a. ASTM International, 2003, West Conshohocken, PA 19428-2959.

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