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Standard Terminology for Masonry¹

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1. Scope*

1.1 This standard incorporates generic terms and generic definitions of terms specifically associated with manufactured masonry units and masonry constructed with manufactured masonry units. These generic terms and definitions are used within the standards developed by Committee C12 on Mortars and Grouts for Unit Masonry and Committee C15 on Manufactured Masonry Units.

1.2 This standard incorporates terms and definitions of terms associated with the standards specific to clay masonry units, in particular to Specifications C32, C34, C56, C62, C126, C212, C216, C279, C410, C530, C652, C902, C1088, C1167, C1261, C1272, and C1405, and to Test Methods C67/C67M.

1.3 This standard incorporates terms and definitions of terms associated with the standards specific to concrete masonry units in particular to Specifications C55, C73, C90, C129, C139, C744, C1319, C1372, C1491, C1623, and C1634 and to Test Methods C140/C140M, C426, and C1262/C1262M.

1.4 This standard incorporates terms and definition of terms associated with the standards specific to autoclaved aerated concrete masonry units in particular to Practice C1692 and to Specifications C1386, C1691, and C1693.

1.5 This standard incorporates terms and definitions of terms associated with the standards specific to clay and concrete roofing tile units in particular to Specifications C1167 and C1492 and to Test Methods C1568, C1569, and C1570.

1.6 For terminology specific to mortar and grout, see Terminology C1180.

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This terminology is under the jurisdiction of ASTM Committee C15 on Manufactured Masonry Units and is the direct responsibility of Subcommittee C15.08 on Terminology.

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2. Referenced Documents

2.1 ASTM Standards:²

- C32 Specification for Sewer and Manhole Brick (Made From Clay or Shale)
- C34 Specification for Structural Clay Loadbearing Wall Tile
- C55 Specification for Concrete Building Brick
- C56 Specification for Structural Clay Nonloadbearing Tile
- C62 Specification for Building Brick (Solid Masonry Units Made From Clay or Shale)
- C67/C67M Test Methods for Sampling and Testing Brick and Structural Clay Tile
- C73 Specification for Calcium Silicate Brick (Sand-Lime Brick)
- C90 Specification for Loadbearing Concrete Masonry Units
- C126 Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units
- C129 Specification for Nonloadbearing Concrete Masonry Units
- C139 Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes
- C140/C140M Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
- C212 Specification for Structural Clay Facing Tile
- C216 Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)
- C279 Specification for Chemical-Resistant Masonry Units
- C410 Specification for Industrial Floor Brick
- C426 Test Method for Linear Drying Shrinkage of Concrete Masonry Units
- C530 Specification for Structural Clay Nonloadbearing Screen Tile
- C652 Specification for Hollow Brick (Hollow Masonry Units Made From Clay or Shale)
- C744 Specification for Prefaced Concrete and Calcium Silicate Masonry Units
- C902 Specification for Pedestrian and Light Traffic Paving Brick
- C936/C936M Specification for Solid Concrete Interlocking Paving Units

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

*A Summary of Changes section appears at the end of this standard

- C1088 Specification for Thin Veneer Brick Units Made From Clay or Shale
- C1167 Specification for Clay Roof Tiles
- C1180 Terminology of Mortar and Grout for Unit Masonry
- C1261 Specification for Firebox Brick for Residential Fireplaces
- C1262/C1262M Test Method for Evaluating the Freeze-Thaw Durability of Dry-Cast Segmental Retaining Wall Units and Related Concrete Units
- C1272 Specification for Heavy Vehicular Paving Brick
- C1319 Specification for Concrete Grid Paving Units
- C1372 Specification for Dry-Cast Segmental Retaining Wall Units
- C1386 Specification for Precast Autoclaved Aerated Concrete (AAC) Wall Construction Units (Withdrawn 2013)³
- C1405 Specification for Glazed Brick (Single Fired, Brick Units)
- C1491 Specification for Concrete Roof Pavers
- C1492 Specification for Concrete Roof Tile
- C1568 Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Mechanical Uplift Resistance Method)
- C1569 Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Wind Tunnel Method)
- C1570 Test Method for Wind Resistance of Concrete and Clay Roof Tiles (Air Permeability Method)
- C1623 Specification for Manufactured Concrete Masonry Lintels
- C1634 Specification for Concrete Facing Brick
- C1691 Specification for Unreinforced Autoclaved Aerated Concrete (AAC) Masonry Units
- C1692 Practice for Construction and Testing of Autoclaved Aerated Concrete (AAC) Masonry
- C1693 Specification for Autoclaved Aerated Concrete (AAC)

freeze thaw resistance, *n*—the ability of masonry to maintain integrity under the forces caused by cyclic action of freezing and thawing in the presence of moisture.

