
**Monolithic (unshaped) refractory
products —**

**Part 5:
Preparation and treatment of test pieces**

Produits réfractaires monolithiques (non façonnés) —

Partie 5: Préparation et traitement des éprouvettes



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 1927-5 was prepared by Technical Committee ISO/TC 33, *Refractories*.

ISO 1927 consists of the following parts, under the general title *Monolithic (unshaped) refractory products*:

- *Part 1: Introduction and classification*
- *Part 2: Sampling for testing*
- *Part 3: Characterization as received*
- *Part 4: Determination of consistency of castables*
- *Part 5: Preparation and treatment of test pieces*
- *Part 6: Measurement of physical properties*
- *Part 7: Tests on pre-formed shapes*
- *Part 8: Determination of complementary properties*

Introduction

The values of the properties obtained using test pieces are used to assess the homogeneity of monolithic (unshaped) materials. They are reference values which do not necessarily correspond with those obtained in industrial applications. Other methods of test-piece preparation or treatment, which differ from those specified by this part of ISO 1927, can lead to different values.

Monolithic (unshaped) refractory products —

Part 5: Preparation and treatment of test pieces

1 Scope

This part of ISO 1927 specifies methods for the preparation and treatment (curing, drying and firing) of test pieces from monolithic (unshaped) refractory materials.

The methods are applicable to dense and insulating castables and to ramming materials with the four types of chemical composition defined in ISO 1927-1.

The dimensions of the test pieces are specified and the preparation of the mixture, compaction methods, storage and post-treatment of the test pieces are described.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1927-1, *Monolithic (unshaped) refractory products — Part 1: Introduction and classification*

ISO 1927-2, *Monolithic (unshaped) refractory products — Part 2: Sampling for testing*

ISO 1927-4, *Monolithic (unshaped) refractory products — Part 4: Determination of consistency of castables*

ISO 10060, *Dense shaped refractory products — Test methods for products containing carbon*

3 Dimensions of test pieces

Shape A: Length: 230 mm; width: 114 mm; thickness: 64 mm;

Shape B: Length: 230 mm; width: 64 mm; thickness: 54 mm;

Shape C: Length: 230 mm; width: 64 mm; thickness: 64 mm;

Shape D: Length: 160 mm; width: 40 mm; thickness: 40 mm.

The width of the test piece as tested shall correspond to the height during preparation. The vibration of the test piece during preparation shall be recorded, and for shapes C and D the compaction surface shall be marked for reference. The selection of test pieces for each type of material shall be as given in Table 1, except that for basic dense castables, ramming materials, taphole mixes and dry vibration mixes, test pieces with a diameter of 50 mm and height of 50 mm $\pm$ 1 mm are permissible and can be prepared using the sand-rammer. Shape C shall be used as the referee shape for inter laboratory testing.

Table 1 — Type of shape for tests

Castables	Dense castables	Max grain size <15 mm		Shape B or C or D	Shape A
			Direct characterization ^b	X	
			Other tests		X
		Max grain size >15 mm	Direct characterization ^b	X ^a	
			Other tests		X
	Insulating castables				X
Ramming materials	Ramming mixes			X	
	Plastics			X	

^a For these materials, shapes B and C are prepared by cutting from shape A.

^b Tests for which results are directly obtained from the bars without size modifications are modulus of rupture, cold compressive strength, and permanent change in dimensions on heating.

4 Apparatus

4.1 Separator. A riffle sampler, suitable for use with the maximum particle size of the product, or a shovel for the quartering method. The riffle separation shall be at least 2,5 times the maximum grain size.

4.2 Mixer, comprising the following.

4.2.1 Pan. The pan shall be symmetrical around axis A and shall have a capacity of 15 l to 30 l. Both the pan and the mixing blade (see 4.2.2) shall be constructed from a material that does not react with the test material (see Figure 1).