Suitability Properties

Important Properties

Gradation

Relative density and absorption

Hardness (resistance to wear)

Durability (resistance to weathering)

Shape and surface texture

Deleterious substances

Crushing strength

Soft and lightweight particles

Chemical stability

Hardness

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.

Designation: C535 – 16

Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine[1]

This standard is issued under the fixed designation C535; 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.

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

1. Scope*

1.1 This test method covers testing sizes of coarse aggregate larger than 19 mm (¾ in.) for resistance to degradation using the Los Angeles testing machine (Note 1).

NOTE 1—A procedure for testing coarse aggregate smaller than 37.5 mm (1½ in.) is covered in Test Method C131/C131M.

1.2 The values stated in SI units are to be regarded as the

3. Terminology

3.1 For definitions of terms used in this test method, refer to Terminology C125.

4. Summary of Test Method

4.1 This test is a measure of degradation of mineral aggregates of standard gradings resulting from a combination of

Hardness
(Resistance to Wear)

Source: http://pavementinteractive.org

LA Abrasion Test

Hardness
(Resistance to Wear)

100% retained on No. 12 sieve

Source: http://pavementinteractive.org

<100% retained on No. 12 sieve

Hardness
(Resistance to Wear)

$$\% \text{ loss} = \frac{M_{original} - M_{final}}{M_{original}} \times 100\%$$

(Elapsed Time = 15 minutes = 1000 revolutions)

Example

A 5015-g sample of coarse aggregate is tumbled in a Los Angeles Abrasion device for 1000 revolutions (15 minutes). When the resulting aggregate is passed through a No. 12 sieve, 3891 g of material is retained.

Find the % loss

Important Properties

Gradation

Relative density and absorption

Hardness (resistance to wear)

Durability (resistance to weathering)

Shape and surface texture

Deleterious substances

Crushing strength

Soft and lightweight particles

Chemical stability

Durability
(Resistance to Weathering)

Resistance to Wetting/Drying

Resistance to Freezing/Thawing

Resistance to Heating/Cooling

Soundness Test

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.

Designation: C88 – 13

Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate[1]

This standard is issued under the fixed designation C88; 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.

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

1. Scope

1.1 This test method covers the testing of aggregates to estimate their soundness when subjected to weathering action in concrete or other applications. This is accomplished by repeated immersion in saturated solutions of sodium or magnesium sulfate followed by oven drying to partially or completely dehydrate the salt precipitated in permeable pore spaces. The internal expansive force, derived from the rehy-

C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates
C670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials
C702 Practice for Reducing Samples of Aggregate to Testing Size
D75 Practice for Sampling Aggregates
E11 Specification for Woven Wire Test Sieve Cloth and Test

Soundness Test
(Resistance to Weathering)

$MgSO_4$

Na_2SO_4

Source: http://pavementinteractive.org

Soundness Test
(Resistance to Weathering)

Coarse aggregate sample before testing

Same sample after 5 cycles of soaking and drying

Source: http://pavementinteractive.org

Soundness Test
(Resistance to Weathering)

Aggregate Size		Sieve Used	
U.S.	**Metric**	**U.S.**	**Metric**
≥ 1.5 inches	≥ 37.5 mm	1.25 inches	31.5 mm
1.5 to 0.75 inches	37.5 to 19.0 mm	5/8 inch	16.0 mm
0.75 to 0.375 inches	19.0 to 9.5 mm	5/16 inch	8.0 mm
0.375 inches to No. 4	9.5 to 4.75 mm	No. 5	4.0 mm

Source: http://pavementinteractive.org

Soundness Test
(Resistance to Weathering)

$$\% \text{ loss} = \frac{M_{original} - M_{final}}{M_{original}} \times 100\%$$

(Elapsed Time = 5 cycles)

Example

A 2175-g sample of 1" aggregate is subjected to 5 cycles of wetting (16-18 hr) and drying. When the resulting aggregate is passed through a 5/8" sieve, 1847 g of material is retained.

Find the % loss

Important Properties

Gradation

Relative density and absorption

Hardness (resistance to wear)

Durability (resistance to weathering)

Shape and surface texture

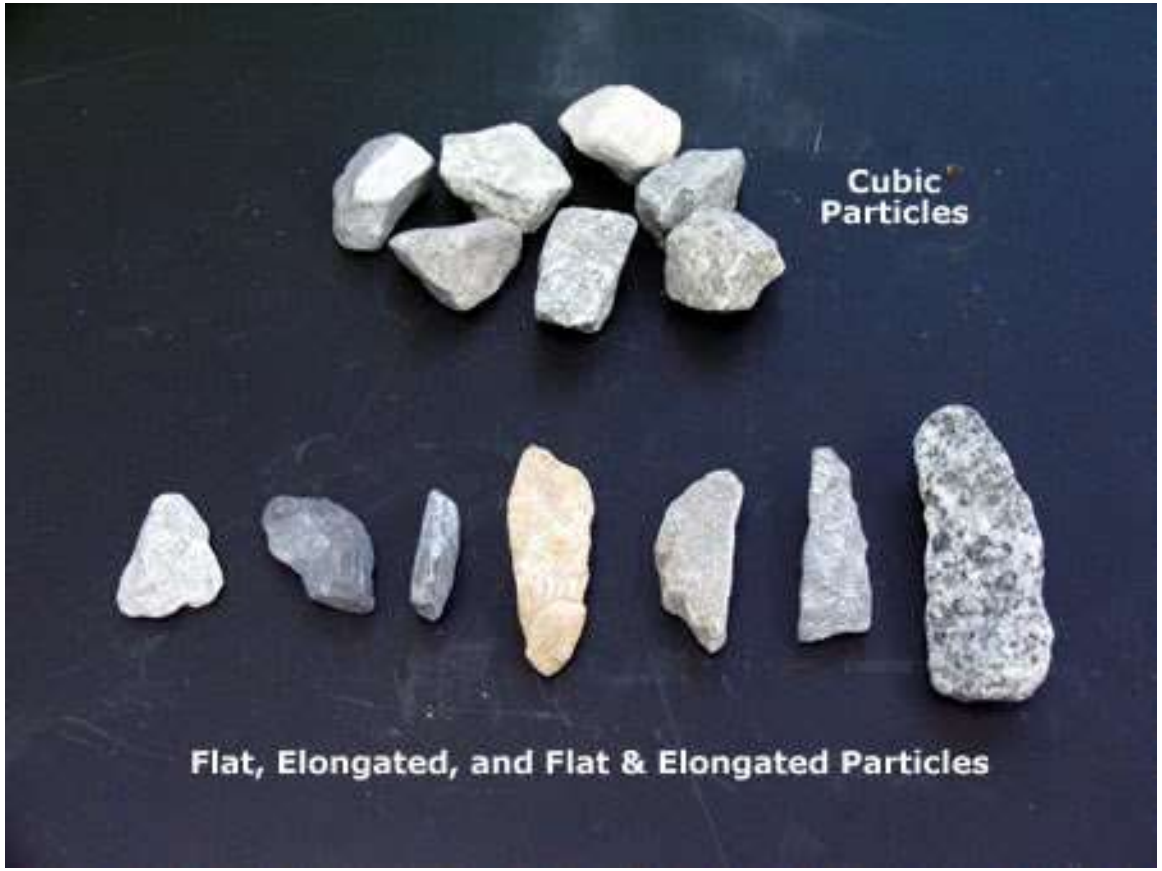
Deleterious substances

Crushing strength

Soft and lightweight particles

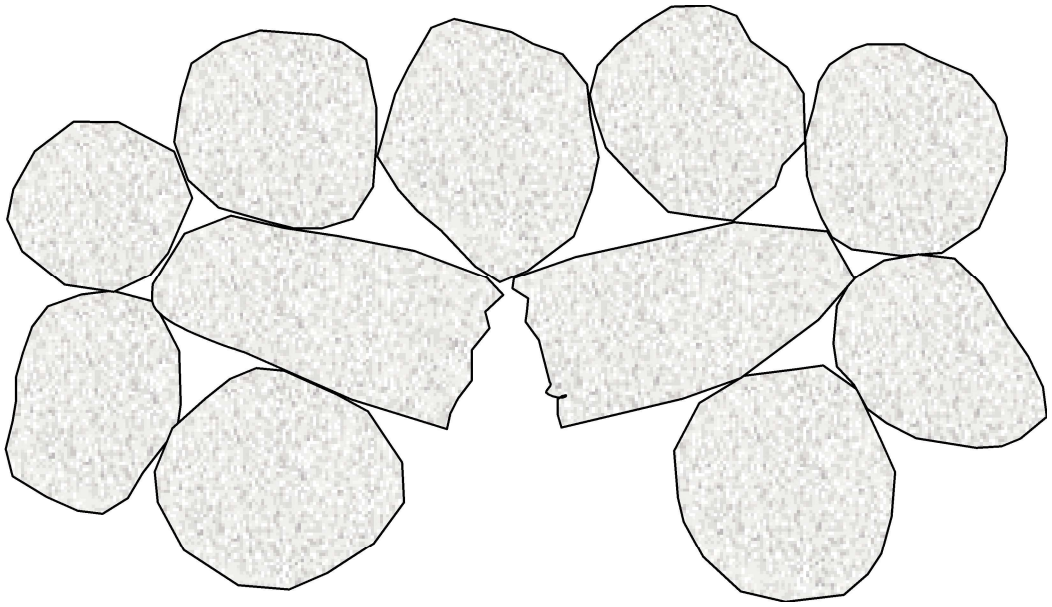
Chemical stability

Particle Shape
(Flat and Elongated Particles)



Source: http://pavementinteractive.org

Flat and Elongated Particles



Flat and Elongated Particles

Designation: D 4791 – 05

Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate[1]

This standard is issued under the fixed designation D 4791; 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.

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

1. Scope

1.1 This test method covers the determination of the percentages of flat particles, elongated particles, or flat and elongated particles in coarse aggregates.

1.2 The values stated in inch-pound units are to be regarded as the standard except in regard to sieve size and the size of aggregate, which are given in SI units in accordance with Specification E 11. The SI units in parentheses are for information purposes only.

