



Standard Terminology Relating to Soaps and Other Detergents^{1,2}

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1. Scope

1.1 This terminology covers soaps and other detergents.

2. Referenced Documents

2.1 *ASTM Standards*:³

[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[D2330 Test Method for Methylene Blue Active Substances \(Withdrawn 2011\)](#)⁴

[D2667 Test Method for Biodegradability of Alkylbenzene Sulfonates \(Withdrawn 2013\)](#)⁴

[D2960 Guide for Controlled Laundering Test Using Naturally Soiled Fabrics and Household Appliances \(Withdrawn 2013\)](#)⁴

[D4265 Guide for Evaluating Stain Removal Performance in Home Laundering](#)

[D5548 Guide for Evaluating Color Transfer or Color Loss of Dyed Fabrics in Laundering \(Not Suitable for Detergent or Washing Machine Rankings\)](#)

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.

¹ 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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² 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.

³ 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.

⁴ The last approved version of this historical standard is referenced on www.astm.org.

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*.

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.

cleaning wipe—a sheet of woven or non-woven material that is moistened with a cleaning solution and is used to clean soils and stains from various hard surfaces. Cleaning wipes may also have disinfecting properties, and are labeled as such.

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.

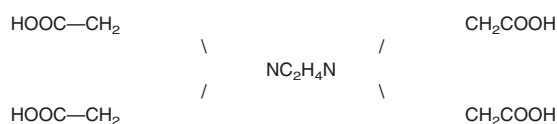
diphase metal cleaner—a composition which produces two phases in the cleaning tank, namely, a solvent layer and an aqueous layer, which cleans by solvent action and emulsification.

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 illu-

mination 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) top-loading washer—a machine that uses spinning, rotating, and/or wobbling wheels, plates or disks to achieve mechanical laundering action. These machines typically have either no center post or a smaller-sized center post instead of a traditional agitator. 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™ 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.

hydrotrophy—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 function, or both. (See Guide [D5548](#).)

methylene blue active substances (MBAS)—compounds that react with methylene blue, a cationic dye, causing it to transfer from an aqueous solution to an immiscible organic liquid upon equilibration under conditions such as those described in Test Method [D2330](#). The reactive compounds are principally surfactants of the sulfonate type $(\text{RSO}_3)^-\text{Na}^+$, the sulfate ester type $(\text{ROSO}_3)^-\text{Na}^+$, and sulfated nonionics $(\text{RE}_n\text{OSO}_3)^-\text{Na}^+$. Soaps are not included among the surfactants reactive to MBAS.

neutral fat—the unsaponified and unsaponifiable matter that becomes included along with fatty acids in a diethyl ether extract of samples under analysis for soap content, as described in 25.2 of Test Method [D460](#).

neutral soap—under **soap**, see *neutral soap*.

neutral white surface—a highly reflecting surface whose diffuse reflectance makes it a colorimetric match of a nonselective reflecting white surface under specified viewing conditions. (psychophysical definition).

nonionic detergent—under **detergent**, see *nonionic detergent*.

nonselectivity reflecting white surface—a surface that exhibits equal, diffuse and high reflectance at all wavelengths in the visible region [380 to 700 nm.] (physical definition).

optical bleach—see **fluorescent whitening agents (FWA)**.

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

penetrating agent—a material that increases the penetration of a liquid medium into a porous material.

percent active FWA—the absolute concentration of specified FWA in (1) raw materials, or (2) finished product, expressed in terms of specific structure or generic name, when known.

precision—the degree of agreement of repeated measurements of the same property, expressed in terms of dispersion of test results about the arithmetical mean result obtained by repetitive testing of a homogeneous sample under specified conditions. The precision of a method is expressed quantitatively as the standard deviation computed from the results of a series of controlled determinations.

preferred white surface(s)—the particular surface which under specified viewing conditions is considered whitest by a statistically significant majority of representative observers in a series of paired comparisons performed at a specified time and geographical locale (psychological definition).

rinse, *v* or *n*—a process or treatment in an aqueous solution for the purpose of removing extraneous matter. (See Guide [D5548](#).)

rosin acids—acids derived from rosin (colophony) consisting mainly of isomers of abietic acid ($\text{C}_{20}\text{H}_{30}\text{O}_2$) with small amounts of hydroabietic acids ($\text{C}_{20}\text{H}_{32}\text{O}_2$ and $\text{C}_{20}\text{H}_{28}\text{O}_2$).

saponification—alkaline hydrolysis of esters to produce the component soaps and alcohols.

