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Refractory mortars —
Part 3:
Determination of joint stability

Mortiers réfractaires —

Partie 3: Détermination de la stabilité des joints



Reference number
ISO 13765-3:2004(E)

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Foreword

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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 13765-3 was prepared by Technical Committee ISO/TC 33, *Refractories*.

ISO 13765 consists of the following parts, under the general title *Refractory mortars*:

- *Part 1: Determination of consistency using the penetrating cone method*
- *Part 2: Determination of consistency using the reciprocating flow table method*
- *Part 3: Determination of joint stability*
- *Part 4: Determination of flexural bonding strength*
- *Part 5: Determination of grain size distribution (sieve analysis)*
- *Part 6: Determination of moisture content of ready-mixed mortars*

Refractory mortars —

Part 3: Determination of joint stability

1 Scope

This part of ISO 13765 describes a method of determination of joint stability of refractory mortars.

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 8656-1, *Refractory products — Sampling of raw materials and unshaped products — Part 1: Sampling scheme*

ISO 13765-1, *Refractory mortars — Part 1: Determination of consistency using the penetrating cone method*

ISO 13765-2, *Refractory mortars — Part 2: Determination of consistency using the reciprocating flow table method*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 joint stability

stability of the mortar joint between bricks when moving by hand one brick jointed to another without breaking the joint

NOTE The time over which this operation is possible before the mortar becomes dry due to loss of specified mixing liquid is used as the time of joint stability.

4 Principle

Trials are carried out laying refractory bricks with a mortar to determine the time of joint stability of the refractory mortar.

5 Apparatus

5.1 Mixer, as specified in ISO 13765-1 or ISO 13765-2.

5.2 Electrical drying oven, fitted with a temperature controller and capable of operating at $110\text{ °C} \pm 5\text{ °C}$.

5.3 Consistency determining device, as specified in ISO 13765-1 or ISO 13765-2.

5.4 Balance, with a weighing capacity of 10 kg and capable of weighing to the nearest 1 g.

5.5 Stopwatch.

5.6 Spacing rods, made of clean metal (e.g. stainless steel) and with a diameter of 3 mm ± 0,1 mm.

5.7 Measuring cylinder.

6 Sampling

For dry mortar, sample the mortar in accordance with ISO 8656-1 or as agreed between parties. Reduce the sample to 5 kg by quartering or with a riffle sampler.

Sample ready-mixed mortars by emptying the entire contents of the container in which the mortar is supplied into another container of larger capacity and mixing thoroughly. It is important that any supernatant liquid not be discarded. Ensure that a representative sample of the wet mixture is obtained.

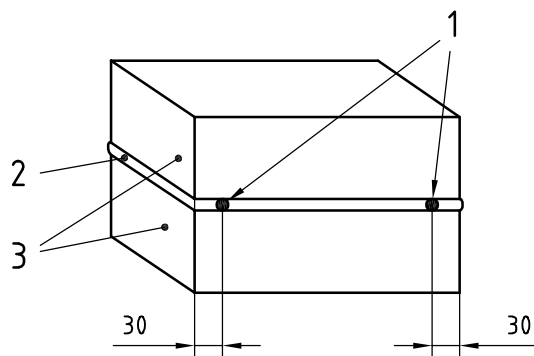
7 Procedure

7.1 Place four standard bricks, 230 mm × 114 mm × 76 mm, with smooth surfaces and clean edges (remove any dust with a hard brush) in the drying oven and dry for at least 24 h, then cool to room temperature naturally. The bricks used in the test shall be compatible with the mortar to be tested.

7.2 For dry mortars, place the mortar in the mixer and add water (or a specified mixing liquid) to the sample and mix thoroughly to attain the desired consistency. Allow the mixed mortar to stand for 30 min or in accordance with the manufacturer's instructions. Ready-mixed mortars shall be tested in the "as-received" state. Note the consistency in accordance with ISO 13765-1 or ISO 13765-2.

7.3 Apply the well-mixed mortar to the 230 mm × 114 mm face of the dried refractory brick. The longitudinal faces of each brick shall be parallel to each other within a tolerance of ± 1 mm and the sides of a cross-section of the brick shall be parallel to each other within a tolerance of 0,5 mm. Position two spacing rods in the mortar layer parallel to and 30 mm from the 114-mm edges. Place another brick on top as shown in Figure 1.

Dimensions in millimetres



- Key**
- 1 metal rod
 - 2 mortar
 - 3 brick

Figure 1 — Placement of bricks

7.4 Press lightly on the top brick while moving it in a to-and-fro motion along the 230-mm direction until a joint of 3 mm is achieved.

7.5 Withdraw the spacing rods, avoiding disruption of the joint and remove the excess mortar from the edges of the joint. Start the stopwatch and move the top brick back and forth in the 230-mm direction without breaking the joint. When the brick can no longer be moved in this way, stop the stopwatch and record the time elapsed in seconds.

7.6 Repeat the operation from 7.3 to 7.5 for the second pair of bricks.

8 Expression of results

Report the joint stability of the mortar as the mean of the two measurements, in seconds.

9 Test report

The report shall include the following information:

- a) all information necessary for identification of the material tested, including a description of the material, manufacturer, type, brand, batch number, etc.;
- b) a reference to this part of ISO 13765 (ISO 13765-3);
- c) the name of the testing establishment;
- d) the type, brand and manufacturer of the refractory bricks used in the test;
- e) in the case of a dry mortar, the percentage of water (or specified liquid) added;
- f) the results of the test, i.e. the joint stability time in seconds, including the results of the individual determinations and their mean, calculated as specified in Clause 8;
- g) the consistency of the mortar tested and the method used to determine the consistency, i.e. ISO 13765-1 or ISO 13765-2;
- h) the ambient temperature at which the test was conducted;
- i) any deviations from the procedure specified;
- j) any unusual features (anomalies) observed during the test;
- k) the date of the test.

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