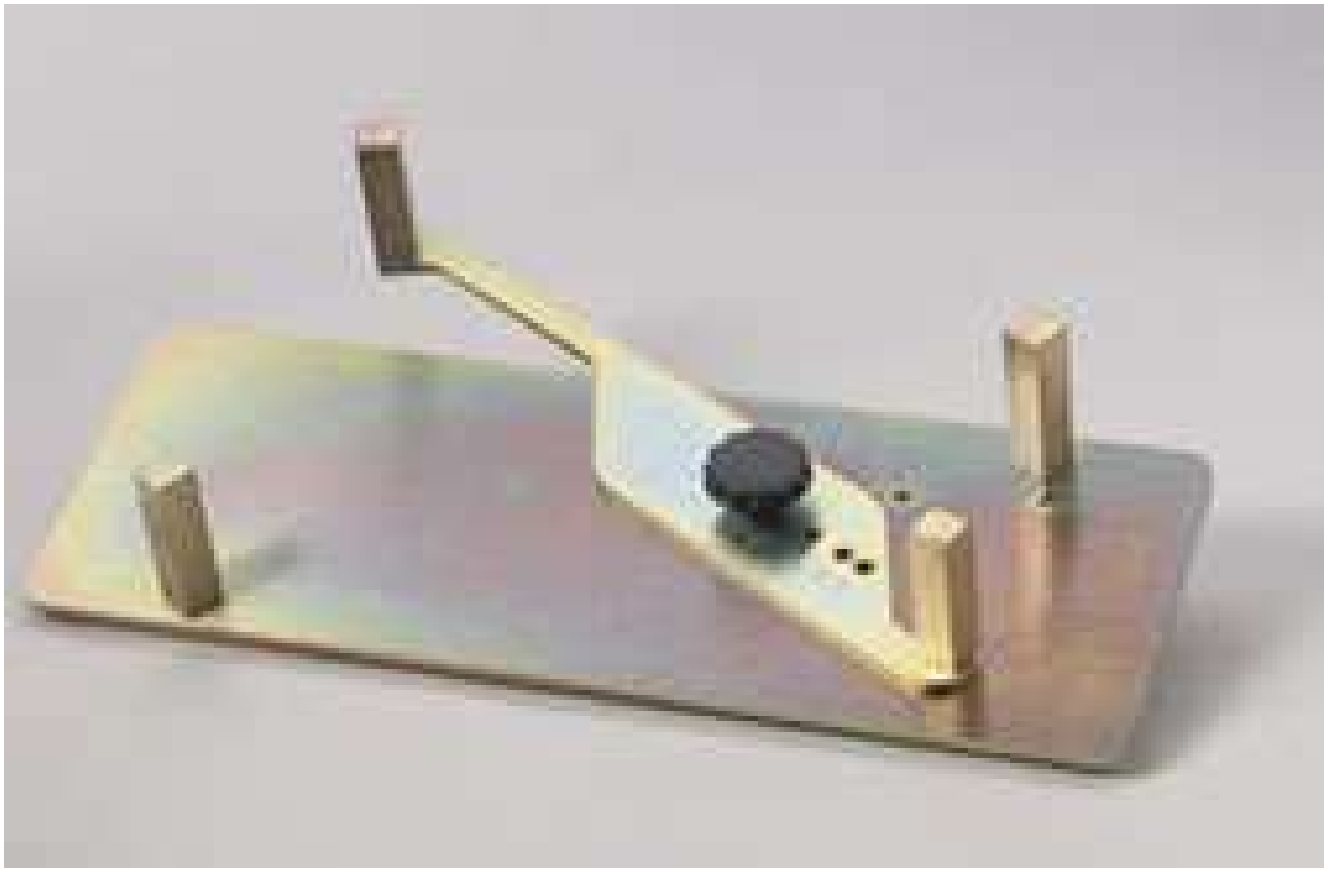
3.1.1 *flat and elongated particles of aggregate*—those particles having a ratio of length to thickness greater than a specified value.

3.1.2 *flat or elongated particles of aggregate*—those particles of aggregate having a ratio of width to thickness or length to width greater than a specified value (see Terminology C 125).

3.1.3 *length*—maximum dimension of the particle.

3.1.4 *thickness*—maximum dimension perpendicular to the

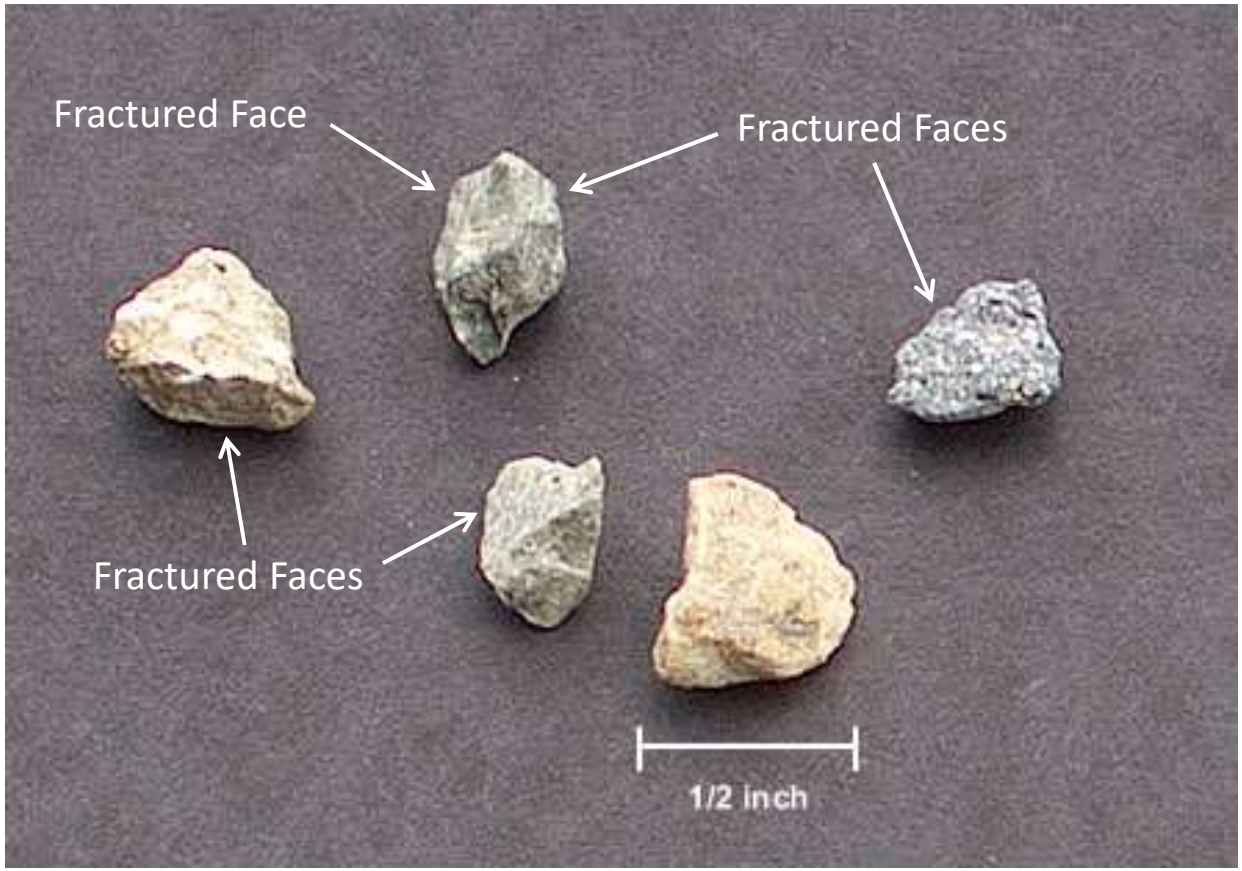
Proportional Caliper Device



Proportional Caliper Device

Source: http://pavementinteractive.org

Particle Shape
(Coarse Aggregate Angularity)



Source: http://pavementinteractive.org

Coarse Aggregate Angularity

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.

Designation: D5821 – 13 (Reapproved 2017)

Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate[1]

This standard is issued under the fixed designation D5821; 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 test method covers the determination of the percentage, by mass or by count, of a coarse aggregate sample that consists of fractured particles meeting specified requirements.

1.2 The values stated in SI units are to be regarded as the standard. The values in parentheses are provided for information only.

1.3 *This standard does not purport to address all of the*

3. Terminology

3.1 *Definitions:*

3.1.1 *fractured face, n*—an angular, rough, or broken surface of an aggregate particle created by crushing, by other artificial means, or by nature (see Terminology D8).

3.1.1.1 *Discussion—For this standard*, a face will be considered a "fractured face" only if it has a projected area at least as large as one-quarter of the maximum projected area (maximum cross-sectional area) of the particle (this excludes small

Fine Aggregate Angularity

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.

Designation: C1252 – 17

Standard Test Methods for Uncompacted Void Content of Fine Aggregate (as Influenced by Particle Shape, Surface Texture, and Grading)[1]

This standard is issued under the fixed designation C1252; 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 These test methods cover the determination of the loose, uncompacted void content of a sample of fine aggregate. When measured on any aggregate of a known grading, void content provides an indication of that aggregate's angularity, sphericity, and surface texture compared with other fine aggregates tested in the same grading. When void content is measured on an as-received fine-aggregate grading, it can be an

priate safety and health 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.*

Particle Shape
(Fine Aggregate Angularity)

Source: http://pavementinteractive.org

$$V_{sand} = \frac{m_{sand}}{RD_{sand} \times \rho_w}$$

$$V_{voids} = V_{cyl} - V_{sand}$$

$$\% \text{ Voids} = \frac{V_{voids}}{V_{cyl}} \times 100\%$$

Important Properties

Gradation

Relative density and absorption

Hardness (resistance to wear)

Durability (resistance to weathering)

Shape and surface texture

Deleterious substances

Crushing strength

Soft and lightweight particles

Chemical stability

Clay Content

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.

Designation: D2419 – 14

Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate[1]

This standard is issued under the fixed designation D2419; 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.

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

1. Scope

1.1 This test method is intended to serve as a rapid field-correlation test. The purpose of this test method is to indicate, under standard conditions, the relative proportions of clay-size or plastic fines and dust in granular soils and fine aggregates that pass the 4.75-mm (No. 4) sieve. The term "sand equivalent" expresses the concept that most granular soils and some fine aggregates are mixtures of desirable coarse particles, sand-size particles, and generally undesirable clay or plastic fines and dust

2. Referenced Documents

2.1 *ASTM Standards:*[2]

C670 Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials

C702 Practice for Reducing Samples of Aggregate to Testing Size

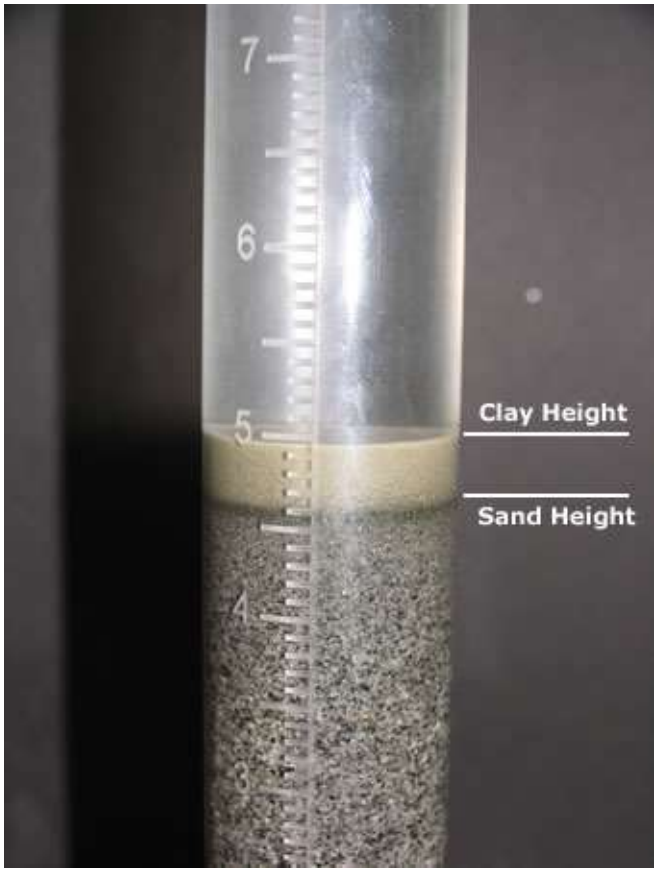
D8 Terminology Relating to Materials for Roads and Pavements

