



Designation: D459 – 08a

## Standard Terminology Relating to Soaps and Other Detergents<sup>1, 2</sup>

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### 1. Scope

1.1 This terminology covers soaps and other detergents.

### 2. Referenced Documents

2.1 *ASTM Standards*:<sup>3</sup>

**D460** Test Methods for Sampling and Chemical Analysis of Soaps and Soap Products

**D820** Test Methods for Chemical Analysis of Soaps Containing Synthetic Detergents

**D2330** Test Method for Methylene Blue Active Substances

**D2667** Test Method for Biodegradability of Alkylbenzene Sulfonates

**D2960** Guide for Controlled Laundering Test Using Naturally Soiled Fabrics and Household Appliances

**D4265** Guide for Evaluating Stain Removal Performance in Home Laundering

**D5548** Guide for Evaluating Color Transfer or Color Loss of Dyed Fabrics in Laundering

### 3. Terms and Definitions

**ABS**—an abbreviation for alkyl benzene sulfonate. Although strictly speaking this might apply to any such compound, present practice is to use it for those containing branched chains. (See **LAS**).

**acid-wash color**—the color developed in the separated acid when a sample of detergent alkylate is agitated with sulfuric acid under the conditions prescribed by the method.

**active ingredient of a synthetic detergent**—the organic surface-active material present in the detergent.

**active oxygen**—in *cleaning compounds*, the oxidizing power of oxygen present as peroxide or other active oxygen-

containing moieties in solution expressed as oxygen (equivalent weight 8.00).

*alkaline detergent*—under **detergent**, see *inorganic alkaline detergent*.

**alkyl benzene sulfonate (in the context of soaps and detergents)**—the detergent produced by sulfonating detergent alkylate; any surface-active substance having the molecular structure of a benzene sulfonic acid having as a ring substituent(s) an alkyl group(s) sufficiently large to confer detergent properties.

*ampholytic surfactant or amphoteric surfactant*—see **surface-active agent**.

*anhydrous soap*—under **soap**, see *anhydrous soap*.

*anionic detergent*—under **detergent**, see *anionic detergent*.

**artificially soiled cloth (sometimes called “standard soiled cloth”)**—cloth soiled with one or more materials and used to evaluate the effectiveness of detergents or washing equipment.

**available chlorine in cleaning compounds**—the oxidizing power of chlorine present as hypochlorite or other oxidizing chlorine moieties in solution, expressed as chlorine of equivalent weight 35.45, and as determined by thiosulfate titration.

**bathroom soil**—the soil composed of water insoluble, or practically insoluble, materials or a mixture of these materials, present on typical bathroom surfaces other than those of floors and toilets. A major component of this soil is the insoluble precipitate, commonly referred to as “soap scum,” that is deposited when soap is used in hard water.

*blended soap*—under **soap**, see *blended soap*.

*brightener*—see **fluorescent whitening agents (FWA)**.

*brightening agent*—see **fluorescent whitening agents (FWA)**.

**buffer action**—the resistance of a solution to change in pH.

**builder**—a material added to a soap or synthetic detergent formulation that enhances or maintains the cleaning efficiency of the surfactant, principally by inactivating water hardness either by sequestration, precipitation, or ion exchange. Other functions, depending on the performance capability of the builder compound used, include supplying alkalinity, buffering to maintain alkalinity at effective cleaning levels, helping to keep removed soil in suspension, and emulsifying oily soils.

*built soap*—under **soap**, see *built soap*.

<sup>1</sup> This terminology is under the jurisdiction of ASTM Committee D12 on Soaps and Other Detergents and is the direct responsibility of Subcommittee D12.32 on Nomenclature and Definitions.

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<sup>2</sup> A “Handbook of Industry Terms” is available from the Soap and Detergent Association, 475 Park Ave. S., New York, NY 10016. This is an essentially nontechnical list of definitions of interest to the soap and detergent industry. It is referenced here for information purposes only.

<sup>3</sup> 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.

*cationic detergent*—under **detergent**, see *cationic detergent*.

**chelating agent**—a sequestering or complexing agent that, in aqueous solution, renders a metallic ion inactive through the formation of an inner ring structure with the ion.

**cleaning**—a process of removing undesirable matter.

*dry cleaning*—cleaning fabrics in a substantially nonaqueous liquid medium.

*wet cleaning*—a term used in the dry cleaning industry to denote cleaning in an aqueous medium.

**complexing agent**—see **sequestering agent**.

**detergency**—the removal of soil, using a detergent.

**detergent**—a composition that removes soil.

*anionic detergent*—a detergent that produces negatively charged colloidal ions in solution.

*cationic detergent*—a detergent that produces positively charged colloidal ions in solution.

*dry-cleaning detergent (charge-type)*—a dry-cleaning detergent used at a given percentage by volume that can pass through a diatomaceous earth-coated filter in the dry-cleaning system without change in composition.

