



Designation: ~~D5360~~—~~09~~ D5360 – 15

# Standard Practice for Design and Construction of Bituminous Surface Treatments<sup>1</sup>

This standard is issued under the fixed designation D5360; 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.

## 1. Scope

1.1 This practice covers the design and construction of bituminous surface treatments. It is a guide and should be used as such. End-use specifications should be adopted to conform to job and user requirements.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *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 and health practices and determine the applicability of regulatory limitations prior to use.* For specific precautions see Section 9.

## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

D140 Practice for Sampling Bituminous Materials

D448 Classification for Sizes of Aggregate for Road and Bridge Construction

D490 Specification for Road Tar

D946 Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction

D977 Specification for Emulsified Asphalt

D1139 Specification for Aggregate for Single or Multiple Bituminous Surface Treatments

D1369 Practice for Quantities of Materials for Bituminous Surface Treatments

D2027 Specification for Cutback Asphalt (Medium-Curing Type)

D2028 Specification for Cutback Asphalt (Rapid-Curing Type)

D2397 Specification for Cationic Emulsified Asphalt

D2399 Practice for Selection of Cutback Asphalts

D2995 Practice for Estimating Application Rate and Residual Application Rate of Bituminous Distributors

D3381 Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction

D3628 Practice for Selection and Use of Emulsified Asphalts

D5624 Practice for Determining the Transverse-Aggregate Spread Rate for Surface Treatment Applications

D6114 Specification for Asphalt-Rubber Binder

D6154 Specification for Chemically Modified Asphalt Cement for Use in Pavement Construction

D6373 Specification for Performance Graded Asphalt Binder

## 3. Terminology

### 3.1 Definitions of Terms Specific to This Standard:

3.1.1 *multiple surface treatment*—the bituminous surface produced by the repeat application of bitumen and aggregate a second or even a third time, with the aggregate size usually becoming smaller with each application. Each layer is immediately rolled, preferably with a pneumatic-tired roller.

<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 Bituminous Asphalt Surface Treatments.

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<sup>2</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.

3.1.2 *single surface treatment*—the bituminous surface produced by the application of bitumen to a prepared surface followed at once by an aggregate cover. The surface is immediately rolled, preferably with a pneumatic-tired roller.

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

### 3.1.3.1 *Discussion*—

The terms “seal coat” and “chip seal” have been used interchangeably with the term “surface treatment.”

## 4. Significance and Use

4.1 This practice is to be used as a guide and not a specification.

## 5. Ordering Information

5.1 Orders for seal coat and surface treatment materials under this guide shall include the following information:

5.1.1 Type of bitumen (asphalt ~~element~~, binder, emulsified asphalt, cutback asphalt, road tar) specification designation,

5.1.2 Grade of bitumen,

5.1.3 Quantity of bitumen required,

5.1.4 Type of aggregate (crushed stone, crushed gravel, crushed slag, gravel, slag) specification designation,

5.1.5 Size or sizes of aggregate to be furnished,

5.1.6 Quantity of aggregate required, and

5.1.7 Special requirements.

## 6. Aggregate

6.1 *Cover Aggregate*, shall conform to Specification **D1139** and Classification **D448**.

6.2 *Size*—Aggregate should be as close to one size as is economically practical, preferably in the range of ½ to ¼ in. (13 to 6 mm) for single surface treatments. For multiple surface treatments, aggregate in the range of 1 to ½ in. (25 to 13 mm) is used for the bottom layer with each successive layer using aggregate approximately ½ the size of the previous aggregate layer. Larger sizes may be used in multiple treatments.

NOTE 1—Aggregates larger than ½ in. (13 mm) can cause objectionable tire noise.

NOTE 2—Aggregates finer than ⅛ in. (3 mm) are difficult to spread evenly. Also, the finer the aggregate, the smaller is the tolerable range for the bituminous material application rate.

6.3 *Shape*—The ideal shape is cubical. Flat or elongated particles are undesirable. Flat particles tend to become aligned on their flat sides and may be completely covered with bituminous material when enough is used to hold the cubical particles in place. Rounded particles tend to roll and have poor retention, and therefore, are undesirable.

6.4 *Cleanliness*—Clean aggregate is extremely important. If the coarse aggregate particles are dusty or coated with fine material, the bituminous material may not adhere to the aggregate, resulting in loss of cover aggregate and poor performance. It is recommended that the fraction passing the No. 200 mesh screen not exceed 1 % by weight.

## 7. Bitumen

7.1 When asphalt ~~element~~ binder is used, it shall conform to one of the following specifications: **D946**, **D3381**, **D6114**, **D6154**, or **D6373**.

NOTE 3—The grade of asphalt ~~element~~ binder to be used depends on climatic conditions and amount and type of traffic.

7.2 When cutback asphalt is used, it shall conform to either Specification **D2027** or Specification **D2028**.

NOTE 4—Selection of cutback type (rapid-cure or medium-cure) and grade depends on the type of construction, climatic conditions, amount and nature of traffic, and cleanliness of aggregate. Refer to Practice **D2399** for selection guide.

7.3 When emulsified asphalt is used, it shall conform to either Specification **D977** or Specification **D2397**.

NOTE 5—The emulsified asphalt type and grade to be used depends on the type of construction, climatic conditions, amount and nature of traffic, and cleanliness of aggregate. Use Practice **D3628** for a selection guide. Other types of emulsified asphalt may be used if experience has shown that satisfactory performance will result.

7.4 When road tar is used, it shall conform to Specification **D490**.

## 8. Application Rates

8.1 The bituminous material application rate shall be estimated by using Practice **D1369** for guidance.

8.2 The bituminous material shall be applied by a bituminous distributor that has ~~been calibrated for~~ had the transverse and longitudinal application ~~rate~~ rates determined by Practice **D2995**.