D75 Practice for Sampling Aggregates

D653 Terminology Relating to Soil, Rock, and Contained

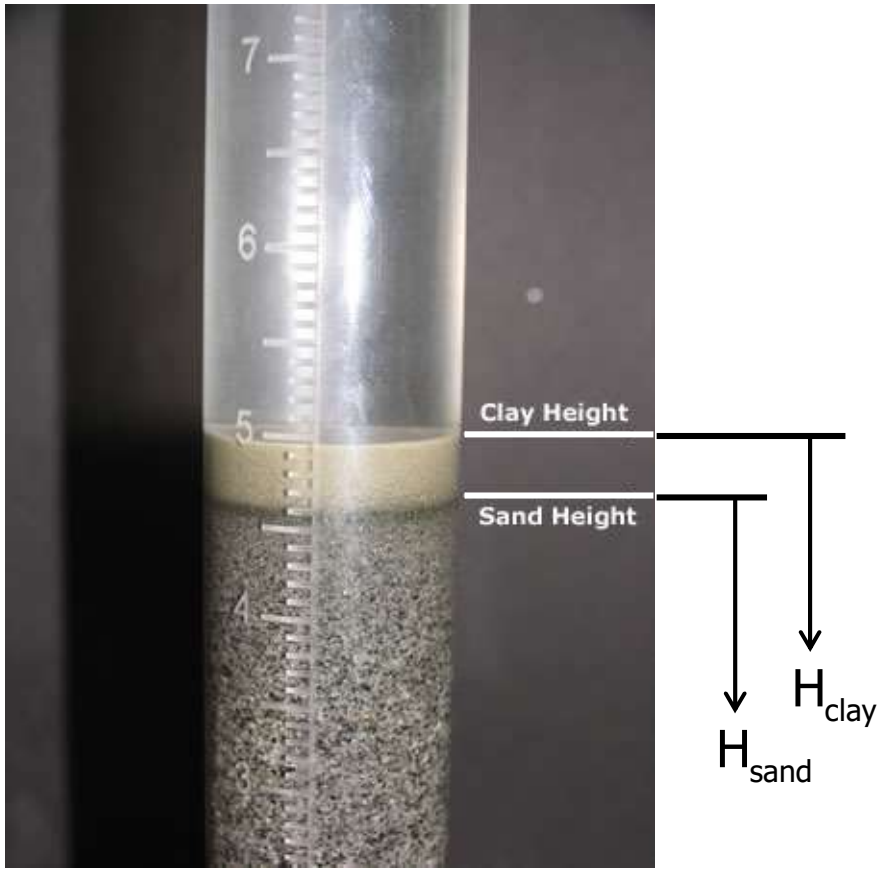
Clay Content
(Sand Equivalent Test)

Source: http://pavementinteractive.org



Source: http://pavementinteractive.org

Clay Content
(Sand Equivalent Test)



$$SE = \frac{H_{sand}}{H_{clay}} \times 100\%$$

Source: http://pavementinteractive.org

Important Properties

Gradation

Relative density and absorption

Hardness (resistance to wear)

Durability (resistance to weathering)

Shape and surface texture

Deleterious substances

Crushing strength

Soft and lightweight particles

Chemical stability

Aggregate Specifications

Specifications

SECTION 903-AGGREGATES

Source: Standard Specifications for Road and Bridge Construction (TDOT, 2006)

Specifications

TDOT Specs for Concrete Fine Aggregate

Material Passing No. 200 Sieve < 3%

Clay Lumps < 0.5%

Coal and Lignite < 0.5%

L.A. Abrasion Loss < 40%

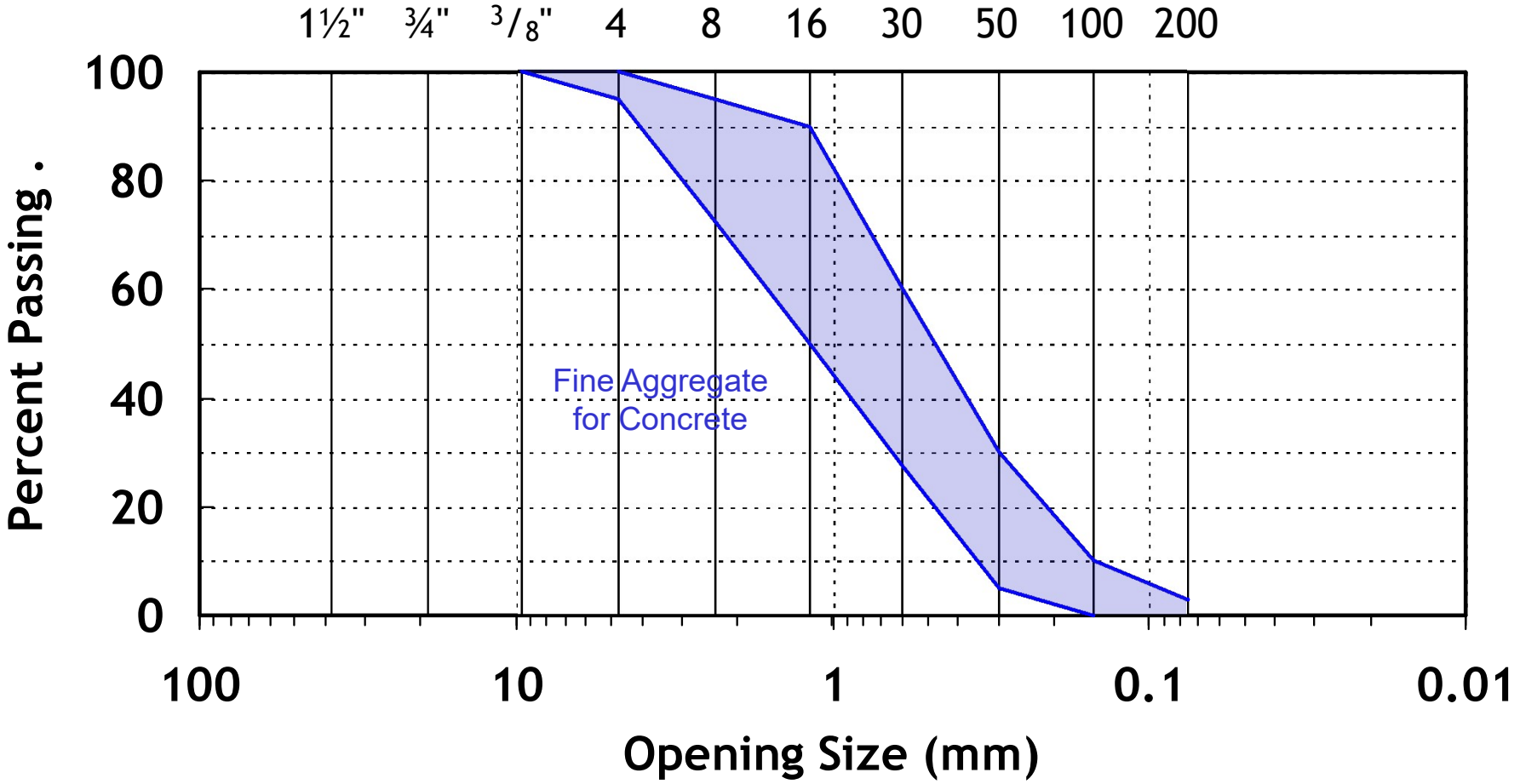
Sodium Soundness Loss < 10%

Specifications

TDOT Specs for Concrete Fine Aggregate

Sieve Size		Percent Passing by Weight
3/8 in.	(9.5 mm)	100
No. 4	(4.75 mm)	95 - 100
No. 16	(1.18 mm)	50 - 90
No. 50	(300 μm)	5 - 30
No. 100	(150 μm)	0 - 10
No. 200	(75 μm)	0 - 3

Specifications



Specifications

TDOT Specs for Concrete Coarse Aggregate

Material Passing No. 200 Sieve < 1%

Flat and Elongated Particles (5:1) < 10%

Clay Lumps < 0.25%

Coal and Lignite < 1%

L.A. Abrasion Loss < 40%

Sodium Soundness Loss < 9%

Specifications

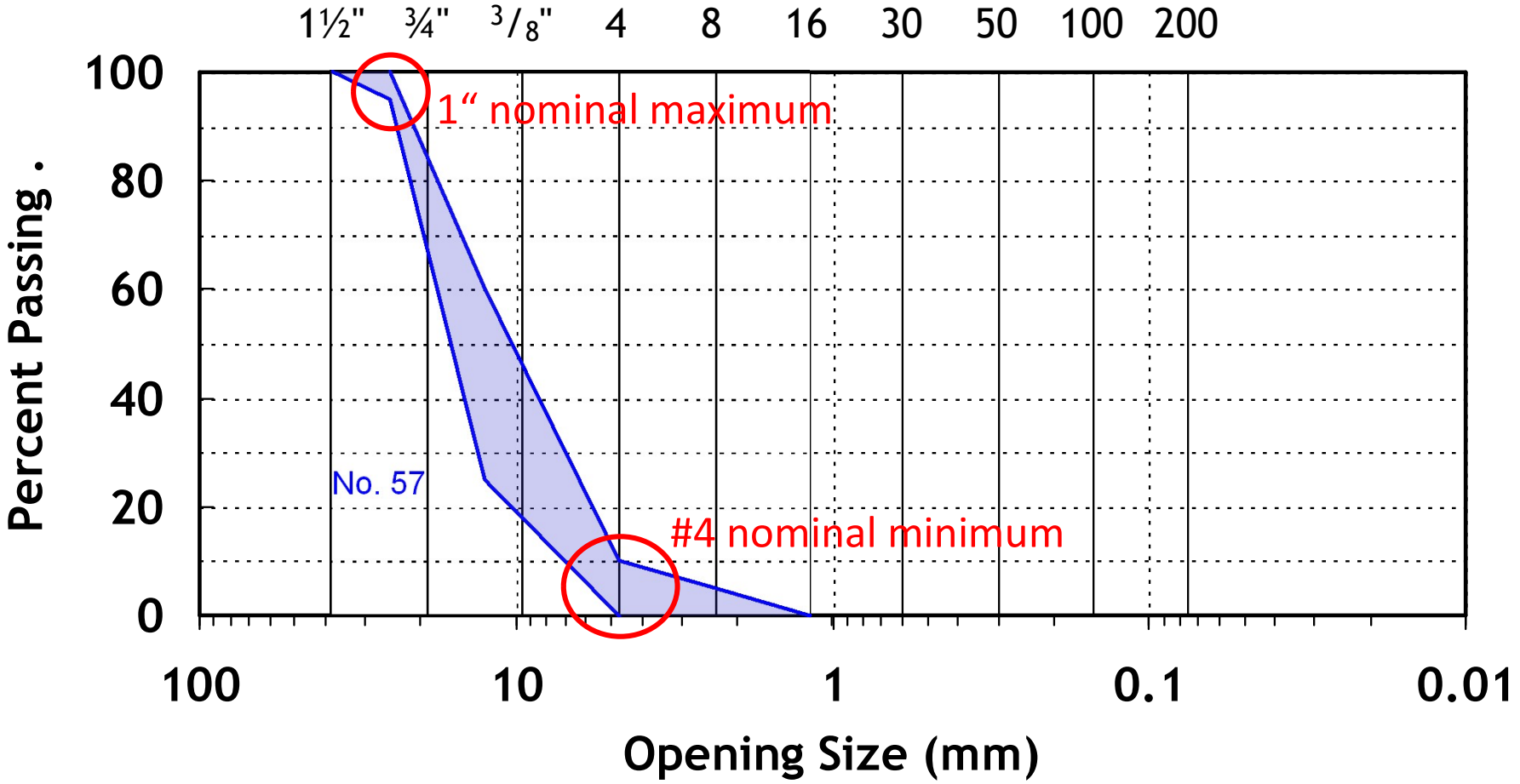
TDOT Specs for Concrete Coarse Aggregate

