BS ISO 7700-2:2011

BSI Standards Publication

Food products — Checking the performance of moisture meters in use —

Part 2: Moisture meters for oilseeds

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National foreword

This British Standard is the UK implementation of ISO 7700-2:2011. It supersedes BS 4289-8:1988 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee AW/307, Oilseeds, animal and vegetable fats and oils and their by-products.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Food products — Checking the performance of moisture meters in use —

Part 2: Moisture meters for oilseeds

Produits alimentaires — Vérification des humidimètres en service —

Partie 2: Humidimètres pour graines oléagineuses

Reference number
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Foreword

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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 7700-2 was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 2, *Oleaginous seeds and fruits and oilseed meals*.

This second edition cancels and replaces the first edition (ISO 7700-2:1987), which has been technically revised.

ISO 7700 consists of the following parts, under the general title *Food products — Checking the performance of moisture meters in use*:

— *Part 1: Moisture meters for cereals*

— *Part 2: Moisture meters for oilseeds*

Introduction

The calibration of moisture meters can, for stable samples and under ideal measuring conditions, prove entirely satisfactory. On the other hand, the results obtained with the same moisture meter can be affected by many variables including: oilseeds species and variety, cultivation, ripeness, humidity, temperature, harvesting, transport and level of impurities, particularly for oilseeds received with high moisture content.

INTERNATIONAL STANDARD **ISO 7700-2:2011(E)**

Food products — Checking the performance of moisture meters in use —

Part 2: Moisture meters for oilseeds

1 Scope

This part of ISO 7700 specifies a method of checking the performance of moisture meters in service for measuring the moisture content of oilseeds.

This part of ISO 7700 is not applicable to either cases of pattern approval or for initial calibration of moisture meters.

The results of the verification described in this part of ISO 7700 are used to evaluate whether to check fully or to repair the moisture meter.

NOTE For built and pattern approval specifications, see OIML R 59[1].

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 665, *Oilseeds — Determination of moisture and volatile matter content*

3 Terms and definitions

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

3.1
moisture content
moisture mass fraction
product's proportion mass loss, determined under specified experimental conditions

NOTE 1 For the purposes of this part of ISO 7700, the experimental conditions are specified in ISO 665.

NOTE 2 It is expressed as a percentage mass fraction [the format "% (m/m)" is deprecated].

4 Principle

Comparison of the results supplied by the moisture meter with those obtained by a reference method for the analysis of a same sample of grains.

Use of at least two different species with, for each one, at least two samples having moisture contents as different as possible, and included within the moisture meter's measurement range.

If local regulations specify that additional samples are required, proceed in order with them.

5 Apparatus

5.1 Bottles, in glass, with airtight seals, of capacity approximately 2 l, 1 l, 0,5 l and 0,1 l, previously cleaned, rinsed and dried.

5.2 Apparatus required for the determination of water content, by the reference method in accordance with ISO 665.

5.3 Sieves, in particular with round holes of diameter 3,15 mm, or **mechanical separator**, fitted out with nettings, as specified by the purchaser.

5.4 Thermometer.

5.5 Sample divider.

6 Preparation of samples

6.1 Selection and cleaning of samples

Select varieties of oilseeds from those which are the most prevalent in the region where the moisture meter is used.

Clean the samples by manual sieving or with the help of the mechanical separator (5.3) using appropriate sieves (5.3) and remove the elements having a bigger size than whole grains of oilseeds.

6.2 Preparation of test samples

6.2.1 Preparation of sample (A)

Select at least two oilseeds species and, from each, select at least two samples having moisture contents as different as possible depending on the availability of samples, providing these are within the measurement range of the moisture meter controlled.

Each sample (A) shall be composed of only one species.

The samples (A) shall have their natural moisture, i.e. they shall not be conditioned by wetting or drying. Checking with grains which have a high moisture content is consequently only possible during the harvesting period.

Samples shall be clean and homogeneous. If necessary, they may be cleaned following the requirements given in 6.1. Make each sample (A) homogeneous by shaking and inverting the bottle.

The volume of each sample (A) shall be such that it fills by two thirds a bottle of appropriate capacity (5.1).

NOTE 1 If the bottle is too full, the sample cannot be completely mixed and if the bottle is not filled enough, there are hygrometric exchanges between the grains and the air present in the bottle, and a modification of the moisture content of the sample can occur.

NOTE 2 If the moisture meter is used for measuring the moisture content of only one species, only this species is used to check the performances of the moisture meter.

6.2.2 Preparation of sample (B)

From each sample (A), divide quickly by using the sample divider (5.5) to obtain a representative test portion (B), taking care to avoid any modification of moisture content of grain. Place the test portion (B) into another bottle (5.1), the capacity of which ensures that it is filled by two thirds, and close it.

7 Procedure

7.1 Initial reference moisture content determination

Determine the moisture content of the test portion (B) following the reference method described in ISO 665.

7.2 Stabilization of sample temperature

It should be noted that a difference of temperature between the moisture meter and the test samples (A minus B) may have an influence on the measurement result. In that case (e.g. as stated by the pattern approval), samples and meter should be left to come to equilibrium before performing the test.

