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Standard Terminology Relating to Materials for Roads and Pavements¹

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1. Scope

1.1 This standard incorporates generic terms and generic definitions of terms specifically associated with road and paving materials. These generic terms and definitions are used within the standards developed by Committee D04 on Road and Paving Materials.

1.2 Only terms that appear in more than one standard under the jurisdiction of Committee D04 will be included in Terminology D8.

1.3 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[D242/D242M Specification for Mineral Filler For Bituminous Paving Mixtures](#)

[D2026/D2026M Specification for Cutback Asphalt \(Slow-Curing Type\)](#)

[D2027/D2027M Specification for Cutback Asphalt \(Medium-Curing Type\)](#)

[D2028/D2028M Specification for Cutback Asphalt \(Rapid-Curing Type\)](#)

[D3142/D3142M Test Method for Specific Gravity, API Gravity, or Density of Cutback Asphalts by Hydrometer Method](#)

[D4124 Test Method for Separation of Asphalt into Four Fractions](#)

[D4552 Practice for Classifying Hot-Mix Recycling Agents](#)

[D5505 Practice for Classifying Emulsified Recycling Agents](#)

¹ This terminology is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.91 on 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. Terminology

aggregate, *n*—a granular material used as a construction material, meeting the requirements of road and paving applications.

DISCUSSION—Examples of aggregate include sand, gravel, shell, slag, and crushed stone. See *coarse aggregate* and *fine aggregate* for more information.

air voids (Pa), *n*—the volume of air between the asphalt-coated aggregate particles throughout a compacted asphalt mix, expressed as a percent of the total volume of the sample.

DISCUSSION—A variable previously used for this term was V_a .

anionic emulsion, *n*—a type of emulsion such that a particular emulsifying agent establishes a predominance of negative charges on the discontinuous phase.

API gravity, *n*—a function of specific gravity represented by the equation in Test Method [D3142/D3142M](#).

DISCUSSION—A specific gravity scale developed by the American Petroleum Institute (API) used to compare how heavy or light a petroleum liquid is compared to water.

asphalt, *n*—A dark brown to black cement-like residuum obtained from the distillation of suitable crude oils.

DISCUSSION—The distillation processes may involve one or more of the following: atmospheric distillation, vacuum distillation, steam distillation. Further processing of distillation residuum may be needed to yield a material whose physical properties are suitable for commercial applications. These additional processes can involve air oxidation, solvent stripping or blending of residua of different stiffness characteristics. In Europe asphalt is called *bitumen*.

asphalt binder, *n*—asphalt which may or may not contain an asphalt modifier (see *asphalt modifier*).

DISCUSSION—this term is often used in the Performance Graded Binder system.

asphalt cement, *n*—See *asphalt*

asphalt concrete, *n*—See *asphalt mix*.

asphalt mix (asphalt mixture), *n*—a mixture of asphalt binder, emulsified asphalt, or cutback asphalt and aggregates. The mixture may also include other materials.

asphalt pavement, *n*—a structure consisting of one or more prepared layers of asphalt mix atop one or more supporting layers of unbound, modified, or treated subgrade, subbase or base materials.

asphalt-rubber, *n*—a blend of asphalt cement, reclaimed tire rubber, and certain additives in which the rubber component is at least 15 % by weight of the total blend and has reacted in the hot asphalt cement sufficiently to cause swelling of the rubber particles.

asphaltenes, *n*—insoluble materials that are precipitated by use of selected solvents, such as *n*-heptane.

DISCUSSION—The asphaltene fraction should be identified by the solvent and solvent-asphalt ratio used.

bank gravel, *n*—gravel found in natural deposits, usually more or less intermixed with fine material, such as sand or clay, or combinations thereof; gravelly clay, gravelly sand, clayey gravel, and sandy gravel indicate the varying proportions of the materials in the mixture.

bitumen, *n*—dark brown to black cement-like residuum obtained from the distillation of suitable crude oils.

DISCUSSION—The distillation processes may involve one or more of the following: atmospheric distillation, vacuum distillation, steam distillation. Further processing of distillation residuum may be needed to yield a material whose physical properties are suitable for commercial applications. These additional processes can involve air oxidation, solvent stripping or blending of residua of different stiffness characteristics. In North America bitumen is called asphalt.

bituminous, *adj*—containing or treated with bitumen (also *bituminized*).

DISCUSSION—Examples: bituminous concrete, bituminized felts and fabrics, bituminous pavement.

bituminous emulsion, *n*—(1) a suspension of minute globules of bituminous material in water or in an aqueous solution, (2) a suspension of minute globules of water or of an aqueous solution in a liquid bituminous material.

blast-furnace slag, *n*—the nonmetallic product, consisting essentially of silicates and alumino-silicates of calcium and other bases, that is developed in a molten condition simultaneously with iron in a blast furnace.

DISCUSSION—Depending on the way of cooling of the liquid slag, it can be distinguished between crystalline air-cooled blast furnace (ACBF) slag and glassy granulated blast furnace (GBF) slag.

bulk density, *n*—the ratio of the mass of a material to the volume it occupies.