Application	Size No.
Concrete Pavement	467
Concrete Base Course	467
Cement Treated Base Course	57
Structural Concrete	57
Prestressed Concrete	57 or 67
Precast Concrete	57 or 67

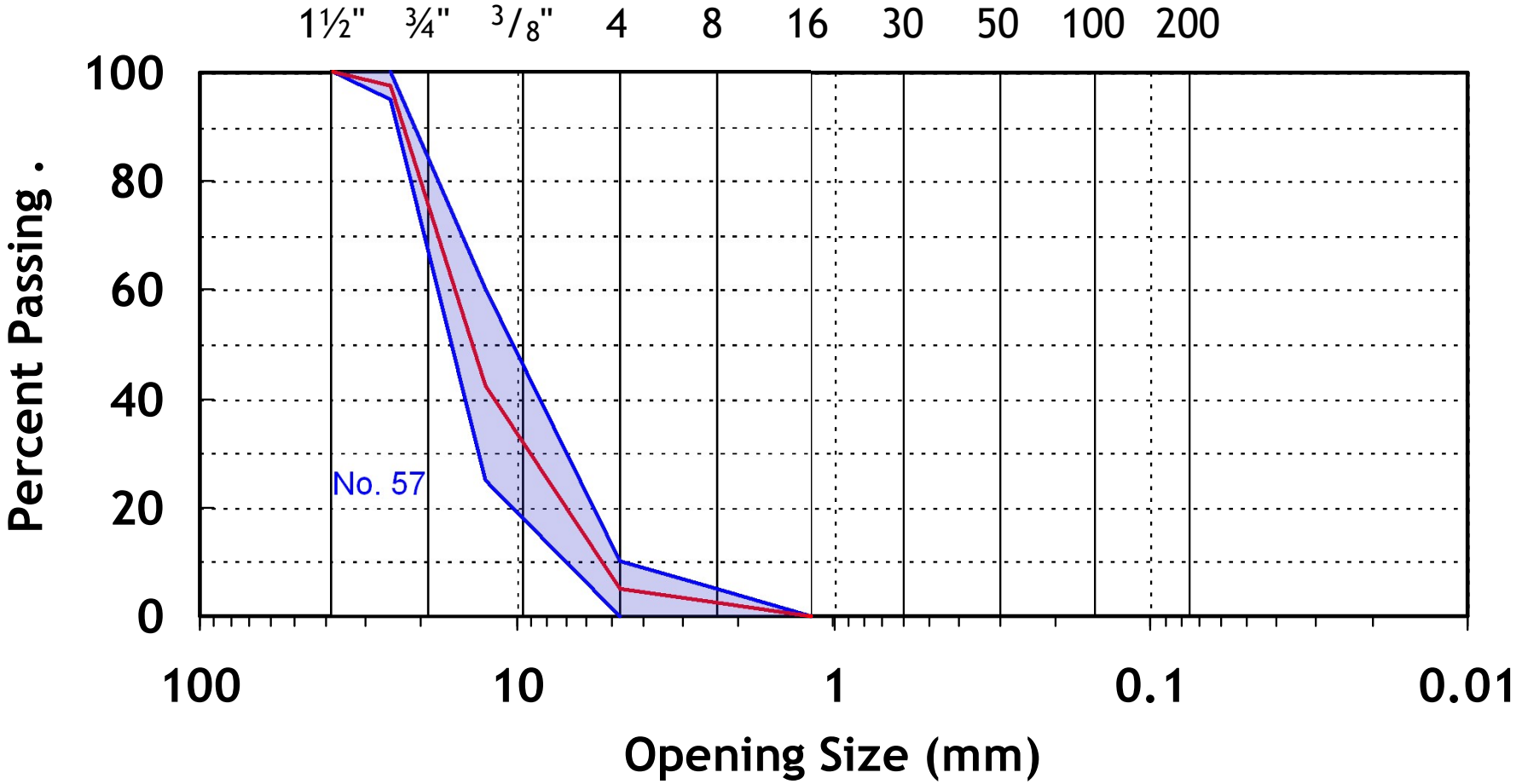
Table 4–3 Standard Classification for Sizes of Aggregate for Road and Bridge Construction (ASTM D448)

Size Number	Nominal Size, Square Openings	Amounts Finer than Each Laboratory Sieve (Square Openings), Weight Percent														
		4 in. (100-mm)	3½-in. (90-mm)	3-in. (75-mm)	2½-in. (63-mm)	2-in. (50-mm)	1½-in. (37.5-mm)	1-in. (25.0-mm)	¾-in. (19.0-mm)	½-in. (12.5-mm)	⅜-in. (9.5-mm)	No. 4 (4.75-mm)	No. 8 (2.36-mm)	No. 16 (1.18-mm)	No. 50 (300-μm)	No. 100 (150-μm)
1	3 ½- to 1 ½-in. (90 to 37.5-mm)	100	90–100	—	25–60	—	0–15	—	0–5	—	—	—	—	—	—	—
2	2 ½- to 1 ½-in. (63 to 37.5-mm)	—	—	100	90–100	35–70	0–15	—	0–5	—	—	—	—	—	—	—
24	2 ½- to ¾-in. (63 to 19.0-mm)	—	—	100	90–100	—	25–60	—	0–10	0–5	—	—	—	—	—	—
3	2- to 1-in. (50 to 25.0-mm)	—	—	—	100	90–100	35–70	0–15	—	0–5	—	—	—	—	—	—
357	2-in. to No. 4 (50 to 4.75-mm)	—	—	—	100	95–100	—	35–70	—	10–30	—	0–5	—	—	—	—
4	1 ½- to ¾-in. (37.5 to 19.0-mm)	—	—	—	—	100	90–100	20–55	0–15	—	0–5	—	—	—	—	—
467	1 ½-in. to No.4 (37.5 to 4.75-mm)	—	—	—	—	100	95–100	—	35–70	—	10–30	0–5	—	—	—	—
5	1- to ½-in. (25.0 to 12.5-mm)	—	—	—	—	—	100	90–100	20–55	0–10	0–5	—	—	—	—	—
56	1- to ⅜-in. (25.0 to 9.5-mm)	—	—	—	—	—	100	90–100	40–85	10–40	0–15	0–5	—	—	—	—
57	1-in. to No. 4 (25.0 to 4.75-mm)	—	—	—	—	—	100	95–100	—	25–60	—	0–10	0–5	—	—	—
6	¾- to ⅜-in. (19.0 to 9.5-mm)	—	—	—	—	—	—	100	90–100	20–55	0–15	0–5	—	—	—	—
67	¾-in. to No. 4 (19.0 to 4.75-mm)	—	—	—	—	—	—	100	90–100	—	20–55	0–10	0–5	—	—	—
68	¾-in. to No. 8 (19.0 to 2.36-mm)	—	—	—	—	—	—	100	90–100	—	30–65	5–25	0–10	0–5	—	—
7	½-in. to No. 4 (12.5 to 4.75-mm)	—	—	—	—	—	—	—	100	90–100	40–70	0–15	0–5	—	—	—
78	½-in. to No. 8 (12.5 to 2.36-mm)	—	—	—	—	—	—	—	100	90–100	40–75	5–25	0–10	0–5	—	—
8	⅜-in. to No. 8 (9.5 to 2.36-mm)	—	—	—	—	—	—	—	—	100	85–100	10–30	0–10	0–5	—	—
89	⅜-in. to No. 16 (9.5 to 1.18-mm)	—	—	—	—	—	—	—	—	100	90–100	20–55	5–30	0–10	0–5	—
9	No. 4 to No. 16 (4.75 to 1.18-mm)	—	—	—	—	—	—	—	—	—	100	85–100	10–40	0–10	0–5	—
10	No. 4 to 0[A] (4.75-mm)	—	—	—	—	—	—	—	—	—	100	85–100	—	—	—	10–30

