INTERNATIONAL STANDARD

ISO 13765-2

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Refractory mortars —

Part 2: Determination of consistency using the reciprocating flow table method

Mortiers réfractaires —

Partie 2: Détermination de la consistance par la méthode de la table d'écoulement à mouvement alternatif

Reference number
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Foreword

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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 13765-2 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 2: Determination of consistency using the reciprocating flow table method

1 Scope

This part of ISO 13765 describes a method for the determination of the consistency of refractory mortars using a reciprocating flow table.

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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13765-1 apply.

4 Principle

The consistency of a refractory mortar is assessed by measuring the increase in diameter of a sample when subjected to up and down mechanical agitation using a reciprocating flow table.

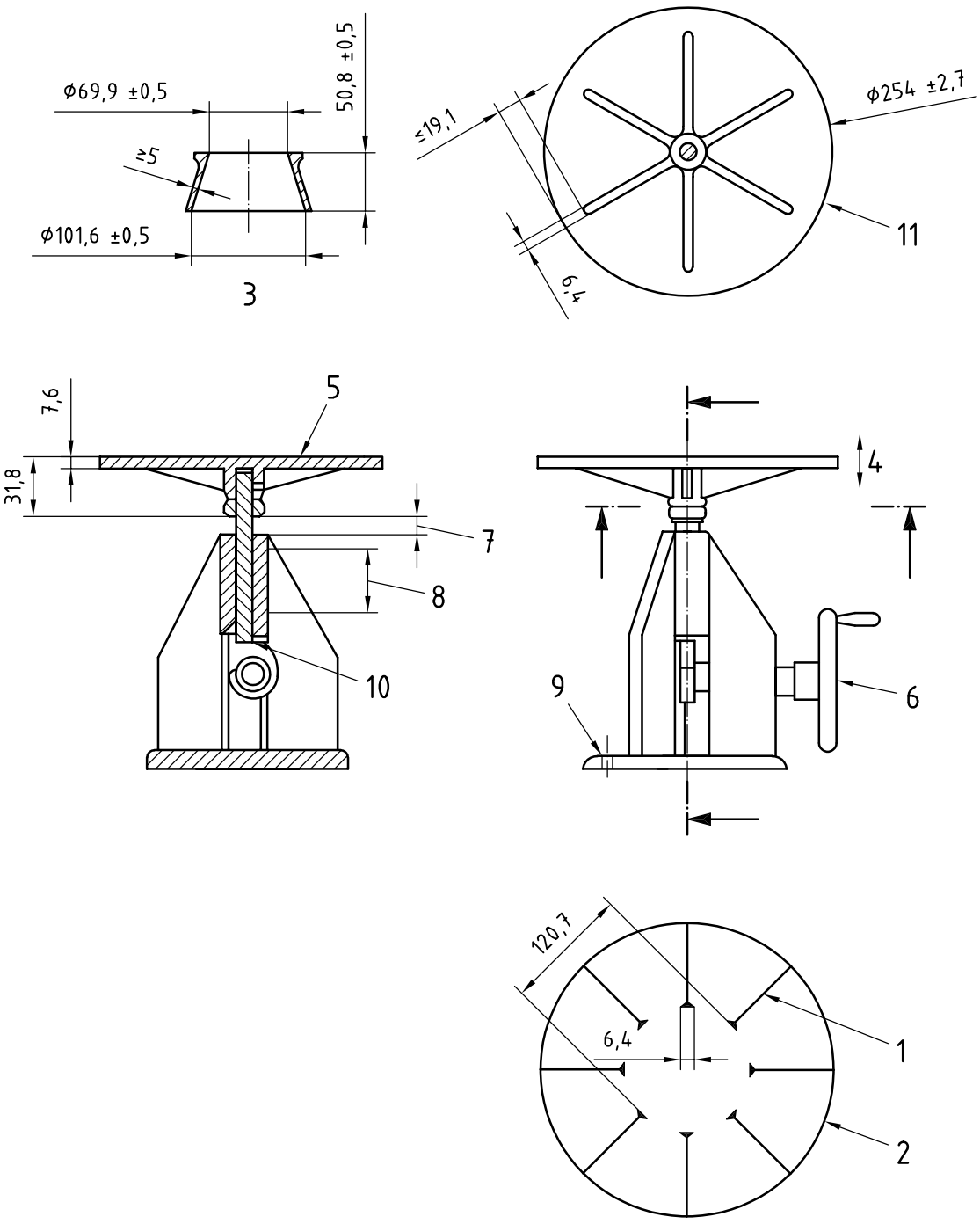
5 Apparatus

5.1 Flow table and mould, as shown in Figure 1.

5.2 Mixer, consisting of:

5.2.1 Stainless steel bowl, with a capacity of about 5 litres and of the general shape and size shown in Figure 2, and provided with means by which it can be fixed securely to the mixer frame during mixing and by which the height of the bowl in relation to the blade and, to some extent, the gap between blade and bowl can be finely adjusted and fixed.

Dimensions in millimetres



Key

1 lines to be scribed on face of table
2 table (brass or bronze)
3 conical mould
4 directions of movement of the flow table
5 table to be fixed to shaft and total mass to be 4 kg ± 0,5 kg
6 handle, or alternatively, motor drive through flexible shaft
7 drop
8 sides machined to give a drop of 12,7 mm ± 0,1 mm
9 fixing holes
10 hardened contact faces
11 view of underside of table

Figure 1 — Flow table and mould

5.2.2 Metal blade, of the general shape, size and tolerances shown in Figure 2, rotating about its own axis as it is driven in a planetary movement around the axis of the bowl by an electric motor at controlled rotational frequencies.

