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Standard Terminology of Structural Clay Products[1]

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1. Scope

1.1 This terminology contains terms and definitions of terms associated with the standards specific to masonry units and roofing tile manufactured by firing clay and shale raw materials.

1.2 The definitions and definitions of terms in this terminology pertain to Specifications C 32, C 34, C 56, C 62, C 126, C 212, C 216, C 279, C 410, C 652, C 902, C 1088, C 1167, C 1261, C 1272 and Test Methods C 67.

1.3 Generic terminology for masonry is found in Terminology C 1232. Terminology C 1232 also applies to masonry units manufactured by firing clay and shale raw materials.

2. Referenced Documents

2.1 *ASTM Standards:*

C 32 Specification for Sewer and Manhole Brick (Made from Clay or Shale)[2]
C 34 Specification for Structural Clay Load-Bearing Wall Tile[2]
C 56 Specification for Structural Clay Non-Load-Bearing Tile[2]
C 62 Specification for Building Brick (Solid Masonry Units Made from Clay or Shale)[2]
C 67 Test Methods for Sampling and Testing Brick and Structural Clay Tile[2]
C 126 Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units[2]
C 212 Specification for Stuctural Clay Facing Tile[2]
C 216 Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)[2]
C 279 Specification for Chemical-Resistant Masonry Units[2]
C 410 Specification for Industrial Floor Brick[2]
C 652 Specification for Hollow Brick (Hollow Masonry Units Made from Clay or Shale)[2]
C 902 Specification for Pedestrian and Light Traffic Paving Brick[2]
C 1088 Specification for Thin Veneer Brick Units Made from Clay or Shale[2]
C 1167 Specification for Clay Roof Tiles[2]
C 1232 Terminology of Masonry[2]
C 1261 Specification for Firebox Brick for Residential Fireplaces[2]
C 1272 Specification for Heavy Vehicular Paving Brick[2]

3. Terminology

3.1 *Terms and Definitions:*

RAW MATERIALS

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.

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

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.

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

MANUFACTURE

bed surface, *n*—the bed surface of the brick is the in situ non-vertical surface intended to be joined by mortar.

brick face, *n*—the face of brick is any surface intended for use to form the exposed surface of the masonry structure.

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

cells/core holes, *n*—continuous openings or perforations within extruded clay products. 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 mm^2) under Specification C 34, and 1½ in. ^{2}(968 mm^2) under Specification C 652.

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

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[2] *Annual Book of ASTM Standards,* Vol 04.05.

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.

fired bond, *n*—bond developed between particulate constituents of brick solely as the result of the firing process. 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. The temperatures are usually in excess of 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.

frog, *n*—an indentation in one bed surface of a brick manufactured by molding or pressing. The identation may be shallow (not exceeding ⅜ in. (9.5 mm)) and is termed a panel. A deeper indentation is called a deep frog. Limits on the extent of frogging are given in Specifications C 62, C 216, and C 652.

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. 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. Different sub-classifications 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 %.

DISCUSSION—*Molding* was listed as *soft mud process* and *extrustion* was listed as *stiff mud process* in Terminology C 43–92 and earlier editions of this standard.

shells, *n*—the outer walls of tile or hollow brick.

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.

webs, *n*—the partitions dividing tile or hollow brick into cells.

PARTS, OPENINGS, AND DESIGNATION OF DIMENSIONS

height, *n*—the vertical dimension of the unit in the face of a wall.

length, *n*—the horizontal dimension of the unit in the face of the wall.

PRODUCT PROPERTIES

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.

Two conditions of immersion are designated in standards relating to brick: 24 h in room temperature (60–86°F (15.5–30°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 absorption* and *boiling 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.

initial rate of absorption, *n*—a distinct property that offers different information from absorption. It is a measure of the suction of water upward into a dry brick from a bed face during one minute of exposure. It is expressed as grams of water picked up in one minute by a net area of 30 in.^{2}(194 cm^2).

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.

SURFACE FEATURES

combed finish, *n*—units whose face surfaces are altered by more or less parallel scratches or scarfs in manufacture.

exposed finish, *n*—units whose surfaces are intended to be left exposed or painted.

flashed finish, *n*—units whose surface faces have a range of color produced by the control of the atmospheric conditions in the kiln during firing.

glaze, *n*—a hard, glassy, fused ceramic coating which may have a matte or glossy surface.

natural finish, *n*—units having unglazed or uncoated surfaces burned to the natural color of the material used in forming the body.

plaster-base finish, *n*—units whose surfaces are intended for the direct application of plaster.

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

roughened finish, *n*—units whose plane die surfaces are entirely broken by mechanical means, such as wire cutting or wire brushing.

salt glaze, *n*—units whose surface faces have a lustrous glazed finish from the thermo-chemical reaction of the silicates of the clay body with vapors of salt or chemicals.