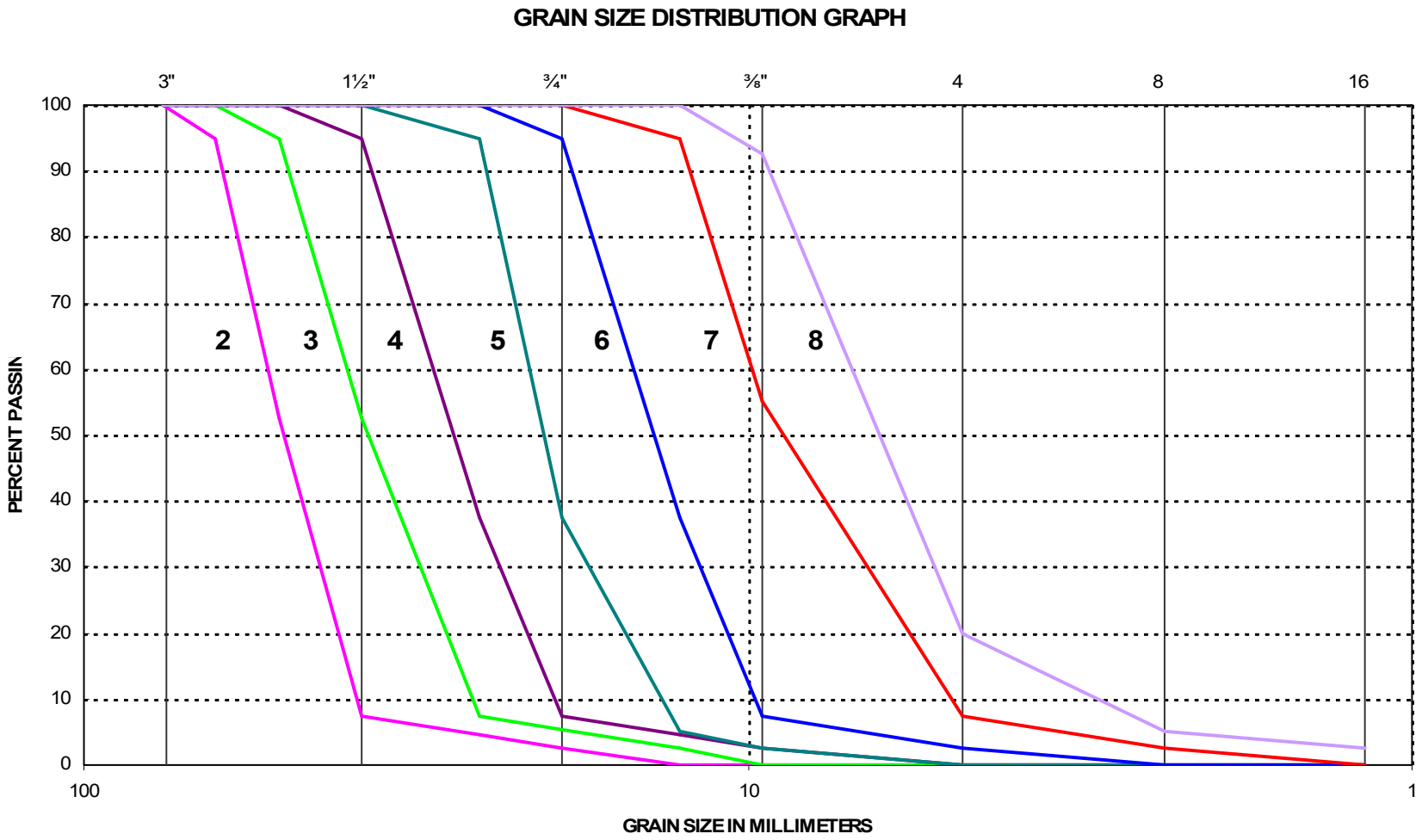
Specifications



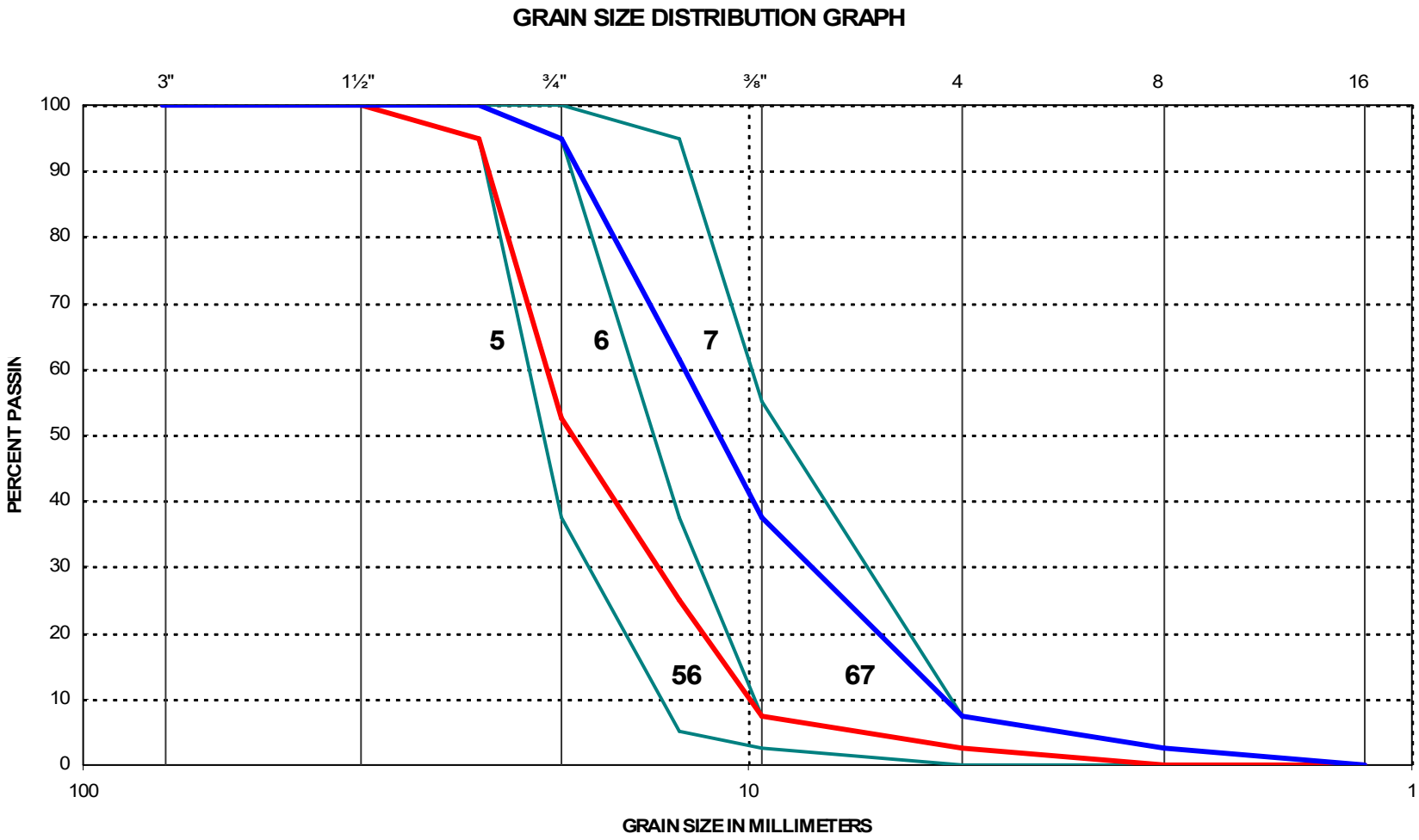
Specifications



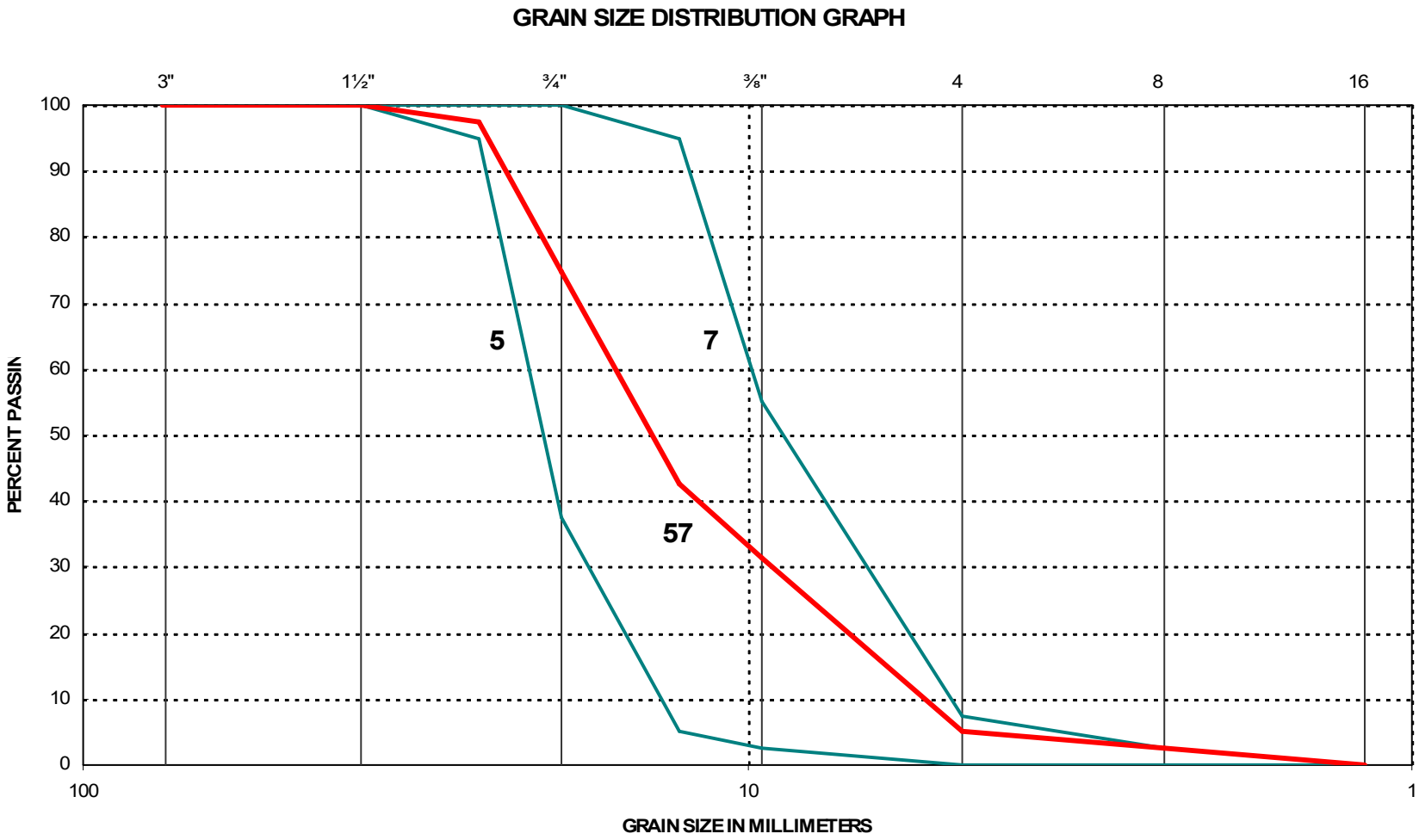
Standard Sizes of Processed Aggregate (ASTM D448)



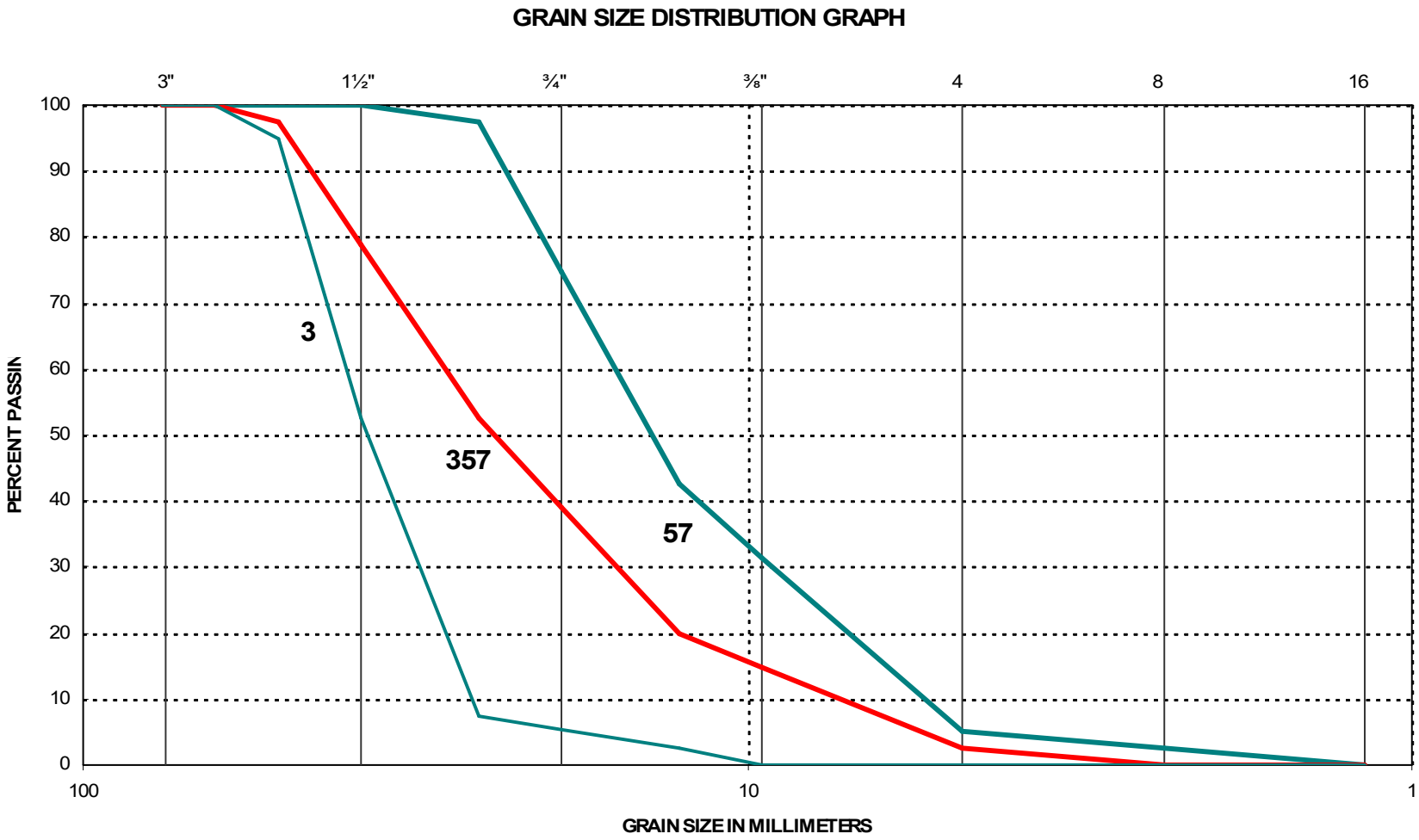
Standard Sizes of Processed Aggregate (ASTM D448)