The two directions of rotation shall be opposite and the ratio between the two frequencies shall not be a whole number. Where more than one mixer is used, blades and bowls shall form sets which are always used together. The gap between blade and bowl shown in Figure 2 shall be checked every month.

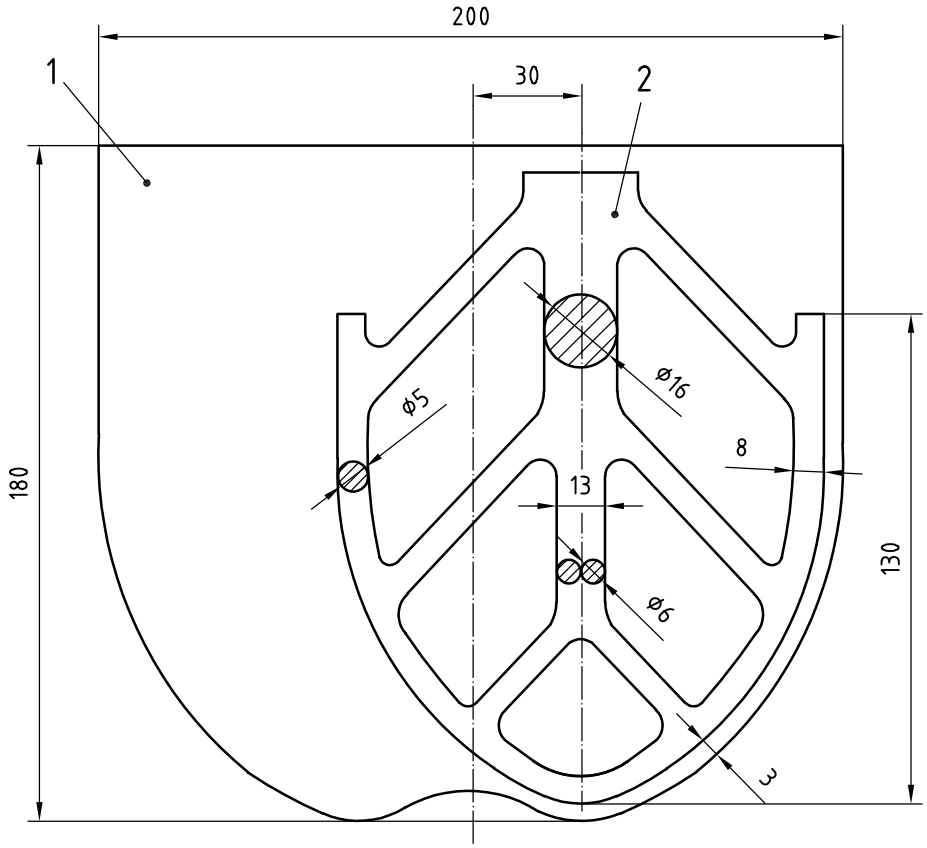
NOTE The gap indicated in Figure 2 (3 mm $\pm$ 1 mm) refers to the situation when the blade in the empty bowl is brought as close as possible to the wall. Simple tolerance gauges (feeler gauges) are useful where direct measurement is difficult.

5.3 Thermometer.

5.4 Palette knife.

5.5 Measuring cylinder.

Dimensions in millimetres



Key

1 bowl

2 blade

Figure 2 — Mixer blade and bowl

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 is not discarded. Ensure that a representative sample of the wet mixture is obtained.

7 Procedure

Carry out the determination in triplicate.

If the table has not been used for 24 h or more, operate for 10 revolutions before use. Wipe the flow table top until clean and dry and place the clean dry mould at the centre.

For dry mortars, place the mortar in the mixer and add water (or the specified mixing liquid) in accordance with the manufacturer's instructions and mix thoroughly. Note the quantity of liquid added. Allow the mixed mortar to stand for 15 min, unless any specific instructions are given by the manufacturer in which case these shall be followed. Ready-mixed mortar shall be tested in “as received” state.

Measure the temperature of the mixed mortar to the nearest 1 °C.

Fill the mould uniformly with the mortar. Using a palette knife, strike off the mortar surface plane and level with the top of the mould. Wipe the surrounding table top clean and dry, being especially careful to remove any water from around the edge of the mould. Lift the mould away vertically. Remove any material left in the mould with a knife and place this on top of the material on the table. Operate the flow table 25 times in about 15 s. Measure the average diameter of the mortar to the nearest millimetre in two directions at right angles.

8 Calculation

For each of the three determinations, calculate the consistency as the flow index, F, in percent, using the equation:

$$F = \frac{D - D_{\mathrm{o}}}{D_{\mathrm{o}}} \times 100$$

where

D is the mean diameter of the mortar after operating the flow table as described in Clause 7;

D_{o} is the internal base diameter of the mould.

Report the consistency of the mortar as the mean value of the three flow index results to the nearest 1 %.

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 13765-2);

c) the name of the testing establishment;

d) in the case of a dry mortar, the percentage of water (or specified liquid) added;

e) the results of the test, i.e. the flow index to the nearest 1 %, including the results of the individual determinations and their mean, calculated as specified in Clause 8;

f) the ambient temperature at which the test was conducted;

g) the temperature of the mixed mortar;

h) any deviations from the procedure specified;

i) any unusual features (anomalies) observed during the test;

j) the date of the test.

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