Designation: D 8 – ~~97~~02

Standard Terminology Relating to Materials for Roads and Pavements[1]

This standard is issued under the fixed designation D 8; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval. ~~**BITUMINOUS MATERIALS**~~
~~*Relating in General to Bituminous Materials*~~

1. Scope

1.1 This standard is a compilation of terminology related to materials used in the highway industry, generally for the construction of bituminous pavements, and that are within the jurisdiction of Committee D04. Terms that are generally understood or that are adequately defined in other readily available sources are not included.

1.2 Other terminology under the jurisdiction of Committee D04 is included in two other standards. Terms relating to bridge deck and substructure protection are defined in Terminology D 3743. Terms relating to sealants for joints and cracks are defined in Terminology D 5535.

1.3 When a term is used in an ASTM document for which Committee D04 is responsible, it is included herein only when judged, after review by Subcommittee D04.95, to be a term generally usable in a number of Committee D04 standards.

1.4 Definitions that are identical to those published by other ASTM committees or other standards organizations are identified with the ASTM designation (for example, Terminology C 125) or with the abbreviation of the name of the organization.

1.5 A definition in this standard is a statement of the meaning of a word or word group expressed in a single sentence with additional information included in notes or discussion.

NOTE 1—The subcommittee responsible for this standard will review definitions on a five-year basis to determine if the definition is still appropriate as stated. Revisions will be made when determined necessary.

2. Referenced Documents

2.1 *ASTM Standards:*
C 125 Terminology Relating to Concrete and Concrete Aggregates[2]
D 3743 Terminology Relating to Bridge Deck and Substructure Protection[3]
D 5535 Terminology Relating to Formed-in-Place Sealants for Joints and Cracks in Pavements[3]
2.2 *AASHTO Standards:*
MP2 Standard Specification for Superpave Volumetric Mix Design[4]

3. Terminology

3.1 *Definitions:*
3.1.1 *Bituminous Materials*:

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

asphalt, *n*—a dark brown to black cementitious material in which the predominating constituents are bitumens which occur in nature or are obtained in petroleum processing.

asphalt cement, *n*—a fluxed or unfluxed asphalt specially prepared as to quality and consistency for direct use in the manufacture of bituminous pavements, and having a penetration at 25°C (77°F) of between 5 and 300, under a load of 100 g applied for 5 s.

asphaltenes, *n*—the high molecular weight hydrocarbon fraction precipitated from asphalt by a designated paraffinic naphtha solvent at a specified solvent-asphalt ratio.

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

---

[1] This terminology is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.95 on Quality Control, Inspection and Testing Agencies.
Current edition approved July 10, ~~1997.~~ 2002. Published ~~February 1998.~~ September 2002. Originally published as D 8 – 12. Last previous edition D 8 – 9~~4~~7.
[2] *Annual Book of ASTM Standards,* Vol 04.02
[3] *Annual Book of ASTM Standards,* Vol 04.03.
[4] Available from American Association of State Highway and Transportation Officials (AASHTO), 444 N. Capitol St., NW, Suite 249, Washington, DC 20001.

asphalt rock (rock asphalt), *n*—a naturally occurring rock formation, usually limestone or sandstone, impregnated throughout its mass with a minor amount of bitumen.

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.

bitumen, *n*—a class of black or dark-colored (solid, semisolid, or viscous) cementitious substances, natural or manufactured, composed principally of high molecular weight hydrocarbons, of which asphalts, tars, pitches, and asphaltites are typical.

bituminous, *adj*—containing or treated with bitumen (also *bituminized*~~). Examples:~~); for example: 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, or (*2*) a suspension of minute globules of water or of an aqueous solution in a liquid bituminous material.

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

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

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

cut-back asphalt, *n*—petroleum residuum (asphalt) which has been blended with petroleum distillates.

DISCUSSION—Slow-curing materials may be made directly by distillation and are often referred to as road oils.

cut-back products, *n*—petroleum or tar residuums which have been blended with distillates.

flux, *n*—a bituminous material, generally liquid, used for softening other bituminous materials. ~~Relating Specifically to Petroleum or Asphalts~~

~~**asphalt,**~~**"free-carbon" in tar,** *n*~~—a dark brown to black cementitious material in which the predominating constituents are bitumens which occur in nature~~—the hydrocarbon fraction that is precipitated from a tar by dilution with carbon disulfide or ~~are obtained in petroleum processing.~~ benzene.

~~**asphalt cement,**~~**gas-house coal tar,** *n*~~—a fluxed or unfluxed asphalt specially prepared as to quality and consistency for direct use~~—coal tar produced in gas-house retorts in the manufacture of illuminating gas from bituminous ~~pavements, and having a penetration at 25°C (77°F) of between 5 and 300, under a load of 100 g applied for 5 s.~~ coal.