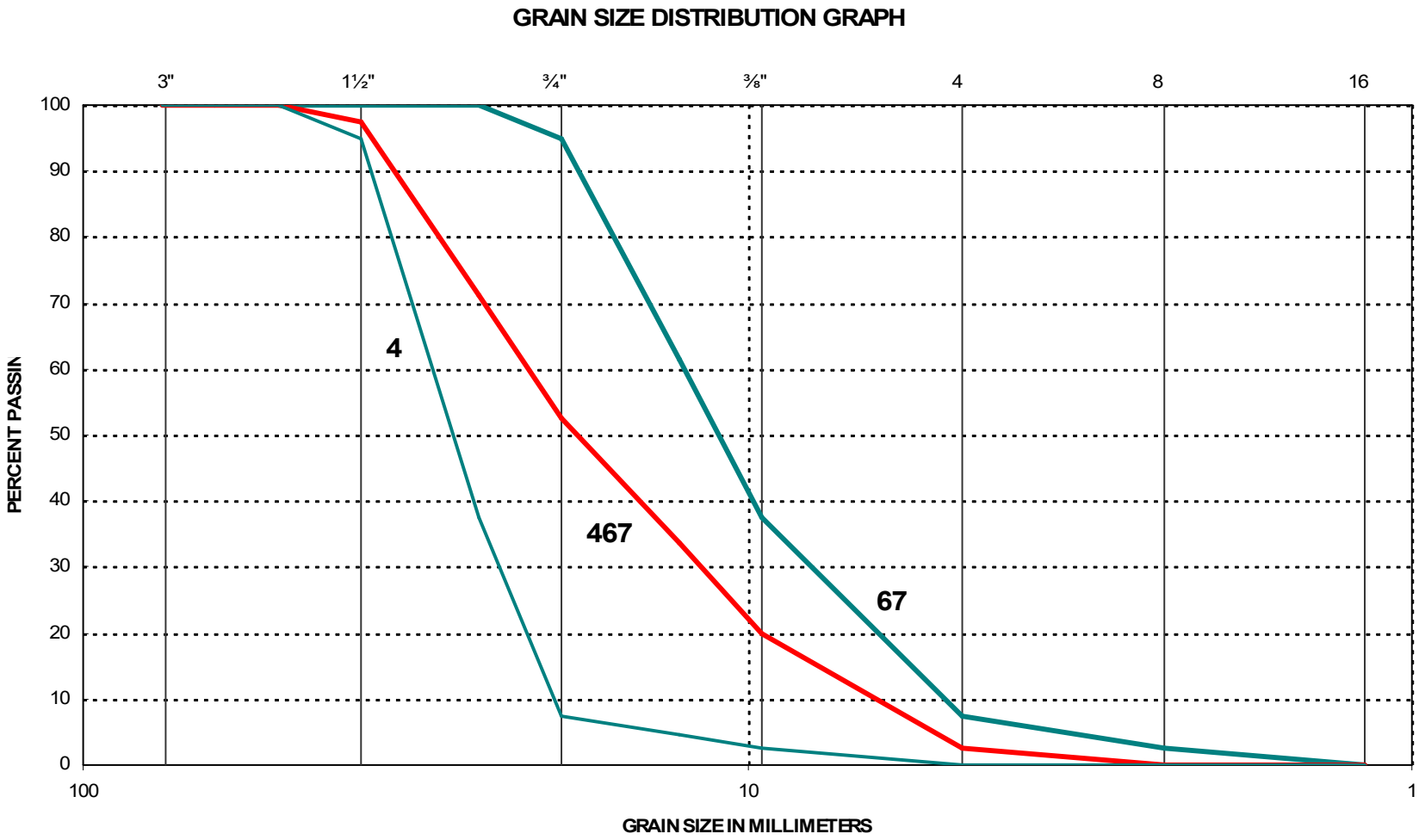
Standard Sizes of Processed Aggregate (ASTM D448)



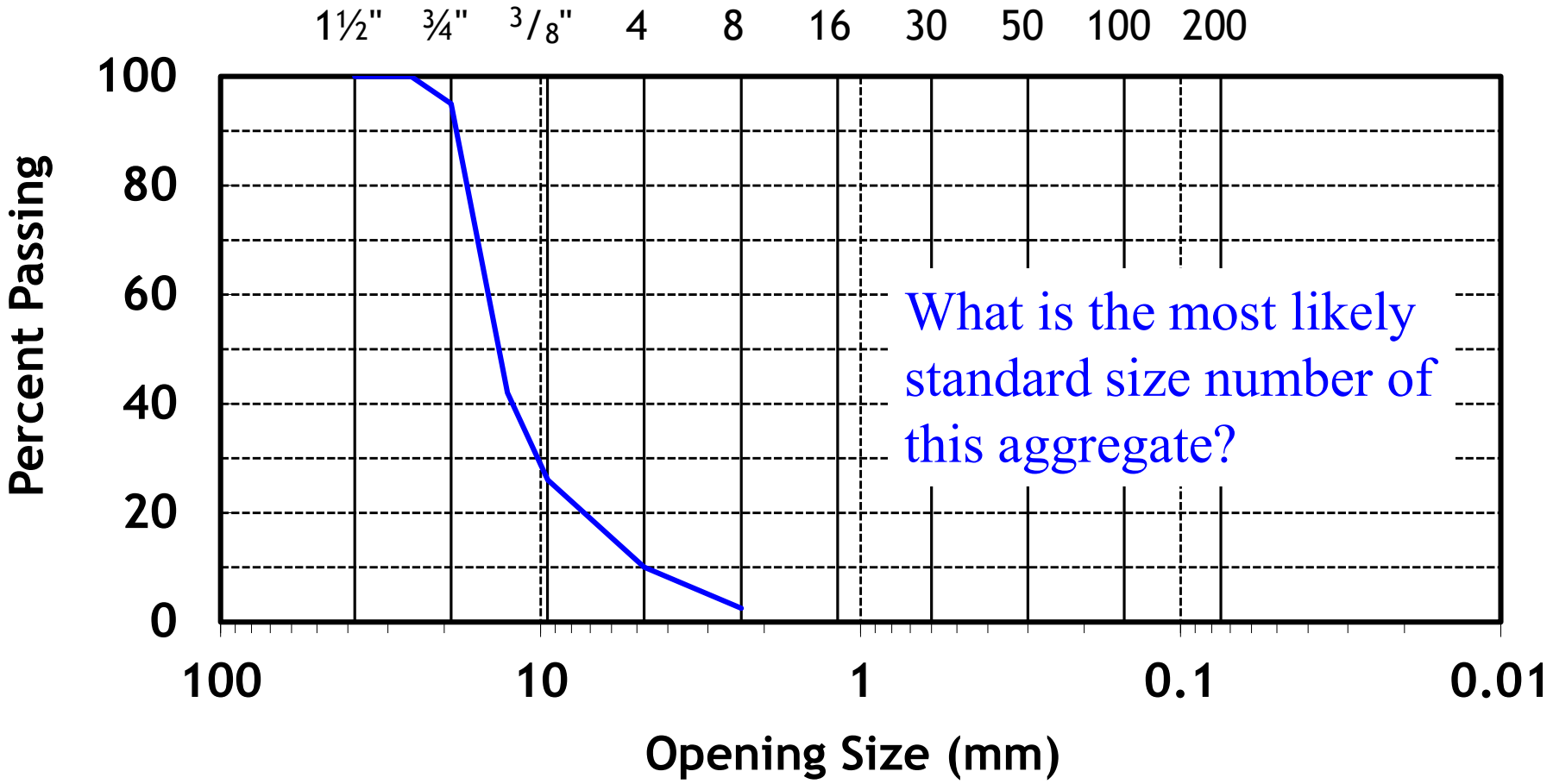
Standard Sizes of Processed Aggregate (ASTM D448)



Standard Sizes of Processed Aggregate (ASTM D448)



Example


1½"
¾"
3/8"
4
8
16
30
50
100
200
100
80
60
40
20
0
Percent Passing
100
10
1
0.1
0.01
Opening Size (mm)
What is the most likely standard size number of this aggregate?

