



Designation: D1369 – 19

# Standard Practice for Quantities of Materials for Asphalt-Aggregate Surface Treatments<sup>1</sup>

This standard is issued under the fixed designation D1369; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the U.S. Department of Defense.*

## 1. Scope

1.1 This practice covers the rates of application of asphalt materials and aggregates and types and grades of asphalt materials for single and multiple asphalt surface treatments as applied to suitably prepared pavements or bases.

1.2 The text of this standard references notes and footnotes that provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *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:*<sup>2</sup>

[C29/C29M Test Method for Bulk Density \(“Unit Weight”\)](#)

<sup>1</sup> This practice is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.24 on Asphalt Surface Treatments.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

and Voids in Aggregate

[D8 Terminology Relating to Materials for Roads and Pavements](#)

[D448 Classification for Sizes of Aggregate for Road and Bridge Construction](#)

[D946/D946M Specification for Penetration-Graded Asphalt Binder for Use in Pavement Construction](#)

[D977 Specification for Emulsified Asphalt](#)

[D1139/D1139M Specification for Aggregate for Single or Multiple Bituminous Surface Treatments](#)

[D1250 Guide for the Use of the Joint API and ASTM Adjunct for Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils: API MPMS Chapter 11.1](#)

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

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

[D2397/D2397M Specification for Cationic Emulsified Asphalt](#)

## 3. Terminology

3.1 For definitions of other terms used in this standard, refer to Terminology [D8](#).

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 The types of surface treatments covered by this practice are as follows:

3.2.2 *multiple-surface treatment, n*—a wearing surface composed of asphalt material and aggregate, in which coarser aggregate is placed uniformly over an initial application of asphalt material and followed by one or more subsequent applications of asphalt material and smaller aggregate.

3.2.2.1 *Discussion*—Generally, the designated maximum size of the smaller aggregate is one half that of the aggregate used in the preceding application. Each application of aggregate is placed uniformly in a single layer, the thickness of which approximates the nominal maximum size of the aggregate.

3.2.3 *single-surface treatment, n*—a wearing surface of asphalt material and aggregate in which the aggregate is placed uniformly over the applied asphalt material in a single layer,

the thickness of which approximates the nominal maximum size of the aggregate used.

#### 4. Significance and Use

4.1 This practice is intended to be used as a guide by those involved in the design of asphalt surface treatments. It covers typical application rates for the various types of surface treatments and covers aggregate sizes and recommended grades of asphaltic material for both hot and cool weather conditions.

4.2 The typical asphalt material application rates given are for normal surfaces and non-porous aggregates. Provision is made for rate adjustment when other than normal surfaces or porous aggregates, or both, are involved.

#### 5. Rates of Application

5.1 Typical quantities of materials for the several types of surface treatments are listed in [Tables 1 and 2](#).

5.2 The quantities of the various gradations are normally sufficient to provide a uniform cover over the area specified. The quantities of aggregate are shown by volume measurement in order to minimize the effect of variations due to specific gravity, particle shape, surface texture, and porosity. For job control, the quantity of aggregate by volume may be converted to a weight figure by determining the loose unit weight of the aggregate and calculating or using [Tables 3 and 4](#) to determine the pounds per square yard or kilograms per square metre.

5.3 The quantities of asphalt materials for the various aggregate gradations are typical rates of application considered adequate to retain aggregate of the specified size on a normal surface. The quantity of asphalt material should be increased when highly absorptive or porous aggregate is used and when treating an old surface that is dry, in order to allow for asphalt

material absorbed. The quantity of asphalt material should be decreased when treating an existing surface that is rich in asphalt, in order to compensate for such excess. Quantities of asphalt materials shown are for volumes of the material at 15.6 °C (60.0 °F). For application at elevated temperatures, these quantities should be adjusted to provide the desired volume at 15.6 °C (60.0 °F).

5.4 The typical rates of application shown in [Tables 1 and 2](#) may be adjusted for variations in the gradation of the aggregate from the coarse to the fine limit of the specification. The quantities of asphalt material and aggregate should be increased when the gradation of the aggregate approaches the coarse limit of the specification. Likewise, the quantities should be decreased when the aggregate approaches the fine limit of the specification. The amount of such increase or decrease should not be more than 20 % of the quantity given.

5.5 The types and grades of asphalt materials recommended for use with the various aggregate sizes are listed in [Table 5](#).

#### 6. Reference Specifications

6.1 The specifications for aggregates are covered in Specification [D1139/D1139M](#).

6.2 The specifications for asphalt materials are covered by the following ASTM specifications: Specifications [D946/D946M](#), [D2027/D2027M](#), [D2028/D2028M](#), [D977](#), and [D2397/D2397M](#).

#### 7. Measurement of Materials

7.1 The following method and tables are applicable for measuring the quantities of asphalt materials and aggregates:

7.1.1 Guide [D1250](#).

7.1.2 *Unit Weight of Aggregate-Loose Weight*—To be made in accordance with Test Method [C29/C29M](#).

**TABLE 1 Quantities of Materials for Asphalt-Aggregate Surface Treatments (Inch-Pound Units)**

NOTE 1—The values are typical design or target values and are not necessarily obtainable to the precision indicated.

Surface Treatment			Aggregate		Asphalt Material <sup>A</sup>
Type	Application	Size No. <sup>B</sup>	Nominal Size (Square Openings)	Typical Rate of Application, ft <sup>3</sup> /yd <sup>2</sup>	Typical Rate of Application, gal/yd <sup>2</sup>
Single	Initial	5	1 in. to ½ in.	0.50	0.42
		6	¾ in. to ⅝ in.	0.36	0.37
		7	½ in. to No. 4	0.23	0.23
		8	⅜ in. to No. 8	0.17	0.19
		9	No. 4 to No. 16	0.11	0.13
Double	Initial	5	1 in. to ½ in.	0.50	0.42
	Second	7	½ in. to No. 4	0.25	0.26
Double	Initial	6	¾ in. to ⅝ in.	0.36	0.37
	Second	8	⅜ in. to No. 8	0.18	0.20
Triple	Initial	5	1 in. to ½ in.	0.50	0.42
	Second	7	½ in. to No. 4	0.25	0.26
	Third	9	No. 4 to No. 16	0.13	0.14
Triple	Initial	6	¾ in. to ⅝ in.	0.36	0.37
	Second	8	⅜ in. to No. 8	0.18	0.20
	Third	9	No. 4 to No. 16	0.13	0.14

<sup>A</sup> Experience has shown that these quantities should be increased slightly (5 to 10 %) when the asphalt material to be used was manufactured for application with little or no heating.

<sup>B</sup> According to Classification [D448](#).