~~**asphaltenes,** *n*—the high molecular weight hydrocarbon fraction precipitated from asphalt by a designated paraffinic naphtha solvent at a specified solvent-asphalt ratio.~~

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

~~**asphalt rock (rock asphalt),** *n*—a naturally occurring rock formation, usually limestone or sandstone, impregnated throughout its mass with a minor amount of bitumen.~~

~~**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.~~

naphthene-aromatics, *n*—a mixture of naphthenic and aromatic hydrocarbons which are adsorbed from a paraffinic solvent on an adsorbent during percolation and then desorbed with an aromatic solvent such as toluene.

DISCUSSION—The naphthene-aromatics fraction should be identified by the solvent, the solvent-asphalt ratio and the absorbing medium.

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

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

pitch, *n*—black or dark-brown solid cementitious material which gradually liquefies when heated and which is obtained as residua in the partial evaporation or fractional distillation of tar.

polar-aromatics, *n*—a polar aromatic hydrocarbon fraction that is adsorbed on an adsorbing medium from a paraffinic solvent during percolation and then desorbed with a chlorinated hydrocarbon solvent such as trichloroethylene.

DISCUSSION—The polar-aromatics fraction should be identified by the solvent, the solvent-asphalt ratio and the absorbing medium.

~~**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.**

saturates, *n*—a mixture of paraffinic and naphthenic hydrocarbons that on percolation in a paraffinic solvent are not adsorbed on

the adsorbing medium. O; other compounds such as naphthenic and polar aromatics are adsorbed thus permitting the separation of the saturate fraction.

DISCUSSION—The saturates fraction should be identified by the solvent, the solvent-asphalt ratio and the absorbing medium. Relating Specifically to Tars and Pitches

coal tar, *n*—a dark brown to black cementitious material produced by the destructive distillation of bituminous coal.
coke-oven tar, *n*—coal tar produced in by-product coke ovens in the manufacture of coke from bituminous coal.
"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.
oil-gas tars, *n*—tars produced by cracking oil vapors at high temperatures in the manufacture of oil gas.
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.
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.
straight-run pitch, *n*—a pitch run to the consistency desired in the initial process of distillation and without subsequent fluxing.
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. *Relating Specifically to Tests*

3.1.2 *Bitumen-Aggregate Mixtures and Applications*:

normal temperature,crack filler, *n*—as applied—bituminous material used to laboratory observations of the physical characteristics of bituminous materials, 25°C (77°F). fill and seal cracks in existing pavements.
penetration,dust binder, *n*—the consistency—a light application of a bituminous material expressed as for the distance in tenths express purpose of a millimetre (0.1 mm) that a standard needle penetrates vertically a sample of the material under specified conditions of loading, time, laying and temperature.

BITUMEN-AGGREGATE MIXTURES
Relating in General to Combinations of Bituminous Material and Aggregate that are Mixed, Spread on the Job-site, and Compacted
bonding loose dust.

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.
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.

DISCUSSIONG A—Appropriate hand or mechanical methods are used 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.

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. O; 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.
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.
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.
slurry seal,prime coat, *n*—an application of a fluid mixture of low-viscosity bituminous emulsion, fine aggregate, mineral filler, and water material to an absorptive surface, designed to penetrate, bond, and stabilize this existing pavement. Single or multiple applications may be used. surface and to promote adhesion between it and the construction course that follows.
tar concrete, cold-laid,reclaimed asphalt pavement (RAP), *n*—a plant mix containing a medium-viscosity grade of tar and a graded mineral aggregate, designed to be laid either shortly after mixing—asphalt pavement or when the paving mixture is at or near ambient temperature. removed from its original location for use in recycled asphalt paving mixture.
tar concrete, hot laid,recycled asphalt paving mixture, *n*—a plant mix containing a high-viscosity grade mixture of tar and a densely graded mineral aggregate designed to be laid at or near reclaimed asphalt pavement with the elevated temperature inclusion, if required, of mixing.

BITUMEN—AGGREGATE APPLICATIONS

Relating in General to the Application of Bituminous Material on Prepared Aggregate or Pavement Surfaces which are Covered with Mineral Aggregate

asphalt cement, emulsified asphalt, cut-back asphalt, recycling agent, mineral aggregate, and mineral filler.

penetration macadam,slurry seal, *n*—a pavement layer containing essentially one-size coarse aggregate, penetrated in place by a heavy—an application of bituminous material, followed by an application of a smaller size coarse fluid mixture of bituminous emulsion, fine aggregate, mineral filler, and compacted. Multiple layers containing still smaller coarse aggregate may be used. water to an existing pavement.