frog, *n*—an indentation in a bed surface of a masonry unit. Indentations not exceeding $\frac{3}{8}$ in. (9.5 mm) are termed a frog, sometimes called a panel or panel frog. Indentations exceeding $\frac{3}{8}$ in. (9.5 mm) are termed a deep frog.

groove, *n*—a channel formed on surfaces other than finished faces of manufactured masonry units for production or construction purposes.

height, *n*—vertical dimension of the face of a unit when the unit is positioned as a stretcher.

length, *n*—horizontal dimension of the face of a unit when the unit is positioned as a stretcher.

masonry, *n*—the type of construction made up of manufactured masonry units laid with mortar, grout, or other methods of joining.

nominal dimension, *n*—dimension that is greater than the specified dimension by the thickness of a mortar joint. It is usually expressed as a whole number.

permeable unit pavement system, *n*—pavement with wearing surface made from clay or concrete units that allows infiltration of water through open-graded aggregate in the joints, cores, or other openings, to a bed, base, and subbase, or combinations thereof.

DISCUSSION—Permeable pavement systems are utilized to reduce stormwater runoff. Permeable pavements have wearing surfaces with high initial water infiltration through open spaces filled with aggregates to drain water into open-graded bedding and base materials. The open spaces in the wearing surface are designed to enable sufficient infiltration rates to handle runoff from designated storm types (for example, 1 year, 24 hour event).

With unit pavers the open spaces can be achieved with exposed coring, a specially-shaped perimeter configuration, or wider joints, or combinations thereof. Permeable pavement systems can also be made with standard units and a laying pattern that permits sufficient water entry.

score, *n*—a channel formed for appearance purposes on the finished faces of a manufactured masonry unit.

shell, *n*—the outer walls of a hollow masonry unit. Shell can either be an end shell or a face shell.

specified dimensions, *n*—dimensions to which masonry units or constructions are required to conform. Actual (measured) dimensions may differ from the specified dimensions by permissible variations.

surface feature, *n*—a quality or condition of the face of a manufactured masonry unit.

DISCUSSION—Surface features include coatings, colors, textures, relief, or combinations of these. A masonry unit may have different surface features on individual faces.

thickness, *n*—that dimension designed to lie at right angles to the face of the wall, floor, or other assembly.

unit, facing, *n*—manufactured masonry unit designed for use where one or more faces will be exposed and for which the

3. Terminology

3.1 *Generic Definitions*—The definitions apply to manufactured masonry units and masonry constructed with manufactured masonry units. They are generic as used by ASTM Committees C12 and C15.

bed surface, *n*—*before and during construction*, the nonvertical surfaces of a manufactured masonry unit intended by the manufacturer to be joined by mortar or other methods.

bed surface, *n*—*in situ*, the nonvertical surfaces of a manufactured masonry unit joined by mortar or other methods.

cryptofluorescence, *n*—crystalline deposit of water-soluble compounds in the pores of masonry.

efflorescence, *n*—crystalline deposit, usually white, of water-soluble compounds on the surface of masonry.

face, exposed, *n*—the in situ exposed surface(s) of a manufactured masonry unit.

face, finished, *n*—any surface(s) of a manufactured masonry unit intended by the manufacturer to be exposed to view.

³ The last approved version of this historical standard is referenced on www.astm.org.

specification includes requirements on color, finish, and other properties affecting appearance.

unit, hollow masonry, *n*—unit whose net cross-sectional area in any plane parallel to the surface containing cores, cells, or deep frogs is less than 75 % of its gross cross-sectional area measured in the same plane.

unit, manufactured masonry, *n*—a manmade noncombustible building product intended to be laid by hand and joined by mortar, grout, or other methods of joining.

unit, permeable paving, *n*—a manufactured masonry unit for pavement applications configured to achieve a minimum percentage of open area in the wearing surface of the pavement by coring, a specially-shaped perimeter, or larger spacer lugs, or combinations thereof.

DISCUSSION—Permeable paving units may be specified under **C902** for Pedestrian and Light Traffic Paving Brick, **C936/C936M** for Solid Concrete Interlocking Paving Units, **C1272** for Heavy Vehicular Paving Brick, or **C1319** for Concrete Grid Paving Units. Permeable pavement systems can also be made with standard units and a laying pattern that permits sufficient water entry.

unit, solid masonry, *n*—unit whose net cross-sectional area in any plane parallel to the surface containing cores, cells, or deep frogs is 75 % or more of its gross cross-sectional area measured in the same plane.

units placed in usage, *n*—manufactured masonry units that have been installed in masonry.

