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## CAN CARDBOARD FORMS BE USED TO FABRICATE GROUT COMPRESSION SPECIMENS?

Yes, when specific criteria are met. The compressive strength testing of masonry grout is covered under ASTM C1019 *Standard Test Method for Sampling and Testing Grout*. Prior to 2009, ASTM C1019 did not explicitly contain provisions for forming grout compression specimens by means other than using masonry units to form the mold. Instead, historical editions of ASTM C1019 contained the following guidance for those opting to use alternative forming procedures, such as cardboard forms, to mold grout compression specimens:

NOTE 6 – Other methods of obtaining grout specimens and specimens of different geometry have been employed in grout testing, but are not described in this test method. Other methods used to obtain grout specimens include: drilling grout-filled cores of regular units; filling cores of masonry units specifically manufactured to provide grout specimens; filling compartments in slotted corrugated cardboard boxes specifically manufactured to provide grout specimens; and forming specimens from different sized masonry units of the same or similar material. Since test results vary with methods of forming and specimen geometry, comparative test results between the specimen described in this test method and the proposed specimen should be required and confined to a single specimen shape and method of forming.

In 2009, new provisions were introduced into ASTM C1019 that explicitly permitted the use of alternative molding techniques, including cardboard grout boxes. The use and limitations related to alternative molding techniques are detailed in Section 6.2 of ASTM C1019-13[1]:

6.2 *Alternative Methods* – Alternative methods of forming the specimens shall be used only with the approval of the specifier. Such approval shall be based

on comparative testing of grout specimens constructed from molds as described in 6.1 and the alternative method. Approval shall be limited to a single specimen shape, method of forming, masonry units used, and grout mix. A conversion factor based on comparative testing of a minimum of ten pairs of specimens shall be used to modify results from alternative methods.

ASTM C1019 recognizes that there will likely be a difference between the compressive strength obtained from specimens formed in molds using masonry units to those obtained through alternative forming methods. To account for this, ASTM C1019 requires comparative testing between the conventional and alternative methods to establish a correlation factor to adjust the measured compressive strength. This correlation factor applies only to the combination of specimen shape, forming method, masonry units, and grout mix used to establish the value.

ASTM C1019 also requires the following additional information to be reported when using alternative forming methods:

- Description of the method used;
- Conversion factor used to account for differences in method of forming and reference to supporting documentation of conversion factor determination, if not based on results included in this testing report;
- Average corrected compressive strength; and
- Coefficient of variation of the compressive strengths of the standard forming method to the alternative method.

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## REFERENCES

1. ASTM C1019, 2013, "Standard Test Method for Sampling and Testing Grout", ASTM International, [www.astm.org](http://www.astm.org)

## ABOUT CMHA

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