



Designation: D692/D692M – 20

# Standard Specification for Coarse Aggregate for Asphalt Paving Mixtures<sup>1</sup>

This standard is issued under the fixed designation D692/D692M; 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 reappraisal. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

## 1. Scope

1.1 This specification covers crushed stone, crushed hydraulic-cement concrete, crushed blast-furnace slag, crushed gravel, crushed expanded shale, crushed expanded clay, and crushed expanded slate suitable for use in asphalt paving mixtures, as described in Specification [D3515](#) or [D4215](#).

NOTE 1—Other slags having demonstrated a satisfactory service record may be used.

1.2 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.

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

1.4 *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”) and Voids in Aggregate

[C88/C88M](#) Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

[C125](#) Terminology Relating to Concrete and Concrete Aggregates

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee [D04](#) on Road and Paving Materials and is the direct responsibility of Subcommittee [D04.50](#) on Aggregate Specifications.

Current edition approved May 1, 2020. Published May 2020. Originally approved in 1942. Last previous edition approved in 2015 as D692/D692M – 15. DOI: 10.1520/D0692\_D0692M-20.

<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.

[C131/C131M](#) Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

[C136/C136M](#) Test Method for Sieve Analysis of Fine and Coarse Aggregates

[C294](#) Descriptive Nomenclature for Constituents of Concrete Aggregates

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

[D75/D75M](#) Practice for Sampling Aggregates

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

[D3319](#) Practice for the Accelerated Polishing of Aggregates Using the British Wheel

[D3515](#) Specification for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures (Withdrawn 2009)<sup>3</sup>

[D3665](#) Practice for Random Sampling of Construction Materials

[D4215](#) Specification for Cold-Mixed, Cold-Laid Bituminous Paving Mixtures

[D5821](#) Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate

## 3. Terminology

3.1 For defining aggregate types, see Descriptive Nomenclature [C294](#), and Terminologies [D8](#) and [C125](#).

3.2 *Definitions:*

3.2.1 *expanded shale, n; expanded clay, n; expanded slate, n*—the product resulting from the expanding of selected materials (shale, clay, or slate) in a rotary kiln at temperatures over 1000 °C [1832 °F].

## 4. Ordering Information

4.1 Orders for the material under this specification shall include the following information:

4.1.1 The specification designation and year of issue.

4.1.2 The size to be furnished (see [5.2](#)).

4.1.3 The quantity required.

4.1.4 Use of the coarse aggregate, whether for conventional mixtures or open-graded friction course mixtures (see [5.4](#)), and whether for surface courses or base courses (see [5.7](#)).

<sup>3</sup> The last approved version of this historical standard is referenced on [www.astm.org](http://www.astm.org).

4.1.5 In the case of sulfate soundness tests (5.6), which salt is to be used.

4.1.6 Any special requirements.

## 5. Physical Requirements

5.1 *General*—The coarse aggregate shall consist of hard, strong, durable pieces, free of coherent coatings and conforming to the requirements of this specification.

### 5.2 Grading:

5.2.1 The coarse aggregate grading shall conform to the requirements of Classification **D448** for the size number designated, or to another grading as stated in the order (see **Note 2**).

**NOTE 2**—The coarse aggregate grading to be furnished is dependent upon the desired composition of the paving mixture, and whether the grading to be used in the mixture is achieved with or without blending. Other coarse aggregate gradings may be used provided that the combined aggregate and filler, when used, will produce a paving mixture that provides the desired characteristics.

5.2.2 The size to be used is dependent upon the desired composition of the paving mixture, and the required size or sizes either before or after blending as specified.

### 5.3 Density:

5.3.1 *Slag*—Air-cooled blast-furnace slag coarse aggregate, when tested in size No. 57 or No. 8, shall have a minimum density of 1120 kg/m<sup>3</sup> [70 lb/ft<sup>3</sup>] as determined in accordance with Test Method **C29/C29M**, rodding procedure.

5.3.2 *Expanded Shale, Expanded Clay, Expanded Slate*—The coarse aggregate, when tested in size No. 57 or No. 8, shall have a minimum density of 500 kg/m<sup>3</sup> [31 lb/ft<sup>3</sup>] as determined in accordance with Test Method **C29/C29M**, shoveling procedure.

5.4 *Fractured Particles in Coarse Aggregate*—Orders for materials under this specification shall state the appropriate requirements for fractured particles.

5.4.1 *Conventional Mixtures*—Not less than 40 % by mass of the aggregate particles retained on the 4.75-mm (No. 4) sieve shall have at least one fractured face (see **Notes 3 and 4**).

5.4.2 *Open-Graded Friction Course Mixtures*—Of the aggregate particles retained on the 4.75-mm (No. 4) sieve, not less than 90 % by mass shall have one or more fractured faces and 75 % by mass, two or more fractured faces.

**NOTE 3**—Attention is called to the distinction between conventional (dense mixtures or open mixtures) and open-graded friction coarse mixtures in Specification **D3515**.

**NOTE 4**—Some sources of aggregate contain angular particles that will perform similarly to a mechanically fractured particle. Where laboratory tests or service records indicate this to be true, such angular particles may

be considered as fractured.

5.5 *Polishing Characteristics*—The coarse aggregates, or the coarsest fraction of the aggregate for use in surface course mixtures, shall be of a type known to possess adequate resistance to the polishing action of the anticipated traffic. (See **Note 5**.)

**NOTE 5**—No standard ASTM method has been recognized to be capable of defining adequate resistance to the polishing action of specific traffic conditions. Practice **D3319** has been found useful in evaluating the relative polish resistance between samples of different aggregates or mixtures containing different aggregates.

5.6 *Soundness*—The coarse aggregate, when subjected to five cycles of the soundness test, shall have a weighted loss not greater than 12 % when sodium sulfate is used or 18 % when magnesium sulfate is used (see **Note 6**). If the salt is not designated by the purchaser, the aggregate will be acceptable if it meets the indicated limit for the salt used.

5.7 *Degradation*—The aggregate (with the exception of crushed blast-furnace slag) when subjected to testing in accordance with Test Method **C131/C131M** shall have a loss not greater than 40 % for surface courses or 50 % for base courses (see **Note 6**).

**NOTE 6**—Coarse aggregate (other than crushed hydraulic-cement concrete) failing to meet the requirements of 5.6 or 5.7 may be considered for use provided that (1) similar aggregates from the same source or geologic formation have been shown by experience to result in satisfactory pavements, and (2) the results of other tests suggest that the desired performance can be obtained. Aggregate from a new source (including crushed hydraulic-cement concrete) that fails the requirements of 5.6 or 5.7 and for which no experience exists may be considered, provided the results of the other tests suggest that the desired performance can be obtained. Crushed hydraulic-cement concrete may chemically react with Na<sub>2</sub>SO<sub>4</sub> or MgSO<sub>4</sub>, giving higher results which may not reflect the aggregate's freeze-thaw properties. Additional tests may be required.

## 6. Methods of Sampling and Testing

6.1 Sample the aggregates and determine the properties enumerated in this specification in accordance with the following methods:

6.1.1 *Sampling*—Practices **D75/D75M** and **D3665**.

6.1.2 *Grading*—Test Method **C136/C136M**.

6.1.3 *Bulk Density of Aggregate*—Test Method **C29/C29M**.

6.1.4 *Soundness*—Test Method **C88/C88M**.

6.1.5 *Degradation*—Test Method **C131/C131M**.

6.1.6 *Fractured Particles*—Test Method **D5821**.

## 7. Keywords

7.1 aggregate; asphalt paving; coarse aggregate; open-graded friction; paving mixtures