3.2 Definitions Specific to Clay Masonry Units:

absorption, *n*—weight of water picked up by a clay masonry unit during immersion at prescribed conditions expressed in relation to the dry weight of the unit.

DISCUSSION—Two conditions of immersion are designated in standards relating to brick: 24 h in room temperature (60 to 86°F (15.5 to 30°C)) water or 5 h in boiling water. (Different time intervals are specified for structural tile and other products.) The resulting absorptions are termed *cold water absorption* and *boiling water absorption*.

Absorption values are used in brick and tile standards as one factor in classifying these products into durability grades. Absorptions are indicators of the extent of firing during manufacture as well as being indicators of durability.

absorption, initial rate of, *n*—a measure of the suction of water upward into a dry brick from a bed face during one minute of exposure.

DISCUSSION—Initial rate of absorption (IRA) is a distinct property that offers different information from absorption. It is expressed as grams of water picked up in one minute by a net area of 30 in.² (194 cm²).

Initial rate of absorption is one factor influencing the quality of bond between brick and mortar. It is used in brick standards to recommend construction practices for enhancing mortar to brick bonding.

brick, *n*—a solid or hollow masonry unit of clay or shale, usually formed into a rectangular prism, then burned or fired in a kiln; brick is a ceramic product.

brick, building, *n*—brick for load-resisting or other purposes where appearance properties such as texture or color are not

important (formerly called common brick); see Specification **C62** and Specification **C652**.

brick, chemical-resistant, *n*—brick suitable for use in chemical environments where resistance to thermal shock may be a consideration, usually used in conjunction with chemical-resistant mortars; see Specification **C279**.

brick, facing, *n*—brick for general purposes where appearance properties such as color, texture, and chippage are important; see Specification **C216** and Specification **C652**.

DISCUSSION—Facing brick are produced from selected clays and are available in typical face sizes, various colors, and in various textures.

brick, firebox, *n*—brick intended for use as the lining in the fireboxes of residential fireplaces; see Specification **C1261**.

brick, floor, *n*—brick with physical properties related to resistance to chemicals, thermal and mechanical shock, or absorption, or combinations of these, used as finished floor surfaces in industrial applications; see Specification **C410**.

DISCUSSION—Other brick are used as flooring in non-industrial applications; see Specification **C902**. Floor brick manufactured to meet the requirements in Specification **C410** are typically smooth and dense.

brick, paving, *n*—brick made to provide the wearing surface of highways, streets, driveways, walkways, patios, and similar applications; see Specifications **C902** and **C1272**.

brick, sewer, *n*—low absorption, abrasive-resistant brick intended for use in drainage structures; see Specification **C32**.

brick, specially-shaped, *n*—a brick manufactured to a basic shape of other than a rectangular prism.

cells/core holes, *n*—continuous openings or perforations within extruded clay products.

DISCUSSION—The extent of permissible openings is specified for each product as the percentage of gross area in the normal bedding surface plane that must be net (solid) area. Core hole is generally used for brick while cell is used for structural tile. Cells are distinguished from core holes by being larger in size. As an illustration, cells must be larger than 1 in.² (645 mm²) under Specification **C34**, and 1½ in.² (968 mm²) under Specification **C652**.

ceramic, *adj*—pertaining to products containing hydrous silicates of alumina that are treated to develop fired bond.

DISCUSSION—Ceramic materials used for brick and clay tile typically consist of clay or other similar earthy materials that have been fired in a kiln to temperatures above 1500°F (655°C). The exposure to high temperature begins the transformation of the constituent materials from their natural state to that of a glassy state (incipient fusion).

clay, *n*—an earthy or stony mineral aggregate consisting essentially of hydrous silicates of alumina, plastic when sufficiently pulverized and wetted, rigid when dry, and vitreous when fired to a sufficiently high temperature.

color, body, *n*—the range of color obtained when materials used to form the brick react to the effects of firing temperature and atmosphere.

DISCUSSION—There may be additives in the body to produce a desired color. When no materials are added to the surface of the brick and the unit is not flashed when fired, the body color is also the through-body color, a surface feature.

color, through-body, *n*—the range of surface color obtained when units without materials added to the surfaces for appearance purposes are fired without flashing.