Example

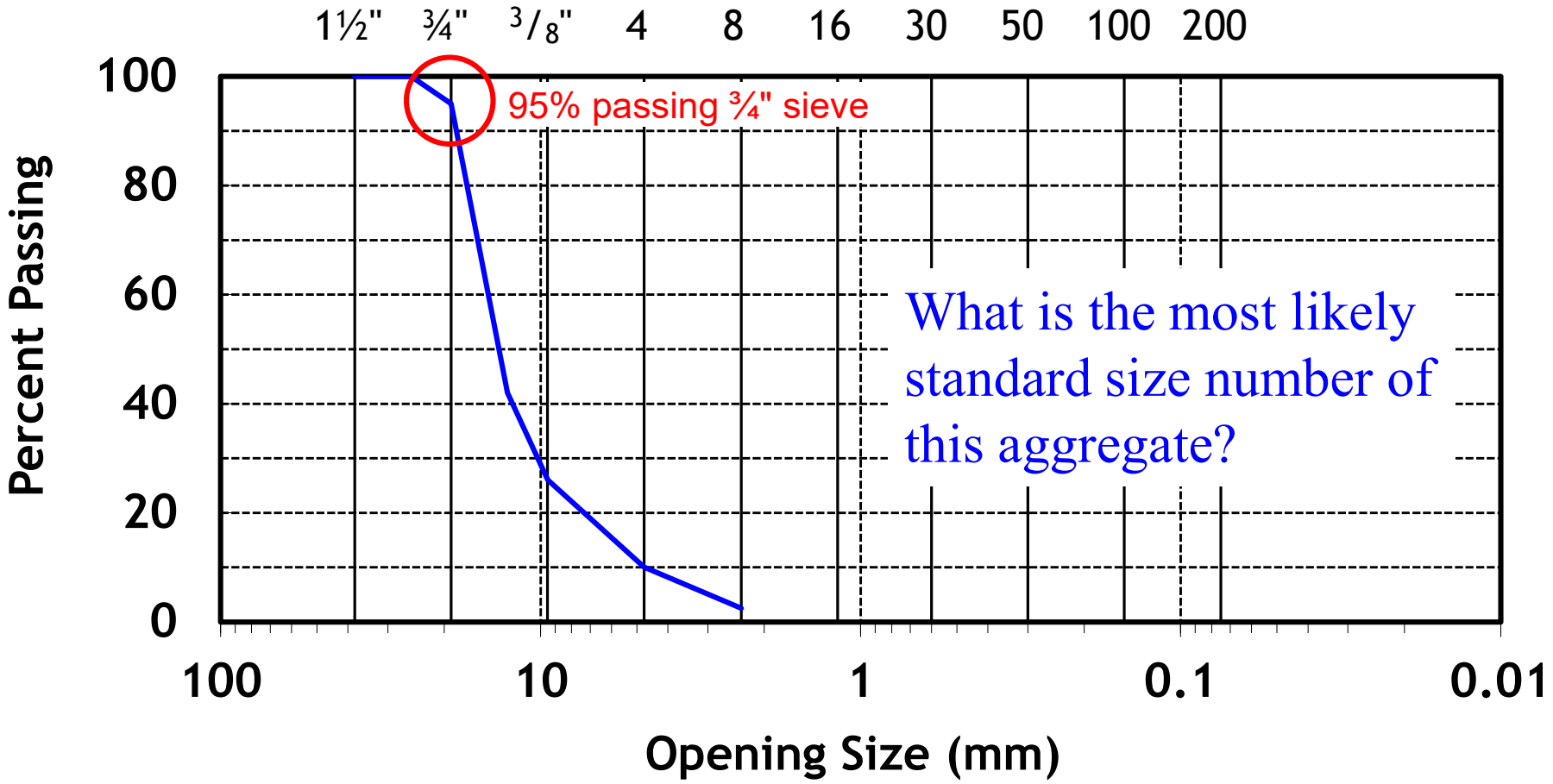

1½"
¾"
3/8"
4
8
16
30
50
100
200
100
80
60
40
20
0
95% passing ¾" sieve
What is the most likely standard size number of this aggregate?
Percent Passing
100
10
1
0.1
0.01
Opening Size (mm)

Table 4-3 Standard Classification for Sizes of Aggregate for Road and Bridge Construction (ASTM D448)

Size Number	Nominal Size, Square Openings	Amounts Finer than Each Laboratory Sieve (Square Openings), Weight Percent														
		4 in. (100-mm)	3½-in. (90-mm)	3-in. (75-mm)	2½-in. (63-mm)	2-in. (50-mm)	1½-in. (37.5-mm)	1-in. (25.0-mm)	¾-in. (19.0-mm)	½-in. (12.5-mm)	⅜-in. (9.5-mm)	No. 4 (4.75-mm)	No. 8 (2.36-mm)	No. 16 (1.18-mm)	No. 50 (300-µm)	No. 100 (150-µm)
1	3 ½- to 1 ½-in. (90 to 37.5-mm)	100	90–100	—	25–60	—	0–15	—	0–5	—	—	—	—	—	—	—
2	2 ½- to 1 ½-in. (63 to 37.5-mm)	—	—	100	90–100	35–70	0–15	—	0–5	—	—	—	—	—	—	—
24	2 ½- to ¾-in. (63 to 19.0-mm)	—	—	100	90–100	—	25–60	—	0–10	0–5	—	—	—	—	—	—
3	2- to 1-in. (50 to 25.0-mm)	—	—	—	100	90–100	35–70	0–15	—	0–5	—	—	—	—	—	—
357	2-in. to No. 4 (50 to 4.75-mm)	—	—	—	100	95–100	—	35–70	—	10–30	—	0–5	—	—	—	—
4	1 ½- to ¾-in. (37.5 to 19.0-mm)	—	—	—	—	100	90–100	20–55	0–15	—	0–5	—	—	—	—	—
467	1 ½-in. to No.4 (37.5 to 4.75-mm)	—	—	—	—	100	95–100	—	35–70	—	10–30	0–5	—	—	—	—
5	1- to ½-in. (25.0 to 12.5-mm)	—	—	—	—	—	100	90–100	20–55	0–10	0–5	—	—	—	—	—
56	1- to ⅜-in. (25.0 to 9.5-mm)	—	—	—	—	—	100	90–100	40–85	10–40	0–15	0–5	—	—	—	—
57	1-in. to No. 4 (25.0 to 4.75-mm)	—	—	—	—	—	100	95–100	—	25–60	—	0–10	0–5	—	—	—
6	¾- to ⅜-in. (19.0 to 9.5-mm)	—	—	—	—	—	—	100	90–100	20–55	0–15	0–5	—	—	—	—
67	¾-in. to No. 4 (19.0 to 4.75-mm)	—	—	—	—	—	—	100	90–100	—	20–55	0–10	0–5	—	—	—
68	¾-in. to No. 8 (19.0 to 2.36-mm)	—	—	—	—	—	—	100	90–100	—	30–65	5–25	0–10	0–5	—	—
7	½-in. to No. 4 (12.5 to 4.75-mm)	—	—	—	—	—	—	—	100	90–100	40–70	0–15	0–5	—	—	—
78	½-in. to No. 8 (12.5 to 2.36-mm)	—	—	—	—	—	—	—	100	90–100	40–75	5–25	0–10	0–5	—	—
8	⅜-in. to No. 8 (9.5 to 2.36-mm)	—	—	—	—	—	—	—	—	100	85–100	10–30	0–10	0–5	—	—
89	⅜-in. to No. 16 (9.5 to 1.18-mm)	—	—	—	—	—	—	—	—	100	90–100	20–55	5–30	0–10	0–5	—
9	No. 4 to No. 16 (4.75 to 1.18-mm)	—	—	—	—	—	—	—	—	—	100	85–100	10–40	0–10	0–5	—
10	No. 4 to 0[A] (4.75-mm)	—	—	—	—	—	—	—	—	—	100	85–100	—	—	—	10–30

Example

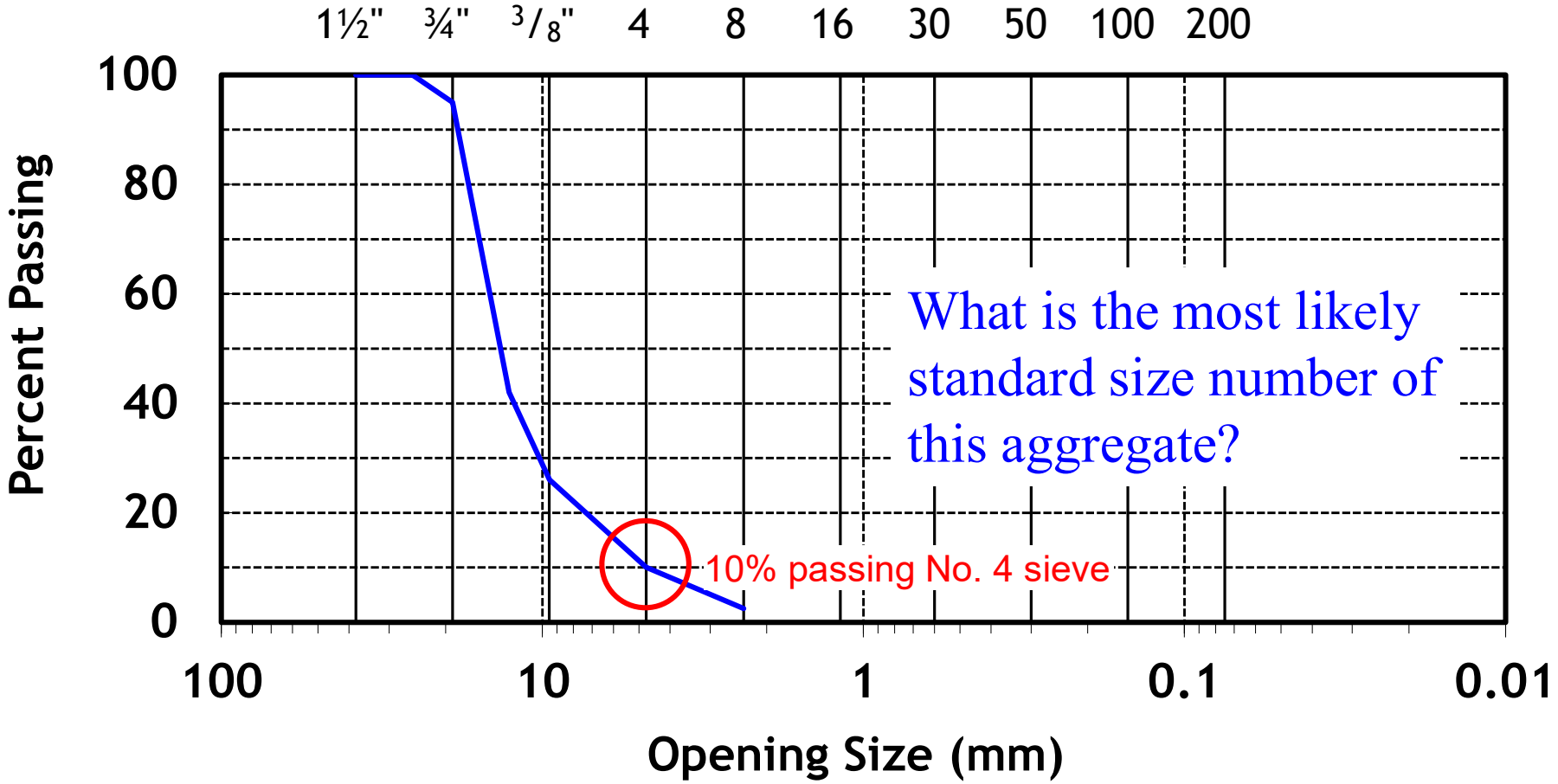

1½"
¾"
3/8"
4
8
16
30
50
100
200
100
80
60
40
20
0
Percent Passing
What is the most likely standard size number of this aggregate?
10% passing No. 4 sieve
100
10
1
0.1
0.01
Opening Size (mm)

Table 4-3 Standard Classification for Sizes of Aggregate for Road and Bridge Construction (ASTM D448)

