



Quality Assurance Procedures Summary



The Refractory Specialists

When We Say Yes Depend On Us

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Pryor Giggey Co.
QA Testing Procedures

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QUALITY POLICY STATEMENT

Our philosophy for doing business is, “When we Say *Yes*, Depend On Us.” This states our commitment to excellence. Throughout our company it means that when an individual is given a job and it is accepted, our entire organization and our customers are depending on that employee to do what was promised.

The goal of Pryor Giggey Co. is to become more competitive with respect to quality, cost, and delivery of refractory products or services that conform to all established requirements and the reasonable expectations for continuous quality improvement.

Process controls are used throughout all operations to monitor the product quality and to control the manufacturing process to ensure that the highest possible quality level is maintained to meet or exceed customer expectations.

A handwritten signature in black ink that reads "Tim Austel".

Timothy Austel
QA Manager

Pryor Giggey Co.

QA Testing Procedures

INTRODUCTION

This summary contains the quality assurance testing procedures adopted and practiced by Pryor Giggey Co. Though many of the procedures are established standard tests and are used by other companies in the refractories industry, some of the information contained here is considered proprietary and is therefore confidential. By granting access to this information, Pryor Giggey Co. assumes that the recipients maintain its confidentiality.

The testing procedures set forth are used for testing products that are normally manufactured by Pryor Giggey Co. and do not necessarily include all products that Pryor Giggey Co. is capable of making or has made in the past. Periodically, customers will request tests that are not described here. In the event that such a request is made, written procedures approved by the Technical Department will be distributed to the personnel involved with the manufacture and testing of the order. All special procedures, as well as test results, are maintained on file for future reference.

Pryor Giggey Co.

QA Testing Procedures

CASTABLES

Sampling:

One sample from every fourth 3000 pound batch is quartered in a sample splitter (per ASTM C 860).



Mixing/Consistency:

After mixing, the consistency of conventional castables is tested by the ball-in-hand test (per ASTM C 860).



Flowability:

The consistency of low cement castables is measured by an in-house (non-ASTM) flowability test. Castable flowability is determined by timing the flow on a vibrating table. Self-flowing castables are tested on a surface with no vibration.



Set Time:

Castable set time is determined by casting a sample and allowing it to set in ambient air conditions and checking it at timed intervals.



Bulk Density:

Castable bulk densities are determined by weighing and measuring cubes (per ASTM C 134) that have been dried at 230°F and fired to 1500°F.



Screen Analysis:

Castable particle size distribution is determined using the wet sieve technique (per ASTM C 92).



Cold Crushing Strength: Castable cold crushing strengths are determined by crushing cubes in a compression tester (per ASTM C 133) that have been dried at 230°F and fired to 1500°F.



Noncompliant Product: Castables that do not perform within established tolerance limits in all of the above categories are disposed of in accordance with industry standards and environmental guidelines.

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PLASTICS

Sampling: One sample from every fourth 2000 pound batch is removed from the mixer before the plastic is packaged.

Workability: Plastic workability is determined by measuring the initial and final height of a compacted sample (per ASTM C 181).



Moisture: Plastic moisture is determined by weighing a plastic sample before and after drying.



Bulk Density (wet): Plastic bulk density is determined by weighing and measuring the compacted sample from the workability test.



Screen Analysis:

Plastic particle size distribution is determined using the wet sieve technique (per ASTM C 92).



Aged Workability:

The workability is retested (per ASTM C 181) after the material has aged in an airtight container for 24 hours and again after 72 hours.



Noncompliant Product:

Plastics that do not perform within established tolerance limits in all of the above categories are disposed of in accordance with industry standards and environmental guidelines.

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MORTARS

Sampling:

One sample from every fourth 2500 pound batch of wet mortars is removed from the mixer before the mortar is packaged. One sample from every fourth 3000 pound batch of dry mortars is quartered in a sample splitter (per ASTM C 860).

Mixing:

Dry mortars are mixed with water to a troweling consistency and tested as a wet mortar.



Consistency:

Mortar consistency is determined by measuring the cone penetration depth of a universal penetrometer.



Moisture:

Mortar moisture is determined by weighing the mortar before and after drying.



Bulk Density (wet):

Mortar density is determined by weighing a known volume of mortar.



Screen Analysis:

Mortar particle size distribution is determined using the wet sieve technique (per ASTM C 92).



Noncompliant Material:

Mortars that do not perform within established tolerance limits in all of the above categories are disposed of in accordance with industry standards and environmental guidelines.

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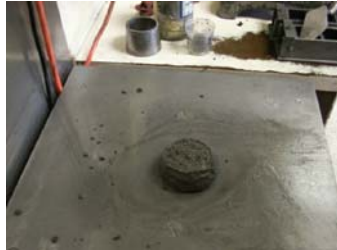
VIBRATION MIXES

Sampling:

One sample from every fourth 2000 pound batch is removed from the mixer before packaging.

Flowability:

Vibration Mix flowability is determined by timing the flow on a vibrating table.



Moisture:

Vibration Mix moisture is determined by weighing a sample before and after drying.



Screen Analysis:

Vibration Mix particle size distribution is determined using the wet sieve technique (per ASTM C 92).



Bulk Density:

Vibration Mix bulk density is determined by weighing and measuring cubes (per ASTM C 134) that have been fired to 1500°F.



Cold Crushing Strength:

Vibration Mix cold crushing strength is determined by crushing cubes in a compression tester (per ASTM C 133) that have been fired to 1500°F.



Noncompliant Product:

Vibration Mixes that do not perform within established tolerance limits in all of the above categories are disposed of in accordance with industry standards and environmental guidelines.

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RAMMING MIXES

Sampling: One sample from every fourth 2000 pound batch is removed from the mixer before packaging.

Moisture: Ramming Mix moisture is determined by weighing a sample before and after drying.



Screen Analysis: Ramming Mix particle size distribution is determined using the wet sieve technique (per ASTM C 92).



As-Made Bulk Density: Ramming Mix bulk density is determined by weighing and measuring a sample that has been compacted (per ASTM C 181).



Noncompliant Product: Ramming Mixes that do not perform within established tolerance limits in all of the above categories are disposed of in accordance with industry standards and environmental guidelines.