DISCUSSION—Another common phrase for this term is *unit weight*.

bulk specific gravity, *n*—the ratio of the mass of a given volume of material, including the impermeable and permeable voids, to the mass of an equal volume of water at a specified temperature.

DISCUSSION—This term is also sometimes referred to as *relative density*.

cationic emulsion, *n*—a type of emulsion such that a particular emulsifying agent establishes a predominance of positive charges on the discontinuous phase.

clinker, *n*—generally a fused or partly fused by-product of the combustion of coal, but also including lava and portland-cement clinker, and partly vitrified slag and brick.

coal tar, *n*—a dark brown to black cementitious material produced by the destructive distillation of bituminous coal.

coarse aggregate, *n*—(1) aggregate predominantly retained on the 4.75-mm (No. 4) sieve: or (2) the portion of aggregate retained on the 4.75-mm (No. 4) sieve.

DISCUSSION—The definitions are alternatives to be applied under differing circumstances. Definition (1) is applied to an entire aggregate either in a natural condition or after processing. Definition (2) is applied to a portion of an aggregate. Requirements for properties and grading should be stated in the specification. Some specifying agencies use alternative sieve sizes to define coarse aggregate, such as the No. 8 and $\frac{3}{8}$ in.

coke-oven tar, *n*—coal tar produced in by-product coke ovens in the manufacture of coke from bituminous coal.

crack filler, *n*—bituminous material used to fill and seal cracks in existing pavements.

crusher-run, *n*—the total unscreened product of a stone crusher.

cutback asphalt, *n*—asphalt binder which has been blended with hydrocarbon distillates.

DISCUSSION—Slow-curing materials may be made and are often referred to as road oils. See Specifications [D2026/D2026M](#), [D2027/D2027M](#), and [D2028/D2028M](#).

dense-graded aggregate, *n*—an aggregate that has a particle size distribution such that when it is compacted, the resulting voids between the aggregate particles, expressed as a percentage of the total space occupied by the material, are relatively small.

dust binder, *n*—a light application of bituminous material for the express purpose of laying and bonding loose dust.

fine aggregate, *n*—(1) aggregate passing the 4.75-mm (No. 4) sieve or (2) the portion of aggregate passing the 4.75-mm (No. 4) sieve.

DISCUSSION—The definitions are alternatives to be applied under differing circumstances. Definition (1) is applied to an entire aggregate either in a natural condition or after processing. Definition (2) is applied to a portion of an aggregate. Requirements for properties and grading should be stated in the specifications. Some specifying agencies use alternative sieve sizes to define fine aggregate, such as the 2.36-mm (No. 8) and 9.50-mm ($\frac{3}{8}$ -in.) sieve.

fog seal, *n*—a light application of bituminous material to an existing pavement as a seal to inhibit raveling, or to seal the surface, or both. Medium and slow-setting bituminous emulsions are usually used and may be diluted with water.

fractured face, *n*—an angular, rough, or broken surface of an aggregate particle created by crushing, by other artificial means, or by nature.

“free-carbon” in tars, *n*—the hydrocarbon fraction that is precipitated from a tar by dilution with carbon disulfide or benzene.

gas-house coal tar, *n*—coal tar produced in gas-house retorts in the manufacture of illuminating gas from bituminous coal.

macadam, dry-bound and water bound, *n*—a pavement layer containing essentially one-size coarse aggregate choked in place with an application of screenings or sand;

water is applied to the choke material for water-bound macadam. Multiple layers must be used.

maintenance mix, *n*—a mixture of bituminous material and mineral aggregate applied at ambient temperature for use in patching holes, depressions, and distress areas in existing pavements using appropriate hand or mechanical methods in placing and compacting the mix. These mixes may be designed for immediate use or for use out of a stockpile at a later time without further processing.

maltenes, *n*—a red-brown to black heavy oil material remaining after precipitation of asphaltenes from asphalt binder with selected solvents.

maximum size (of aggregate), *n*—in specifications for, or descriptions of aggregate, the smallest sieve opening through which the entire amount of aggregate is required to pass.

mesh, *n*—the square opening of a sieve.

mineral filler, *n*—finely divided mineral matter such as rock dust, slag dust, hydrated lime, hydraulic cement, fly ash, loess, or other material predominantly passing the 75- μm (No. 200) sieve.

DISCUSSION—See Specification [D242/D242M](#) for a description of suitable materials to be used as mineral filler.

mixed-in-place (road mix), *n*—a bituminous surface or base course produced by mixing mineral aggregate and cut-back asphalt, bituminous emulsion, or tar at the job-site by means of travel plants, motor graders, drags, or special road-mixing equipment. Open or dense-graded aggregates, sand, and sandy soil may be used.

mulch treatment, *n*—a spray application of bituminous material used to temporarily stabilize a recently seeded area. The bituminous material can be applied to the soil or to straw or hay mulch as a tie-down, also.

native asphalt, *n*—asphalt occurring as such in nature.

nominal maximum size (of aggregate), *n*—*in specifications for, or descriptions of aggregate*, the smallest sieve opening through which the entire amount of the aggregate is permitted to pass.