Size Number	Nominal Size, Square Openings	Amounts Finer than Each Laboratory Sieve (Square Openings), Weight Percent														
		4 in. (100-mm)	3½-in. (90-mm)	3-in. (75-mm)	2½-in. (63-mm)	2-in. (50-mm)	1½-in. (37.5-mm)	1-in. (25.0-mm)	¾-in. (19.0-mm)	½-in. (12.5-mm)	⅜-in. (9.5-mm)	No. 4 (4.75-mm)	No. 8 (2.36-mm)	No. 16 (1.18-mm)	No. 50 (300-μm)	No. 100 (150-μm)
1	3 ½- to 1 ½-in. (90 to 37.5-mm)	100	90–100	—	25–60	—	0–15	—	0–5	—	—	—	—	—	—	—
2	2 ½- to 1 ½-in. (63 to 37.5-mm)	—	—	100	90–100	35–70	0–15	—	0–5	—	—	—	—	—	—	—
24	2 ½- to ¾-in. (63 to 19.0-mm)	—	—	100	90–100	—	25–60	—	0–10	0–5	—	—	—	—	—	—
3	2- to 1-in. (50 to 25.0-mm)	—	—	—	100	90–100	35–70	0–15	—	0–5	—	—	—	—	—	—
357	2-in. to No. 4 (50 to 4.75-mm)	—	—	—	100	95–100	—	35–70	—	10–30	—	0–5	—	—	—	—
4	1 ½- to ¾-in. (37.5 to 19.0-mm)	—	—	—	—	100	90–100	20–55	0–15	—	0–5	—	—	—	—	—
467	1 ½-in. to No.4 (37.5 to 4.75-mm)	—	—	—	—	100	95–100	—	35–70	—	10–30	0–5	—	—	—	—
5	1- to ½-in. (25.0 to 12.5-mm)	—	—	—	—	—	100	90–100	20–55	0–10	0–5	—	—	—	—	—
56	1- to ⅜-in. (25.0 to 9.5-mm)	—	—	—	—	—	100	90–100	40–85	10–40	0–15	0–5	—	—	—	—
57	1-in. to No. 4 (25.0 to 4.75-mm)	—	—	—	—	—	100	95–100	—	25–60	—	0–10	0–5	—	—	—
6	¾- to ⅜-in. (19.0 to 9.5-mm)	—	—	—	—	—	—	100	90–100	20–55	0–15	0–5	—	—	—	—
67	¾-in. to No. 4 (19.0 to 4.75-mm)	—	—	—	—	—	—	100	90–100	—	20–55	0–10	0–5	—	—	—
68	¾-in. to No. 8 (19.0 to 2.36-mm)	—	—	—	—	—	—	100	90–100	—	30–65	5–25	0–10	0–5	—	—
7	½-in. to No. 4 (12.5 to 4.75-mm)	—	—	—	—	—	—	—	100	90–100	40–70	0–15	0–5	—	—	—
78	½-in. to No. 8 (12.5 to 2.36-mm)	—	—	—	—	—	—	—	100	90–100	40–75	5–25	0–10	0–5	—	—
8	⅜-in. to No. 8 (9.5 to 2.36-mm)	—	—	—	—	—	—	—	—	100	85–100	10–30	0–10	0–5	—	—
89	⅜-in. to No. 16 (9.5 to 1.18-mm)	—	—	—	—	—	—	—	—	100	90–100	20–55	5–30	0–10	0–5	—
9	No. 4 to No. 16 (4.75 to 1.18-mm)	—	—	—	—	—	—	—	—	—	100	85–100	10–40	0–10	0–5	—
10	No. 4 to 0[A] (4.75-mm)	—	—	—	—	—	—	—	—	—	100	85–100	—	—	—	10–30

Example

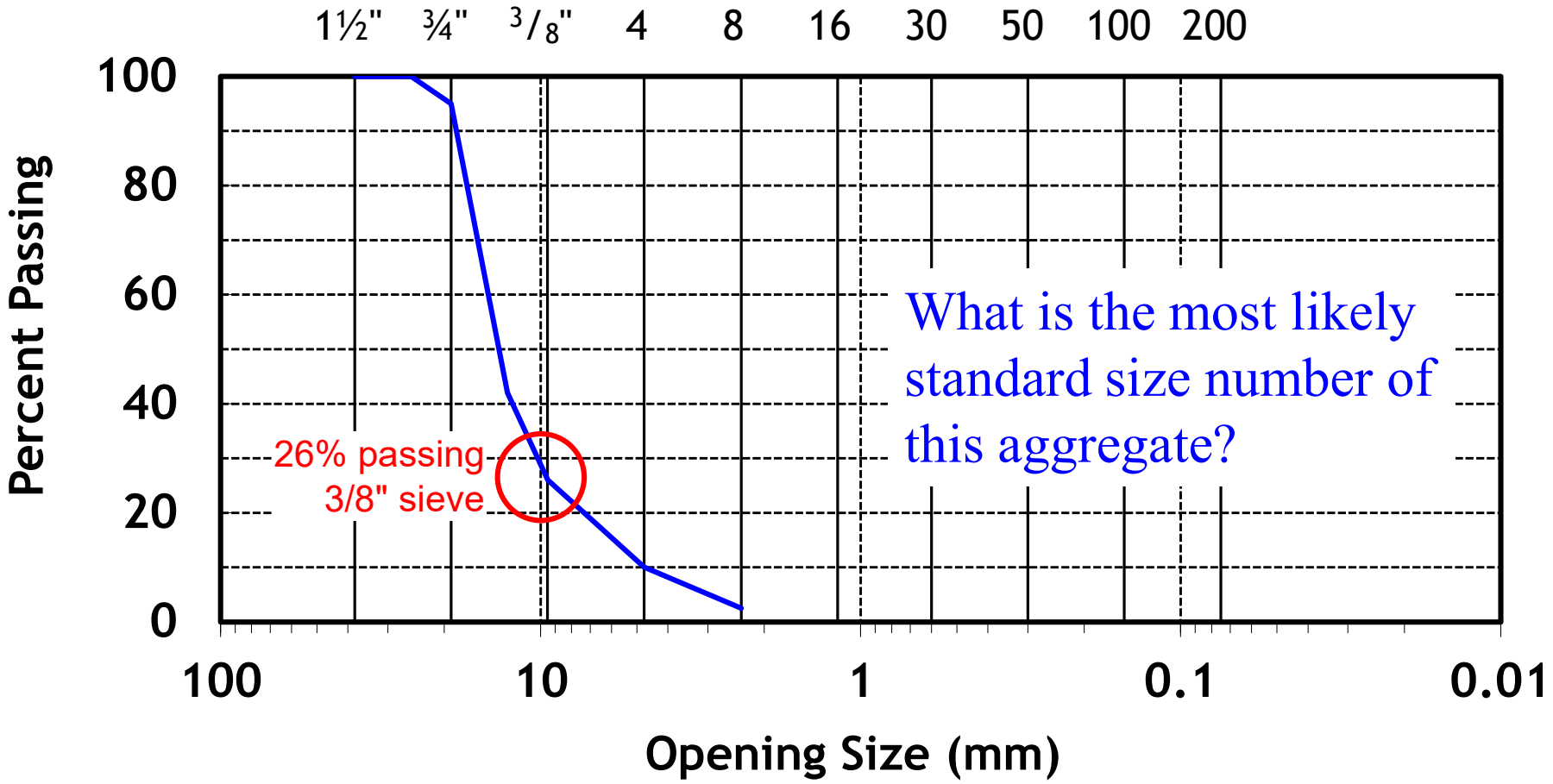

1½"
¾"
3/8"
4
8
16
30
50
100
200
100
80
60
40
20
0
Percent Passing
26% passing
3/8" sieve
What is the most likely standard size number of this aggregate?
100
10
1
0.1
0.01
Opening Size (mm)

Table 4-3 Standard Classification for Sizes of Aggregate for Road and Bridge Construction (ASTM D448)

Size Number	Nominal Size, Square Openings	Amounts Finer than Each Laboratory Sieve (Square Openings), Weight Percent														
		4 in. (100-mm)	3½-in. (90-mm)	3-in. (75-mm)	2½-in. (63-mm)	2-in. (50-mm)	1½-in. (37.5-mm)	1-in. (25.0-mm)	¾-in. (19.0-mm)	½-in. (12.5-mm)	⅜-in. (9.5-mm)	No. 4 (4.75-mm)	No. 8 (2.36-mm)	No. 16 (1.18-mm)	No. 50 (300-µm)	No. 100 (150-µm)
1	3 ½- to 1 ½-in. (90 to 37.5-mm)	100	90–100	—	25–60	—	0–15	—	0–5	—	—	—	—	—	—	—
2	2 ½- to 1 ½-in. (63 to 37.5-mm)	—	—	100	90–100	35–70	0–15	—	0–5	—	—	—	—	—	—	—
24	2 ½- to ¾-in. (63 to 19.0-mm)	—	—	100	90–100	—	25–60	—	0–10	0–5	—	—	—	—	—	—
3	2- to 1-in. (50 to 25.0-mm)	—	—	—	100	90–100	35–70	0–15	—	0–5	—	—	—	—	—	—
357	2-in. to No. 4 (50 to 4.75-mm)	—	—	—	100	95–100	—	35–70	—	10–30	—	0–5	—	—	—	—
4	1 ½- to ¾-in. (37.5 to 19.0-mm)	—	—	—	—	100	90–100	20–55	0–15	—	0–5	—	—	—	—	—
467	1 ½-in. to No.4 (37.5 to 4.75-mm)	—	—	—	—	100	95–100	—	35–70	—	10–30	0–5	—	—	—	—
5	1- to ½-in. (25.0 to 12.5-mm)	—	—	—	—	—	100	90–100	20–55	0–10	0–5	—	—	—	—	—
56	1- to ⅜-in. (25.0 to 9.5-mm)	—	—	—	—	—	100	90–100	40–85	10–40	0–15	0–5	—	—	—	—
57	1-in. to No. 4 (25.0 to 4.75-mm)	—	—	—	—	—	100	95–100	—	25–60	—	0–10	0–5	—	—	—
6	¾- to ⅜-in. (19.0 to 9.5-mm)	—	—	—	—	—	—	100	90–100	20–55	0–15	0–5	—	—	—	—
67	¾-in. to No. 4 (19.0 to 4.75-mm)	—	—	—	—	—	—	100	90–100	—	20–55	0–10	0–5	—	—	—
68	¾-in. to No. 8 (19.0 to 2.36-mm)	—	—	—	—	—	—	100	90–100	—	30–65	5–25	0–10	0–5	—	—
7	½-in. to No. 4 (12.5 to 4.75-mm)	—	—	—	—	—	—	—	100	90–100	40–70	0–15	0–5	—	—	—
78	½-in. to No. 8 (12.5 to 2.36-mm)	—	—	—	—	—	—	—	100	90–100	40–75	5–25	0–10	0–5	—	—
8	⅜-in. to No. 8 (9.5 to 2.36-mm)	—	—	—	—	—	—	—	—	100	85–100	10–30	0–10	0–5	—	—
89	⅜-in. to No. 16 (9.5 to 1.18-mm)	—	—	—	—	—	—	—	—	100	90–100	20–55	5–30	0–10	0–5	—
9	No. 4 to No. 16 (4.75 to 1.18-mm)	—	—	—	—	—	—	—	—	—	100	85–100	10–40	0–10	0–5	—
10	No. 4 to 0[A] (4.75-mm)	—	—	—	—	—	—	—	—	—	100	85–100	—	—	—	10–30