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Standard Terminology of Ceramic Whitewares and Related Products¹

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1. Scope

1.1 This terminology pertains to the terminology used in ceramic whitewares and related products.

1.2 Words adequately defined in standard dictionaries are not included. Included are words that are peculiar to this industry. Double words, hyphenated words, or phrases are listed alphabetically under the first word; additional important words are cross-referenced.

1.3 For definitions of terms relating to surface imperfections on ceramics, refer to Terminology F109.

2. Referenced Documents

2.1 *ASTM Standards*:²

D1129 Terminology Relating to Water

E180 Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial and Specialty Chemicals (Withdrawn 2009)³

F109 Terminology Relating to Surface Imperfections on Ceramics

F465 Practice for Developing Precision and Accuracy Data on ASTM Method for the Analysis of Meat and Meat Products (Withdrawn 1993)³

2.2 *British Standard*:⁴

BS 2955 Glossary of Terms Relating to Powders

3. Terminology

absolute or true density—See *absolute or true density* under **density**.

¹ This terminology is under the jurisdiction of ASTM Committee C21 on Ceramic Whitewares and Related Products and is the direct responsibility of Subcommittee C21.01 on Editorial and Terminology.

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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.

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

⁴ Available from British Standards Institute, 2 Park St., London, England W1A 2B5.

absorbance—the logarithm of that fraction of an incident light beam that is dissipated in the sample, being neither transmitted nor reflected.

absorbed moisture—water held mechanically in the material and having physical properties not substantially different from ordinary water at the same temperature and pressure.

absorption—(1) the relationship of the weight of the water absorbed by a ceramic specimen, subjected to prescribed immersion procedure, to the weight of the dry specimen.

(2) the capacity of a substance to take up a substance, usually a liquid or gas, with the formation of an apparently homogeneous mixture.

adsorption—the capacity of a substance to accept and retain on its surface a layer of another substance, usually a gas or a liquid.

agglomerate—a jumbled mass or collection of two or more particles or aggregates, or a combination thereof, held together by relatively weak cohesive forces caused by weak chemical bonding or an electrostatic surface charge generated by handling or processing.

DISCUSSION—Common usage in powder technology (and British Standard BS 2955) has the terms “aggregate” and “agglomerate” interchanged in meaning from the definitions presented here, and care must be taken to determine in context which definition is in use.

aggregate—a dense mass of particles held together by strong intermolecular or atomic cohesive forces that is stable to normal mixing techniques, including high-speed stirring and ultrasonics.

alumina porcelain—See *alumina porcelain* under **porcelain**.

alumina whiteware—See *alumina whiteware* under **ceramic whiteware**.

andalusite—a polymorph, along with sillimanite and kyanite, of composition $Al_2O_3 \cdot SiO_2$ which on firing dissociates to yield principally mullite.

apparent or pycnometric density—See *apparent or pycnometric density* under **density**.

apparent porosity—See *apparent porosity* under **porosity**.

average particle size—a single value representing the entire particle-size distribution.

DISCUSSION—It is essential to specify the basis under which the average is obtained.

ball clay—a secondary clay, commonly characterized by the presence of organic matter, high plasticity, high dry strength, long vitrification range, and a light color when fired.

ball milling—a method of grinding and mixing material, with or without liquid, in a rotating cylinder or conical mill partially filled with grinding media such as balls or pebbles.

basalt ware—a black unglazed vitreous ceramic ware having the appearance of basalt rock.