DISCUSSION—Through-body color results from the materials used to form the brick reacting to the effects of firing temperature. There may be additives in the body to produce a desired color.

coring, *v*—the process of perforating structural clay products, generally performed during extrusion by supporting cores (rods) within the shaping cap of the extruder.

engobe, *n*—a slip, other than a glaze, that is not impervious and is applied as a coating to a ceramic body to function as a glaze undercoat or to impart color, texture, opacity, or other characteristics.

extrusion, *n*—shaping of brick by pushing plastic clay or shale through a die opening that forms the peripheral dimensions of the brick.

DISCUSSION—The column of extrudate is then cut into sections to provide the third dimension of the brick. Water is added to the clay or shale in sufficient quantities to permit laminar flow through the extrusion machine. The consistency of the extrudate may vary from stiff and capable of supporting several times its weight to soft and deformable under slight loads.

finish, coated, *n*—the surface color and texture resulting from the application of mineral particles to the finished faces in the manufacturing process.

DISCUSSION—Coatings include engobes, glazes, sands, and slips, and these may contain clays, colorants, fluxes, sands, and other materials. Coatings may be applied wet or dry and alone or in combinations.

finish, combed, *n*—the texture resulting when faces are altered by more or less parallel scratches or scarfs in manufacture.

finish, flashed, *n*—the range of color produced by the presence of a reduced oxygen atmosphere in the kiln during firing.

finish, plaster-base, *n*—the texture intended for the direct application of plaster.

DISCUSSION—Plaster-base finishes may be smooth, scored, combed, or roughened.

finish, sand, *n*—the color and texture resulting when faces have sand applied either to the clay column in the extrusion process for appearance purposes or as the lubricant to the molds in the molding process.

fire clay, *n*—a sedimentary clay of low flux content.

fired bond, *n*—bond developed between particulate constituents of brick solely as the result of the firing process.

DISCUSSION—The bond may result from fusion or melting of one or more constituents of the composition or the surface of particles. Other thermal mechanisms such as sintering and interparticle reaction may be responsible for the bond.

The higher the heat treatment, the greater the extent of bonding and consequently the greater the developed strength and the lower the resulting porosity. The bond development should be sufficient to provide the specified strength, porosity, and durability for any particular product.

firing, *v*—process of heating the material to elevated temperatures.

DISCUSSION—The temperatures are usually in excess of 1706°F (930°C). The extent of firing is a function of both time and temperature.

The firing develops the inter-particulate bond, the strengths, the pore structure, and the color of the product. The extent of firing should be sufficient to produce the levels of these properties required by the specifications for the particular product.

glaze, *n*—an impervious finish composed of ceramic materials, fused during firing with the body of brick or tile, which is a semivitreous or vitreous surface and may be clear, white, or colored.

glaze, salt, *n*—the color and texture resulting when faces have a lustrous glazed finish from the thermochemical reaction of the silicates of the clay body with vapors of salt or chemicals.

impervious, *adj*—describes the state of having obtained that degree of vitrification evidenced visually by resistance to penetration of a specified dye.

incipient fusion, *n*—beginning of the development of fired bond.

molding, *v*—shaping of brick by dropping, throwing, or vibrating wet clay or shale in a mold cavity shaped to provide the peripheral dimensions of the brick.

DISCUSSION—Sufficient water is mixed with the clay or shale to produce a soft consistency.

When insides of molds are sanded to prevent sticking of clay, the product is sand-struck brick. When the molds are wetted to prevent sticking, the product is water-struck brick.

pressing, *v*—shaping of brick by pressing clay or shale into a mold cavity which forms the peripheral dimensions of the brick.

DISCUSSION—Different subclassifications of pressing are defined by the quantity of water mixed with the clay or shale.

Dry pressing uses high forming pressures and low water contents usually between 0 and 5 %.

Plastic pressing uses low pressures and sufficient water to produce a plastic mixture.

Semi-dry pressing uses intermediate pressures and water quantities nominally between 5 and 14 %.

reactive particulates, *n*—a particle or particles present in a clay body, which when near the surface may flake off or cause an eruption (pop-outs) of the surface when exposed to the weather.

shale, *n*—a thinly stratified, consolidated, sedimentary clay with well-marked cleavage parallel to the bedding.

slip, *n*—a suspension of clay and mineral particles in a water medium applied as a coating or finish to a ceramic body that, when fired, may function as a glaze or an engobe.

struck surface, *n*—the surface of a molded brick that is not in contact with the mold and from which the excess clay/shale mixture is removed.

surface clay, *n*—an unconsolidated, unstratified clay, occurring on the surface.

tile, end-construction, *n*—tile designed to receive its compressive stress parallel to the axes of the cell.

tile, fireproofing, *n*—tile for use as a protection for structural members against fire.