



Standard Specification for Aggregate for Masonry Mortar¹

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

1. Scope

1.1 This specification covers aggregate for use in masonry mortar.

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

1.3 The following precautionary caveat pertains only to the test methods portion, Section 7, of this standard. *This standard does not purport to address all of the safety problems, 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.*

2. Referenced Documents

2.1 ASTM Standards:

- C 40 Test Method for Organic Impurities in Fine Aggregates for Concrete²
- C 87 Test Method for Effect of Organic Impurities in Fine Aggregate on Strength of Mortar²
- C 88 Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate²
- C 117 Test Method for Materials Finer than 75- μ m (No. 200) Sieve in Mineral Aggregates by Washing²
- C 123 Test Method for Lightweight Pieces in Aggregate²
- C 128 Test Method for Specific Gravity and Absorption of Fine Aggregate²
- C 136 Test Method for Sieve Analysis of Fine and Coarse Aggregates²
- C 142 Test Method for Clay Lumps and Friable Particles in Aggregates²
- C 270 Specification for Mortar for Unit Masonry³
- C 404 Specification for Aggregates for Masonry Grout³

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² Annual Book of ASTM Standards, Vol 04.02.

³ Annual Book of ASTM Standards, Vol 04.05.

D 75 Practice for Sampling Aggregates⁴

3. Materials and Manufacture

3.1 Aggregate for use in masonry mortar shall consist of natural sand or manufactured sand. Manufactured sand is the product obtained by crushing stone, gravel, or air-cooled iron blast-furnace slag specially processed to ensure suitable gradation.

NOTE 1—Care should be taken to ensure a suitable particle shape, since excessive quantities of flat and elongated particles have historically caused problems with workability.

4. Grading

4.1 Aggregate for use in masonry mortar shall be graded within the following limits, depending upon whether natural sand or manufactured sand is to be used:

Sieve Size	Percent Passing	
	Natural Sand	Manufactured Sand
4.75-mm (No. 4)	100	100
2.36-mm (No. 8)	95 to 100	95 to 100
1.18-mm (No. 16)	70 to 100	70 to 100
600- μ m (No. 30)	40 to 75	40 to 75
300- μ m (No. 50)	10 to 35	20 to 40
150- μ m (No. 100)	2 to 15	10 to 25
75- μ m (No. 200)	0 to 5	0 to 10

4.2 The aggregate shall not have more than 50 % retained between any two consecutive sieves of those listed in 4.1 nor more than 25 % between 300- μ m (No. 50) and the 150- μ m (No. 100) sieve.

4.3 If the fineness modulus varies by more than 0.20 from the value assumed in selecting proportions for the mortar, the aggregate shall be rejected unless suitable adjustments are made in proportions to compensate for the change in grading.

NOTE 2—For heavy construction employing joints thicker than 12.5 mm ($\frac{1}{2}$ in.), a coarser aggregate may be desirable; for such work a fine aggregate conforming to Specification C 404 is satisfactory.

4.4 When an aggregate fails the gradation limits specified in 4.1 and 4.2, it may be used provided the mortar can be prepared

⁴ Annual Book of ASTM Standards, Vol 04.03.

to comply with the aggregate ratio, water retention, air content, and compressive strength requirements of the property specifications of Specification C 270.

5. Composition

5.1 *Deleterious Substances*—The amount of deleterious substances in aggregate for masonry mortar, each determined on independent samples complying with the grading requirements of Section 4, shall not exceed the following:

Item	Maximum Permissible Weight Percent
Friable particles	1.0
Lightweight particles, floating on liquid having a specific gravity of 2.0	0.5 ^A

^A This requirement does not apply to blast-furnace slag aggregate.

5.2 Organic Impurities:

5.2.1 The aggregate shall be free of injurious amounts of organic impurities. Except as herein provided, aggregates subjected to the test for organic impurities and producing a color darker than the standard shall be rejected.

5.2.2 Aggregate failing in the test may be used, provided that the discoloration is due principally to the presence of small quantities of coal, lignite, or similar discrete particles.

5.2.3 Aggregate failing in the test may be used provided that, when tested for the effect of organic impurities on strength of mortar, the relative strength at seven days calculated in accordance with the Procedure Section of Test Method C 87, is not less than 95 %.

6. Soundness

6.1 Except as herein provided, aggregate subjected to five cycles of the soundness test shall show a loss, weighted in accordance with the grading of a sample complying with the

limitations set forth in Section 4, not greater than 10 % when sodium sulfate is used or 15 % when magnesium sulfate is used.

6.2 Aggregate failing to meet the requirements of 6.1 may be accepted, provided that mortar of comparable properties made from similar aggregates from the same source has been exposed to weathering, similar to that to be encountered, for a period of more than five years without appreciable disintegration.

7. Test Methods for Sampling and Testing

7.1 Sample and test the aggregate in accordance with the following standards, except as otherwise provided in this specification:

7.1.1 *Sampling*—Practice D 75.

7.1.2 *Sieve Analysis and Fineness Modulus*—Method C 136.

7.1.3 *Amount of Material Finer Than (75- μ m) No. 200 Sieve*—Test Method C 117.

7.1.4 *Organic Impurities*—Test Method C 40.

7.1.5 *Effect of Organic Impurities on Strength*—Test Method C 87.

7.1.6 *Friable Particles*—Test Method C 142.

7.1.7 *Lightweight Constituents*—Test Method C 123.

7.1.8 *Soundness*—Test Method C 88.

7.1.9 *Density*—Determine the density of the fine aggregate in accordance with Test Method C 128. In calculating the air content of mortars, use the method described in Specification C 270.

8. Keywords

8.1 aggregate; fine aggregate; masonry; mortar; sand; soundness

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