



Designation: C1372 – 17

Standard Specification for Dry-Cast Segmental Retaining Wall Units¹

This standard is issued under the fixed designation C1372; 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 dry-cast segmental retaining wall units of concrete, machine-made from hydraulic cement, water, and suitable mineral aggregates with or without the inclusion of other materials. The units are intended for use in the construction of mortarless segmental retaining walls.

NOTE 1—When particular features are desired, such as density classification, higher compressive strength, surface texture, finish, color, or other special features, such properties should be specified separately by the purchaser. Suppliers should be consulted as to availability of units having the desired features.

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

1.3 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.

1.4 *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:²

- C33 Specification for Concrete Aggregates
- C140 Test Methods for Sampling and Testing Concrete Masonry Units and Related Units
- C150 Specification for Portland Cement
- C331 Specification for Lightweight Aggregates for Concrete Masonry Units

¹ This specification is under the jurisdiction of ASTM Committee C15 on Manufactured Masonry Units and is the direct responsibility of C15.03 on Concrete Masonry Units and Related Units.

Current edition approved Aug. 1, 2017. Published August 2017. Originally approved in 1997. Last previous edition approved in 2016 as C1372 – 16. DOI: 10.1520/C1372-17.

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.

- C595 Specification for Blended Hydraulic Cements
- C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- C989 Specification for Slag Cement for Use in Concrete and Mortars
- C1157 Performance Specification for Hydraulic Cement
- C1232 Terminology for Masonry
- C1262 Test Method for Evaluating the Freeze-Thaw Durability of Dry-Cast Segmental Retaining Wall Units and Related Concrete Units

3. Terminology

3.1 Terminology defined in Terminology C1232 shall apply for this specification.

3.2 Definitions:

3.2.1 *Dry-cast, adj*—manufacturing concrete products using low frequency, high amplitude vibration to consolidate concrete of stiff or extremely dry consistency in a form.

3.2.2 *segmental retaining wall unit, n*—unit manufactured of concrete for the construction of dry-stacked earth retaining walls.

3.2.3 *segmental retaining wall unit, dry-cast, n*—a segmental retaining wall unit manufactured of concrete using a dry-cast process.

4. Materials

4.1 *Cementitious Materials*—Materials shall conform to the following applicable specifications:

4.1.1 *Portland Cements*—Specification C150.

4.1.2 *Modified Portland Cement*—Portland cement conforming to Specification C150, modified as follows:

4.1.2.1 *Limestone*—Limestone, with a minimum 85 % Calcium Carbonate (CaCO₃) content, shall be permitted to be added to the cement, provided these requirements of Specification C150 as modified are met:

(1) Limitation on Insoluble Residue—1.5 %.

(2) Limitation on Air Content of Mortar—Volume percent, 22 % max.

(3) Limitation on Loss of Ignition—7 %.

4.1.3 *Blended Hydraulic Cements*—Specification C595.

4.1.4 *Hydraulic Cement*—Specification C1157.

4.1.5 *Pozzolans*—Specification C618.

4.1.6 *Blast Furnace Slag Cement*—Specification C989.

*A Summary of Changes section appears at the end of this standard

4.2 *Aggregates*—Aggregates shall conform to the following specifications, except that grading requirements shall not necessarily apply:

4.2.1 *Normal Weight Aggregates*—Specification C33.

4.2.2 *Lightweight Aggregates*—Specification C331.

4.3 *Other Constituents*—Air-entraining agents, coloring pigments, integral water repellents, finely ground silica, and other constituents shall be previously established as suitable for use in segmental retaining wall units and shall conform to applicable ASTM standards or shall be shown by test or experience to be not detrimental to the durability of the segmental retaining wall units or any material customarily used in segmental retaining wall construction.

5. Physical Requirements

5.1 At the time of delivery to the work site, the units shall conform to the physical requirements of Table 1 when tested in accordance with 8.2. All units shall be sound and free of cracks or other defects that interfere with the proper placement of the units or significantly impair the strength or permanence of the construction. Minor cracks incidental to the usual method of manufacture or minor chipping resulting from customary methods of handling in shipment and delivery are not grounds for rejection.

5.1.1 When higher compressive strengths than those listed in Table 1 are specified, the tested average net area compressive strength of three units shall equal or exceed the specified compressive strength, and the following single unit strength requirements shall apply.

5.1.1.1 When the specified compressive strength is less than 5000 psi, no single unit net area compressive strength test result shall be less than the specified compressive strength minus 500 psi.

5.1.1.2 When the specified compressive strength is 5000 psi or greater, no single unit net area compressive strength test result shall be less than 90 % of the specified compressive strength.

5.2 *Freeze-Thaw Durability*—In areas where repeated freezing and thawing under saturated conditions occur, freeze-thaw durability shall be demonstrated by test or by proven field performance that the segmental retaining wall units have adequate durability for the intended use. When testing is required by the specifier to demonstrate freeze-thaw durability, the units shall be tested in accordance with 8.3.

5.2.1 Specimens shall comply with either of the following: (1) the weight loss of each of five test specimens at the conclusion of 100 cycles shall not exceed 1 % of its initial weight; or (2) the weight loss of each of four of the five test

specimens at the conclusion of 150 cycles shall not exceed 1.5 % of its initial weight.