DISCUSSION—Specifications on aggregates usually stipulate a sieve opening through which all of the aggregate may, but need not, pass so that a stated maximum proportion of the aggregate may be retained on that sieve. A sieve opening so designated is the *nominal maximum size*.

normal temperature, *n*—as applied to laboratory observations of the physical characteristics of bituminous materials, 25°C (77°F).

oil-gas tars, *n*—tars produced by cracking oil vapors at high temperatures in the manufacture of oil gas.

penetration, *n*—the consistency of a bituminous material expressed as the distance in tenths of a millimetre (0.1 mm) that a standard needle penetrates vertically a sample of the material under specified conditions of loading, time, and temperature.

penetration macadam, *n*—a pavement layer containing essentially one-size coarse aggregate, penetrated in place by a heavy application of bituminous material, followed by an application of a smaller size coarse aggregate, and compacted. Multiple layers containing still smaller coarse aggregate may be used.

pitches, *n*—black or dark-brown solid cementitious materials which gradually liquefy when heated and which are obtained as residua in the partial evaporation or fractional distillation of tar.

plant mix, cold-laid, *n*—a mixture of cut-back asphalt, bituminous emulsion, or tar and mineral aggregate prepared in a central bituminous mixing plant and spread and compacted at the job-site when the mixture is at or near ambient temperature.

plant mix, hot-laid bituminous emulsion mixtures, *n*—a mixture of emulsion and heated mineral aggregate usually prepared in a conventional asphalt plant or drum mixer and spread and compacted at the job site at a temperature above ambient.

prime coat, *n*—an application of a low-viscosity bituminous material to an absorptive surface, designed to penetrate, bond, and stabilize this existing surface and to promote adhesion between it and the construction course that follows.

reclaimed asphalt pavement (RAP), *n*—asphalt pavement or paving mixture removed from its original location for use in recycled asphalt paving mixture.

recycled asphalt paving mixture, *n*—a mixture of reclaimed asphalt pavement with the inclusion, if required, of asphalt cement, emulsified asphalt, cut-back asphalt, recycling agent, mineral aggregate, and mineral filler.

recycling agent (RA), *n*—a blend of hydrocarbons with or without minor amounts of other materials that is used to alter or improve the properties of the aged asphalt in a recycled asphalt paving mixture.

refined tar, *n*—tar freed from water by evaporation or distillation which is continued until the residue is of desired consistency; or a product produced by fluxing tar residuum with tar distillate.

rock asphalt—see **asphalt rock**.

rubble, *n*—rough stones of irregular shapes and sizes, broken from larger masses either naturally or artificially, as by geological action, in quarrying, or in stone cutting or blasting.

saturates, *n*—material that, on percolation in a *n*-heptane eluant, is not adsorbed under the specified test conditions.

DISCUSSION—See Test Method [D4124](#) and Practices [D4552](#) and [D5505](#).

screen, *n*—in laboratory work an apparatus, in which the apertures are circular, for separating sizes of material.

screenings, *n*—a residual product resulting from the artificial crushing of rock, boulders, cobble, gravel, blast-furnace slag

or hydraulic cement concrete, all of which passed the smallest screen used with the crushing operation and most of which passed the 2.36-mm (No. 8) sieve.

sieve, *n*—in laboratory work, an apparatus in which the apertures are square for separating sizes of material.

slurry seal, *n*—an application of a fluid mixture of bituminous emulsion, fine aggregate, mineral filler, and water to an existing pavement. Single or multiple applications may be used.

soil aggregate, *n*—natural or prepared mixtures consisting predominantly of stone, gravel, or sand which contain a significant amount of minus 75- μm (No. 200) silt-clay material.

steel slag, *n*—the nonmetallic product consisting essentially of calcium silicates and ferrites combined with fused oxides of iron, aluminum, manganese, calcium and magnesium, that is developed simultaneously with steel in basic oxygen, electric, or open hearth furnaces.

Relating Specifically to Tests

stone chips, *n*—small angular fragments of stone containing no dust.

straight-run pitch, *n*—a pitch run to the consistency desired in the initial process of distillation and without subsequent fluxing.

surface treatment, *n*—an application of bituminous material followed by a layer of mineral aggregate. Multiple applications of bituminous material and mineral aggregate may be used.

tack coat (bond coat), *n*—an application of bituminous material to an existing relatively nonabsorptive surface to provide a thorough bond between old and new surfacing.

tar, *n*—brown or black bituminous material, liquid or semisolid in consistency, in which the predominating constituents are bitumens obtained as condensates in the destructive distillation of coal, petroleum, oil-shale, wood, or other organic materials, and which yields substantial quantities of pitch when distilled.

tar concrete, cold-laid, *n*—a plant mix containing a medium-viscosity grade of tar and a graded mineral aggregate, designed to be laid either shortly after mixing or when the mixture is at or near ambient temperature.

tar concrete, hot laid, *n*—a plant mix containing a high-viscosity grade of tar and a densely graded mineral aggregate designed to be laid at or near the elevated temperature of mixing.

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