



Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures¹

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 reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

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 bituminous paving mixtures, as described in Specifications [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 non-conformance 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.

2. Referenced Documents

2.1 *ASTM Standards*:²

- [C29/C29M](#) Test Method for Bulk Density (“Unit Weight”) and Voids in Aggregate
- [C88](#) Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
- [C125](#) Terminology Relating to Concrete and Concrete Aggregates
- [C131](#) Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- [C136](#) Test Method for Sieve Analysis of Fine and Coarse Aggregates
- [C294](#) Descriptive Nomenclature for Constituents of Concrete Aggregates

¹ 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 June 1, 2015. Published July 2015. Originally approved in 1942. Last previous edition approved in 2014 as D692/D692M – 09 (2014). DOI: 10.1520/D0692_D0692M-15.

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.

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

[D75](#) 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)³

[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 Terminology [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](#)),

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

4.1.6 Any special requirements.

³ The last approved version of this historical standard is referenced on www.astm.org.

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/m³ [70 lb/ft³] 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/m³ [31 lb/ft³] 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 course 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. Test Method **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** 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 (a) similar aggregates from the same source or geologic formation have been shown by experience to result in satisfactory pavements and (b) 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 Na₂SO₄ or MgSO₄, 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*—Practice **D75** and Practice **D3665**.
- 6.1.2 *Grading*—Test Method **C136**.
- 6.1.3 *Bulk Density of Aggregate*—Test Method **C29/C29M**.
- 6.1.4 *Soundness*—Test Method **C88**.
- 6.1.5 *Degradation*—Test Method **C131**.
- 6.1.6 *Fractured Particles*—Test Method **D5821**.

7. Keywords

7.1 aggregate; bituminous paving; coarse aggregate; open graded friction; paving mixtures

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, Tel: (978) 646-2600; http://www.copyright.com/