*dry-cleaning detergent (dry-cleaning aid)*—a detergent that when added to a dry-cleaning solvent increases cleaning effectiveness.

*dry-cleaning detergent (non-charge type)*—any dry-cleaning detergent that is not of the charge type.

*inorganic alkaline detergent*—a water-soluble inorganic alkali or alkaline salt having detergent properties, but containing no soap or synthetics.

*nonionic detergent*—a detergent that produces electrically neutral-colloidal particles in solution.

*synthetic detergent*—a detergent produced by chemical synthesis and comprising an organic composition other than soap.

**detergent**—a formulated cleaning composition, generally containing one or more surfactant(s) as the essential component(s). However, under **detergent**, see *inorganic alkaline detergent*. Imprecisely, the terms *detergent* and *surfactant* have been used interchangeably.

*dry-cleaning detergent*—a formulated composition added to the solvent bath in dry-cleaning operations to improve cleaning.

*inorganic alkaline detergent*—a formulated cleaning composition containing water-soluble alkali or alkaline salts, but generally no surfactants.

**detergent alkylate**—a mixture of alkylated aromatic hydrocarbons which when sulfonated yields an alkyl aryl sulfonate detergent. The term usually refers to an alkyl benzene in which the alkyl radical is a mixture of straight-chain and isomeric branched-chain groups, averaging 10 or more carbon atoms.

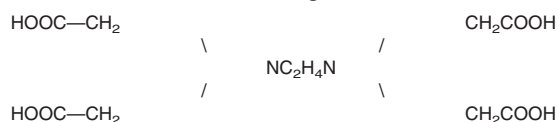
**diphase metal cleaner**—a composition which produces two phases in the cleaning tank, namely, a solvent layer and an aqueous layer, which cleans by solvent action and emulsification.

**dispersing agent**—a material that increases the stability of a suspension of particles in a liquid medium.

*dry cleaning*—under **cleaning**, see *dry cleaning*.

*dry-cleaning detergent*—under **detergent**, see *dry-cleaning detergent*.

**EDTA**—a term used to designate the compound ethylene diamine tetraacetic acid having the structural formula:



or any of its salts that may be specified, used as a sequestering agent.

**emulsifying agent**—a material that increases the stability of a dispersion of one liquid in another.

**emulsion**—a suspension of fine particles or globules of one or more liquids in another liquid.

**emulsion cleaner**—a composition which forms an emulsion capable of dissolving or suspending soil.

**fabric**—a fibrous material containing natural or synthetic fibers, or both, in yarn form, interlaced in various configurations (woven, knitted, or nonwovens).

**fabric softener**—a laundry auxiliary product or laundry detergent ingredient whose primary function is to give fabrics a soft feel, smooth surface, or reduce static electricity, or a combination thereof.

**fatty alcohol sulfate**—the product obtained by treating a one-chain fatty alcohol with a sulfonating agent, the major constituent being the half sulfuric acid ester of the fatty alcohol or a salt thereof.

**fatty matter, free**—the sum of the free rosin acids and free fatty acids plus the unsaponified and unsaponifiable fatty matter.

**fatty matter, total**—fatty and rosin acids plus unsaponified and unsaponifiable fatty matter. This fatty matter is usually isolated from an acidic 50/50 volume percent solution of ethanol and water by extraction with petroleum ether, as per Test Method **D460** and Test Methods **D820**.

**fatty matter, unsaponifiable**—fatty matter (other than acids) that contain no saponifiable esters, such as fatty alcohols, and mineral oil.

**fatty matter, unsaponified**—fatty matter containing saponifiable esters, such as fatty oils, glycerides, and lanolin.

**filler**—a material added to soap or other detergent that does not improve its attractiveness or its effectiveness under the conditions of use.

**fluorescent whitening agents (FWA)**—(optical bleach, fluorescent brightener) complex, organic molecules that adhere to fabrics as though they were dyes. Ultraviolet (UV) energy is absorbed, converted, and emitted as visible blue light to enhance fabric appearance and maintain whiteness or brightness.

**foam**—a mass of bubbles formed on liquids by agitation.

**foaming agent**—a material that increases the stability of a suspension of gas bubbles in a liquid medium.

**FWA buildup**—the course of change in fluorescence emission intensity or fluorescence shade or both, using specified exhaust procedure:

(1) for a specified number of successive applications of FWA, or

(2) by varying the FWA concentration in a series of single applications.