SCAS—see **semicontinuous activated sludge, SCAS**.

scouring—a wet process of cleaning by chemical or mechanical means, or both.

semicontinuous activated sludge, SCAS—a term used to designate a test procedure described in Test Method [D2667](#) that is used to confirm determinations of the degree of biodegradability of alkylbenzene sulfonates.

sequestering agent—any compound that, in aqueous solution, combines with a metallic ion to form a water-soluble combination in which the ion is substantially inactive.

soap—the product formed by the saponification or neutralization of fats, oils, waxes, rosins, or their acids with organic or inorganic bases.

DISCUSSION—Various descriptive adjectives are applied to the name soap to indicate certain characteristics, as follows:

(1) Method of manufacture, for example, boiled soap, cold-process soap.

(2) Physical form, for example, bar soap, chip soap, liquid soap, powdered soap.

(3) A special property, for example, floating soap, low-titer soap, milled soap, soft soap.

(4) A particular ingredient, for example, grit soap, tar soap.

(5) A particular application, for example, automobile soap, dry-cleaning soap, saltwater soap.

anhydrous soap—soap, free of water and all other concomitants.

DISCUSSION—The word “anhydrous” usually means free of water, but in the soap industry it has the additional meaning stated.

blended soap (for example, blended palm oil soap)—a soap in which more than half but not all of the fatty acid stock is from the source stated.

built soap—a mixture of soap and one or more builders containing not less than 50 % of anhydrous soap.

neutral soap—an essentially unbuild soap substantially free from uncombined alkali or fatty matter.

soap powder—a mixture in powdered form of soap and one or more alkaline detergents, but composed principally of the latter.

straight soap (for example, straight palm oil soap)—a soap in which the fatty acid stock is solely from the source stated.

superfatted soap—a toilet soap containing any one or more of the following: unsaponified oils, fats (triglycerides), fatty acids, lanolin and its derivatives, fatty esters or alcohols, and similar agents. See **fatty matter, free**.

soil (in reference to detergency)—matter out of place.

soil-redeposition—deposition of removed soil on a surface during a cleaning process.

soiled cloth—see **artificially soiled cloth**.

stain—a local deposit of soil or visible discoloration on a substrate.

straight soap—under **soap**, see **straight soap**.

substrate—the soiled surface that is being cleaned.

suds—a foam or lather generated on or in a detergent solution.

sulfated oil—a newer term signifying the same type of material as sulfonated oil.

sulfation—the introduction into an organic molecule of the sulfuric ester group (or its salts) —O—SO₃H, where the sulfur is linked through an oxygen atom to the parent molecule.

sulfonated oil—a water dispersible or soluble surface active material obtained by treating an unsaturated or hydroxylated fatty oil, acid, or ester with an agent capable of sulfating or sulfonating it at least partially.

sulfonation—the introduction into an organic molecule of the sulfonic acid group (or its salts) —SO₃H where the sulfur atom is joined to a carbon atom of the parent molecule.

sulfuric anhydride (organically combined)—that portion of sulfur, calculated as sulfur trioxide, bound through oxygen to

carbon in an organic sulfate, or bound directly to carbon in an organic sulfonate.

superfatted soaps—under **soap**, see **superfatted soap**.

surface-active agent—(surfactant) an organic compound that reduces the surface tension of a liquid, or the interfacial tension between two liquids or between a liquid and a solid. It can also modify the properties of the liquid to which it is added, generally water.