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

BITUMEN APPLICATIONS

Relating in General to the Uses of Sprayed Bituminous Materials not Involving the Use of Aggregates

crack filler,tack coat (bond coat), *n*—an application of bituminous material used to fill and seal cracks in an existing p relativemly nonabsorptive surface to provide a thorough bond between old and new surfacing.

dust binder,tar concrete, cold-laid, *n*—a light application plant mix containing a medium-viscosity grade of bituminous material for the express purpose of laying tar and bonding loose dust. a graded mineral aggregate, designed to be laid either shortly after mixing or when the mixture is at or near ambient temperature.

fog seal,tar concrete, hot laid, *n*—a light application plant mix containing a high-viscosity grade of bituminous material to an existing pavement as tar and a densely graded mineral aggregate designed to inhibit raveling, be laid at or to seal near the surface, or both. Medium and slow-setting bituminous emulsions are usually used and may be diluted with water. elevated temperature of mixing.

3.1.3 *Aggregate Materials*:

mulch treatment,aggregate, *n*—a spray application of bituminous granular material of mineral composition such as sand, gravel, shell, slag, or crushed stone, used to temporarily stabilize with a recently seeded area. The bituminous material can be applied cementing medium to the soil form mortars or to straw concrete, or hay mulch alone as a tie-down, also. in base courses, railroad ballasts, etc.

prime coat,bank gravel, *n*—an application of a low-viscosity bituminous material to an absorptive surface, designed to penetrate, bond,—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 stabilize this existing surface and to promote adhesion between it and sandy gravel indicate the construction course that follows. varying proportions of the materials in the mixture.

tack coat (bond coat),blast-furnace slag, *n*—an application—the nonmetallic product, consisting essentially of bituminous material to an existing relatively nonabsorptive surface to provide a thorough bond between old silicates and new surfacing.

NONBITUMINOUS MATERIALS

Relating alumino-silicates of lime and of other bases, that is developed simultaneously with iron in General to Nonbituminous Materials

a blast furnace.

aggregate,clinker, *n*—a granular material of mineral composition such as sand, gravel, shell, slag, or crushed stone, used with—generally a cementing medium to form mortars fused or concrete, or alone as in base courses, railroad ballasts, etc. partly fused by-product of the combustion of coal, but also including lava and portland-cement clinker, and partly vitrified slag and brick.

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

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

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.

fine aggregate, *n*—(*1*) aggregate passing the ⅜-in. (9.5-mm) sieve and almost entirely passing the 4.75-mm (No. 4) sieve and predominantly retained on the 75-µm (No. 200) sieve: or (*2*) that portion of an aggregate passing the 4.75-mm (No. 4) sieve and retained on the 75-µm (No. 200) 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.

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

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. ~~M~~; multiple layers must be used.

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. **(Terminology C 125)**

Discussion—Another definition, which applies only to aggregates used in the Superpave mix design procedure, is included in AASHTO Specification MP 2.

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. **(Terminology C 125)**

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.*

Discussion—Another definition, which applies only to aggregates used in the Superpave mix design procedure, is included in AASHTO Specification MP 2.

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

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.

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~~ pass the smallest screen used with the crushing operation and most of which ~~passed~~ pass the 2.36-mm (No. 8) sieve.

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.

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

3.1.4 *Relating to ~~Materials~~*

Tests:

~~**bank gravel,**~~**mesh,** *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~~—the square opening of ~~the materials in the mixture.~~ a sieve.

~~**blast-furnace slag,**~~**normal temperature,** *n*~~—the nonmetallic product, consisting essentially~~—as applied to laboratory observations of ~~silicates and alumino-silicates~~ the physical characteristics of ~~lime and of other bases, that is developed simultaneously with iron in a blast furnace.~~ bituminous materials, 25°C (77°F).

~~**clinker,**~~**penetration,** *n*~~—generally~~—the consistency of a ~~fused or partly fused by-product~~ bituminous material expressed as the distance in tenths of a millimetre (0.1 mm) that a standard needle penetrates vertically a sample of the ~~combustion~~ material under specified conditions of ~~coal, but also including lava~~ loading, time, and ~~portland-cement clinker, and partly vitrified slag and brick.~~ temperature.

~~**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*~~

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

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

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

3.2 *Abbreviations:*

RA—recycling agent

RAP—reclaimed asphalt pavement

4. Keywords

4.1 aggregates; asphalts; bituminous materials; bituminous paving mixtures; terminology.