Belleek china—a highly translucent whiteware composed of a body containing a significant amount of frit and normally having a luster glaze.

bentonite—a distinct type of fine-grained clay containing not less than 85 % montmorillonite clay having the formula $(\text{OH})_4\text{Si}_8\text{Al}_4\text{O}_{20}\text{nH}_2\text{O}$ and composed of units made up of two silica tetrahedral sheets with a central alumina octahedral sheet.

beryllium oxide (beryllia) (BeO)—an inorganic material of exceptionally high thermal conductivity which is toxic in the powder form.

bias—a constant or systematic error, as opposed to a random error, manifesting itself as a persistent positive or negative deviation of the method average from the accepted reference value. **E180; F465**

binder—a cementing medium; either a material added to the mixture to increase the green or dry strength as compacted, and which may be expelled during sintering or calcining, or a material added to a mixture for the purpose of cementing together particles.

DISCUSSION—A binder may be either a permanent addition, or a temporary additive to a ceramic product.

bisque fire—See *bisque fire* under **firing**.

blackbody—the ideal, perfect emitter and absorber of thermal radiation which emits radiant energy at the maximum rate possible, as a consequence of its temperature, and absorbs all incident radiation.

blistering—the development during firing of enclosed or broken macroscopic vesicles or bubbles in a body, or in a glaze or other coating.

bloating—substantial swelling produced by a heat treatment that causes the formation of a vesicular structure.

blunging—the wet process of blending, or suspending ceramic material in liquid by agitation.

body—the structural portion of a ceramic article, or the material or mixture from which it is made.

bone ash—calcined bone consisting essentially of calcium phosphate.

bone china—a translucent china made from a ceramic white-ware body composition containing a minimum of 25 % bone ash.

bright glaze—See *bright glaze* under **glaze**.

calcine—a ceramic material or mixture fired to less than fusion for use as a constituent in a ceramic composition.

capillary action—the phenomenon of intrusion of a liquid into interconnected small voids, pores, and channels in a solid, resulting from surface tension.

cassiterite (SnO₂)—an inorganic mineral of the tetragonal form used as a source of tin and tin oxide.

casting—a process for forming ceramic ware by introducing a body slip into a porous mold which absorbs sufficient water (or other liquid) from the slip to produce a semirigid article.

drain casting (hollow casting)—forming ceramic ware by introducing a body slip into an open porous mold, and then draining off the remaining slip when the case has reached the desired thickness.

solid casting—forming ceramic ware by introducing a body slip into a porous mold which usually consists of two major sections, one section forming the contour of the outside and the other forming the contour of the inside of the ware and allowing a solid cast to form between the two mold faces.

ceramic article—an article having a glazed or unglazed body of crystalline or partly crystalline structure, or of glass, which body is produced from essentially inorganic, nonmetallic substances and either is formed from a molten mass which solidifies on cooling, or is formed and simultaneously or subsequently matured by the action of the heat.

ceramic mosaic tile—an unglazed tile formed by either the dust-pressed or plastic method, usually $\frac{1}{4}$ to $\frac{3}{8}$ in. (6.4 to 9.5 mm) thick, and having a facial area of less than 6 in.² (39 cm²) and which is usually mounted on sheets approximately 1 by 2 ft (0.3 by 0.6 m) to facilitate setting.

DISCUSSION—Ceramic mosaic tile may be of either porcelain or natural clay composition and may be either plain or with an abrasive mixture throughout.

ceramic paste—a French term synonymous with “ceramic body.”

ceramic process—the production of articles or coatings from essentially inorganic, nonmetallic materials, the article or coating being made permanent and suitable for utilitarian and decorative purposes by the action of heat at temperatures sufficient to cause sintering, solid-state reactions, bonding, or conversion partially or wholly to the glassy state.

ceramics—a general term applied to the art or technique of producing articles by a ceramic process, or to the articles so produced.

ceramic whiteware—a fired ware consisting of a glazed or unglazed ceramic body which is commonly white and of fine texture, designating such product classifications as tile, china, porcelain, semivitreous ware and earthenware.

alumina whiteware—any ceramic whiteware in which alumina (Al₂O₃) is an essential crystalline phase.

cordierite whiteware—any ceramic whiteware in which cordierite (2MgO·2Al₂O₃·5SiO₂) is the essential crystalline phase.