DISCUSSION—Surface-active agent molecules strongly concentrate at surfaces (the surface of the medium, fabric, soil, at the walls of the containing vessel, etc.) and thus create foam, dislodge soil, disperse solids, emulsify oils, and cause water to wet surfaces.

ampholytic or amphoteric (zwitterionic) surfactant—a chemical compound capable of producing either (or both) positively or negatively charged surface active ions in an aqueous solution. The charge carried on the **ampholytic** surface active ions depends upon the pH of the solution but that on **amphoteric (zwitterionic)** surfactants does not.

anionic surfactant—a chemical compound that produces negatively charged surface active ions in solution.

cationic surfactant—a chemical compound that produces positively charged surface active ions in solution.

nonionic surfactant—a chemical compound that produces uncharged surface active particles in solution.

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

surfactant—a contraction of the term surface-active agent.

syndet—a contraction of the term synthetic detergent. Now used to characterize personal washing bars containing surfactants in combination with soap.

synthetic detergent—a detergent containing surfactants other than soap. Historically, the term differentiated the first detergents from the earlier soap-based detergents.

synthetic detergent—under **detergent**, see **synthetic detergent**.

titer (pronounced tē'ter) (of fatty acids)—the maximum temperature achieved during the solidification of fatty acids, which have been cooled below the melting point by a standardized procedure.

top loader—a vertically oriented agitation machine which is used for home laundry.

unsaponifiable matter—see **fatty matter, unsaponifiable**.

unsaponified matter—see **fatty matter, unsaponified**.

wash, v or n—a cleaning process carried out in an aqueous medium.

washable (as applied to a garment)—a term applied to a garment that will be restored to wearability (Discussion 1) by laundering according to an acceptable (Discussion 2) procedure in the absence of irreparable damage.

DISCUSSION—Wearability includes consideration of size (stretch or shrinkage), appearance (color, freedom from stain or dinginess, or both, etc.), and odor (some synthetics have been found to retain perspiration odors, etc). Wearability also includes considerations of utilization; thus

a pair of overalls used by a painter cannot be judged by the same criteria as a frilly blouse.

DISCUSSION—Acceptability procedure refers to the requirement that the instructions given by the detergent manufacturer and the garment manufacturer and the appliance manufacturer shall be followed within reasonable limits, taking due note of local water hardness, etc.

water hardness—a term used to describe a quality of water arising from the presence of dissolved mineral salts, usually calcium (Ca) and magnesium (Mg) and sometimes iron and manganese. The degree of hardness is calculated in grains of calcium carbonate (CaCO₃) per gallon (gpg) or parts per million (ppm), sometimes expressed as milligrams per litre (mgL). One grain per gpg of CaCO₃ equals 17.1 ppm or mgL. The calcium/magnesium ratio of the hardness minerals is also expressed as calcium carbonate. Water essentially free of calcium and magnesium is described as soft; if appreciable amounts of both minerals are present, it is called hard. In the United States the categories of hardness, as defined by the U.S. Geological Survey,⁵ and the Ca/Mg ratio, are:

	Soft	Moderately Hard	Hard	Very Hard
Grains per gallon	0.0–3.5	3.6–7.0	7.1–10.5	10.6*
Parts per million or milligrams per litre	0.0–60	61–120	121–180	over 180
Ca/Mg ratio ^A	4:1	3:1	2:1	

^A Calculated from data in “Public Water Supplies of the 100 Largest Cities in the United States, 1962.”⁵

See discussions in Test Method [D2960](#), Guide [D4265](#), and Guide [D5548](#).

water-break—failure of water to maintain a continuous film on metallic, vitreous, or similar surfaces on withdrawing from clean water.

wet cleaning— under **cleaning**, see *wet cleaning*.

wetting agent—a material that increases the spreading of a liquid medium on a surface.

whiteness-retention—comparative whiteness of original and cleaned fabric.

⁵ Durfor, C. N., and Becker, E., “Public Water Supplies of the 100 Largest Cities in the United States, 1962,” U.S. Geological Survey Water-Supply, Paper 1812, Washington, DC 1964.

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