



Standard Practice for Preparing Refractory Castable Specimens by Cold Gunning¹

This standard is issued under the fixed designation C 903; 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 practice covers a procedure for preparing refractory castable specimens usually containing calcium aluminate cement with or without metal fibers by cold nozzle-mix gunning. Specimens prepared in accordance with this practice are intended for use in standard ASTM test methods required for evaluating gunned materials.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are provided for information only.

1.3 *This standard does not purport to address all of the safety concerns, 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 401 Classification of Alumina and Alumina-Silicate Castable Refractories²

C 865 Practice for Firing Refractory Concrete Specimens²

3. Significance and Use

3.1 The properties of refractory castables can be affected by their method of installation. This practice attempts to minimize the variables encountered during installation by pneumatic gunning.

3.2 This practice provides parameters to produce gunned specimens for use in other ASTM test methods.

3.3 This practice may be used to produce specimens for acceptance testing, service evaluation, manufacturing control, and research and development.

3.4 Differences between various kinds of equipment and the differences in procedures and operator techniques may result in significant variations in the physical properties of the gunned specimens. It is recommended that the same operator use the same equipment to produce specimens for referee testing agreed to by the involved testing parties. The specific operating parameters should be shown in the report.

3.5 Although this practice is specifically designed for re-

fractory castables containing calcium aluminate cement, it may be used with minor modifications for gun mixes containing other bond systems.

4. Apparatus

4.1 *Gun*, pneumatic nozzle-mix.³ At least 50 ft (15.2 m) of hose should be available. Acceptable nozzle diameters range from 1 to 2 in. (25 to 51 mm).

4.2 *Air Compressor*, capable of delivering sufficient pressure and volume to adequately move castable to the gun. The compressor should be able to supply at least 250 ft³ (7 m³)/min.

4.3 *Forms*, suitable nonabsorbent type, which will vary in size in accordance with the number of samples being prepared, but are typically 36 by 36 by 5½ in. (915 by 915 by 140 mm). Forms should be sized to prevent rebound entrapment. The use of ½ inch hardware cloth as sidewalls of the form allows most of the rebound to pass through. This reduces the size of the form required to achieve the desired standard sized central portion of 24 by 24 in. (610 by 610 mm).

4.4 Suitable eye and hand protection must be worn capable of protection against high velocity refractory particles and steel fibers.

5. Procedure

5.1 Store the castable to be gunned at 70 to 85°F (20 to 27°C) for 24 h prior to gunning.

5.2 Oil the forms lightly. Typically 10W-30 oil is used. Place the form against a rigid surface at an angle of 80 to 90° to the horizontal.

5.3 If recommended by the supplier, predampen the castable by mixing with potable water in a paddle mixer for 1 to 5 min or follow manufacturer's specific instructions. In general, regular (dense) castables require 2 to 4 % of predampening water and lightweight (insulating) castables require 5 to 8 %.

NOTE 1—Castables that contain a high-purity cement may benefit by aging for 5 to 10 min after dampening before gunning. This "aging" procedure should be used if gunning without it produces excessive rebound, dusting, or slumping.

NOTE 2—Treat castables containing metal fibers in a normal manner. If metal fibers are to be added to the gunning material, add them to the paddle mixer before any water is introduced. The amount of fiber to be added and the methods of reporting this amount shall be agreed upon by

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² *Annual Book of ASTM Standards*, Vol 15.01.

³ Equipment available from Allentown Pneumatic Gun Co., P.O. Box 185, Allentown, PA 18105, has been found suitable for this purpose (Model N-1 or N-0).