**FWA exhaust efficiency**—a measure of FWA substantivity as expressed by:

(1) **exhaust coefficient (E.C.)**—the ratio of FWA concentration taken up by unprewhitened substrate, (wt of FWA (s)/wt of substrate) to that concentration of FWA remaining in the bath, (wt of FWA (b)/wt of bath) under specified application conditions.

$$\text{E.C.} = \frac{\text{wt FWA (s)/wt substrate}}{\text{wt FWA (b)/wt bath}}$$

(2) **percent exhaust (%E)**—the ratio of FWA on the substrate (wt FWA (s)) obtained under specified conditions to the total FWA introduced in the original bath (wt FWA (o)).

**FWA fastness (on substrate)**—degree of change in fluorescence emission intensity or fluorescence shade or both, when a substrate containing FWA is exposed for a specific length of time to any specified natural or artificial environment.

**FWA fluorescence emission intensity**—the difference between the Z (CIE standard observer) tri-stimulus value of a sample treated with FWA and that of the untreated sample under standardized illumination conditions ( $D_{65}$ ) and viewing conditions (CIE approved geometry) for any specified substrate and specimen presentation techniques.

**FWA fluorescence shade**—(1) the perceived direction of the shift in hue caused by the addition of an FWA to any specified near-white substrate (psychological definition), or (2) the wave length at which an extension of the line connecting the points on a CIE diagram corresponding to the chromaticity coordinates (measured under standardized illumination conditions ( $D_{65}$ ) (CIE approved geometry)) of the untreated substrate to those of the treated substrate intersects the spectrum locus (psychophysical definition).

**FWA formulation-dependent fluorescence emission intensity ratio**—the fluorescence emission intensity obtained with a given FWA on a specified substrate under specified conditions in a designated formulation system relative to that obtained with the same FWA under identical conditions in a different formulation.

**FWA levelness**—the uniformity of distribution of FWA on substrate when applied by a specified method.

**FWA rate of exhaust index**—the time required for an FWA bath of specified composition to be half-depleted by exhaustion onto a particular substrate under specified conditions.

**FWA stability (in solution)**—degree of resistance of FWA in solution under specified exposure condition to specific bath additives.

**FWA substrate selectivity ratio**—the fluorescence emission intensity exhibited by a substrate, relative to that obtained on a reference substrate, after treating these in a specified mixed load, using a given FWA, a designated formulation system, and specified conditions.

**high efficiency (HE)**—used in reference to appliances and allied products that use different technologies to reduce water and energy use for laundering processes; because there is less water to heat, this results in reduced energy usage.

**high efficiency (HE) detergent**—a stain and soil-removing composition specifically formulated to be low-sudsing for use with HE front- and top-loading washer technologies.

**DISCUSSION**—HE washers use considerably less water and energy than traditional deep-fill washers in the laundering process.

**high efficiency (HE) front-loading washers**—two basic types which both utilize technologies that allow for low water usage during the wash and rinse cycle.

**DISCUSSION**—

(1) A machine that tumbles fabrics back and forth through the water or steam, or both, using detergent and additives to remove stains and soils, as the tub rotates clockwise and then counterclockwise.

(2) A machine that spins the tub and fabrics while spraying water and dispersing detergent and additives through fabrics to remove soils. This technology uses considerably less water and energy than traditional deep-fill washers in the laundering process.

**high efficiency (HE) washer**—either a vertically oriented (top loader) or horizontally oriented (front loader) machine used for laundry which uses different mechanical methods than conventional agitator washers to launder fabrics. HE washers use considerably less water and energy than traditional deep-fill washers in the laundering process. HE washers are labeled by the appliance industry and may be recognized by the U.S. DOE and U.S. EPA as Energy Star<sup>™</sup> rated machines.

**home laundering**—the process of cleaning and restoring textile materials to a serviceable condition using the washing and drying equipment commonly found in the home.

**hydrophilic (literally, water-loving)**—a descriptive term applied to the group or radical of a surfactant molecule that makes or tends to make it soluble in water.

**hydrophobic (literally, water-averting)**—a descriptive term applied to the moiety of a surfactant molecule that makes it, or tends to make it, insoluble in water.

**hydrotropy**—the increase in solubility of a substance which is only slightly soluble in an aqueous system by the addition of a third substance. This third substance is called a “hydro-trope” or “hydrotropic agent.”

**inorganic alkaline detergent**—under **detergent**, see *inorganic alkaline detergent*.

**interfacial tension**—the force existing in a liquid-liquid phase interface that tends to diminish the area of the interface. This force, which is analogous to the surface tension of liquid-vapor interfaces, acts at each point on the interface in the plane tangent at that point.

**LAS**—an abbreviation for alkyl benzene sulfonate in which the alkyl radical is a straight chain.

**lather**—a foam or froth when a detergent is agitated in water or other liquid.

**laundering**—a process intended to remove soils or stains, or both, by washing in an aqueous detergent solution, that normally includes subsequent rinsing, extracting, and drying. (See Guide **D5548**.)

**laundry additive**—a separately added product that contributes to the effectiveness of laundering or provides a specialized