6. Permissible Variations in Dimensions

6.1 Overall dimensions for width, height, and length shall differ by not more than $\pm \frac{1}{8}$ in. (3.2 mm) from the specified standard dimensions.

NOTE 2—The term “width” refers to the horizontal dimension of the unit measured perpendicular to the face of the wall from the exposed surface of the unit to the back of the unit. The term “height” refers to the vertical dimension of the unit as placed in the wall. The term “length” refers to the horizontal dimension of the unit measured parallel to the running length of the wall.

6.1.1 Dimensional tolerance requirements for width shall be waived for architectural surfaces.

NOTE 3—Split-faced surfaces are the most common surfaces used to provide an architectural appearance to segmental retaining walls. However, other means could be used to obtain similar architectural effects like tumbling, grinding, and slumping.

7. Finish and Appearance

7.1 No more than 5 % of the units in the shipment shall exhibit one or more of the characteristics described in 7.1.1 through 7.1.4 and 7.2.

7.1.1 Units with dimensions not meeting the requirements of 6.1.

7.1.2 Units with finished face(s) containing chips larger than 1 in. (25.4 mm) in any direction.

7.1.3 Units with finished face(s) containing cracks wider than 0.02 in. (0.5 mm) and longer than 25 % of the nominal height of the unit.

7.1.4 Units that are broken.

NOTE 4—Units specified to have particular features or finishes, such as split-face and tumbled units, should not be evaluated for conformance of such features to the requirements of 7.1.2.

7.2 Where units are to be used in exposed wall construction, the face or faces that are to be exposed shall not show chips or cracks, except as permitted in 7.1.2 and 7.1.3, or other imperfections when viewed from a distance of not less than 20 ft (6.1 m) under diffused lighting.

7.3 The color and texture of units shall be specified by the purchaser. The finished surface that will be exposed in place shall conform to an approved sample consisting of not less than four units, representing the range of texture and color permitted.

NOTE 5—Segmental retaining wall units are produced using a wide variety of natural aggregates and other materials. As such, slight variations inherent from natural materials should be expected. Since specifying units

TABLE 1 Strength, Absorption, and Density Classification Requirements^A

Density Classification	Oven-Dry Density of Concrete lb/ft ³ (kg/m ³)	Maximum Water Absorption lb/ft ³ (kg/m ³)		Minimum Net Area Compressive Strength lb/in. ² (MPa)	
	Average of Three Units	Average of Three Units	Individual Units	Average of Three Units	Individual Units
Lightweight	Less than 105 (1680)	18 (288)	20 (320)	3000 (20.7)	2500 (17.2)
Medium Weight	105 to less than 125 (1680 to 2000)	15 (240)	17 (272)	3000 (20.7)	2500 (17.2)
Normal Weight	125 (2000) or more	13 (208)	15 (240)	3000 (20.7)	2500 (17.2)

^A Consult manufacturers for available densities.

and approving samples can take place several months prior to production of actual units for a project, slight variations in appearance from the approved sample are to be expected.

8. Sampling and Testing

8.1 The purchaser or authorized representative shall be accorded proper facilities to inspect and sample units at the place of manufacture from the lots ready for delivery.

8.2 Compressive strength, absorption, density, and dimensional tolerances shall be based on tests of segmental retaining wall units of any configuration or dimensions made with the same materials, concrete mix design, manufacturing process, and curing method, conducted in accordance with Test Methods C140 and not more than 12 months prior to delivery.

8.3 When required, freeze-thaw durability shall be based on tests of segmental retaining wall units of any configuration or dimension made with the same materials, concrete mix design, manufacturing process, and curing method, conducted in accordance with Test Method C1262 using potable tap water as the test solution and not more than 24 months prior to delivery.

9. Compliance

9.1 If a sample fails to conform to the specified requirements, the manufacturer shall be permitted to remove

units from the shipment. A new sample shall be selected by the purchaser from remaining units from the shipment with a similar configuration and dimension and tested at the expense of the manufacturer. If the second sample meets the specified requirements, the remaining portion of the shipment represented by the sample meets the specified requirements. If the second sample fails to meet the specified requirements, the remaining portion of the shipment represented by the sample fails to meet the specified requirements.

NOTE 6—Unless otherwise specified in the purchase order, the cost of tests is typically borne as follows: (1) if the results of the tests show that the units do not conform to the requirements of this specification, the cost is typically borne by the seller; (2) if the results of the tests show that the units conform to the specification requirements, the cost is typically borne by the purchaser.

10. Keywords

10.1 absorption; aggregates; cementitious materials; compressive strength; concrete masonry units; density classification; dimensions; durability

SUMMARY OF CHANGES

Committee C15 has identified the location of selected changes to this standard since the last issue (C1372 – 16) that may impact the use of this standard. (August 1, 2017)

(1) Modified testing frequency in Section 8 to be based on time of delivery.

Committee C15 has identified the location of selected changes to this standard since the last issue (C1372 – 14a) that may impact the use of this standard. (June 1, 2016)

(1) Modified 8.3 to clarify that water is to be used as the test solution for freeze-thaw testing.

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