Measure and record the room temperature with a thermometer (5.4). It is recommended that tests be carried out under ambient temperature conditions in the range of 15 °C and 25 °C. If such conditions are not possible, the tests shall be carried out under the ambient temperature assigned for the working conditions of the moisture meter (see technical specifications of the manufacturer).

No test conditions are defined regarding the relative humidity, except when they are specified by the manufacturer of the moisture meter.

7.3 Checking of moisture meter

Make the test sample (A minus B) homogeneous by shaking and inverting the bottle.

On opening the bottle, examine the sample and make sure there is no trace or odour of mustiness, fermentation or germination.

With the moisture meter, make, at least, three successive measurements for each test sample (A minus B). After each measurement, put again the test sample (A minus B) into the corresponding bottle and re-mix before making the next measurement.

NOTE 1 The number of measurements can vary depending upon local regulation.

One test sample (A minus B) can be used only:

15 times,	if the reference moisture content is less than:	12 % (mass fraction)
9 times,	if the reference moisture content is between:	12 % and 20 % (mass fraction)
6 times,	if the reference moisture content is more than:	20 % (mass fraction)

NOTE 2 Taking into account the moisture content of the samples, their shelf-life is limited.

NOTE 3 Taking into account this previous indication, a same test sample (A minus B) can be used for checking several moisture meters.

NOTE 4 If the technology of the moisture meter is such that the oilseeds are milled in the meter, it is expected that the above-mentioned procedure be adapted, especially for the volume of the sample (A minus B), to perform the three measurements.

7.4 Final reference moisture content determination

After checking the moisture meters (7.3), from each test sample, take quickly a second representative test portion (C) using the sample divider (5.5) and taking care to avoid any modification of its moisture content. Place the test portion (C) into another bottle (5.1), the capacity of which ensures that it is filled by two thirds and close it. Determine again the moisture content of this second test portion (C) following the routine reference method described in ISO 665.

8 Expression of results

For each test sample (A), the following data are obtained:

a) two results from the reference method, $w_{H_2O,B}$ (initial determination: 7.1) and $w_{H_2O,C}$ (final determination: 7.4);

The difference between the values obtained shall not be more than 0,3 % $\left(\left|w_{H_2O,B} - w_{H_2O,C}\right| \leq 0{,}3\ \%\right)$.

If the difference is greater, repeat the test.

The mean of these two values $\left(w_{H_2O,B} + w_{H_2O,C}\right)/2$ constitute the true value $\left(\overline{w}_{H_2O}\right)$ of the moisture content of the sample.

b) three or more measurements $\left(w_{H_2O,mi}\right)$ from the moisture meter (7.3);

For each test sample, calculate the difference between each measurement $\left(w_{H_2O,mi}\right)$ conducted with the moisture meter, and the reference result measured by the reference method of the sample, $\left(\overline{w}_{H_2O}\right)$, i.e. $\left(w_{H_2O,m1} - \overline{w}_{H_2O}\right)$, $\left(w_{H_2O,m2} - \overline{w}_{H_2O}\right)$ and $\left(w_{H_2O,m3} - \overline{w}_{H_2O}\right)$.

9 Maximum permissible errors

As a matter of principle, the $\left(w_{H_2O,m1} - \overline{w}_{H_2O}\right)$, $\left(w_{H_2O,m2} - \overline{w}_{H_2O}\right)$ and $\left(w_{H_2O,m3} - \overline{w}_{H_2O}\right)$ values shall be lower than the following maximum permissible errors (MPE), but local regulation may impose other MPE.

9.1 Oilseeds other than sunflower seeds

0,7 % (mass fraction in absolute value) for a moisture content, $\left(\overline{w}_{H_2O}\right)$, equal to or less than 10 % (mass fraction).

3 % (relative value) plus 0,4 % (mass fraction in absolute value) for a moisture content, $\left(\overline{w}_{H_2O}\right)$, more than 10 % (mass fraction).

9.2 Sunflower seeds

0,8 % (mass fraction in absolute value) for a moisture content, $\left(\overline{w}_{H_2O}\right)$, equal to or less than 10 % (mass fraction).

4 % (relative value) plus 0,4 % (mass fraction in absolute value) for a moisture content, $\left(\overline{w}_{H_2O}\right)$, more than 10 % (mass fraction).

NOTE Where the numerical value “X” is associated with the symbol “% (mass fraction in absolute value)”, it means the unit of measurement. Where the numerical value “X” is associated with the symbol “% (mass fraction in relative value)”, it means the percentage of the true value of the moisture content of the sample. See Examples 1 and 2.

EXAMPLE 1 If the reference moisture value of a rapeseeds sample as measured using the reference method described in ISO 665 is 15 % (mass fraction), the maximum permissible error is:

$$\pm [0{,}4 + (0{,}03 \times 15)] = \pm [0{,}4 + 0{,}45] = \pm 0{,}85\ \%\ \text{(mass fraction)}$$

EXAMPLE 2 For a sunflower seeds sample having a reference moisture content lower than 10 % (mass fraction), the maximum permissible error is ± 0,8 % (mass fraction).

10 Test report

The test report shall contain at least the following information:

a) all the information necessary for the complete identification of the moisture meter checked (trade name, type, No. of series, etc.);

b) the date and place of the checking;

c) the name of the person who checked the moisture meter;

d) the temperature of the test;

e) the results obtained, together with the values obtained for each measurement;

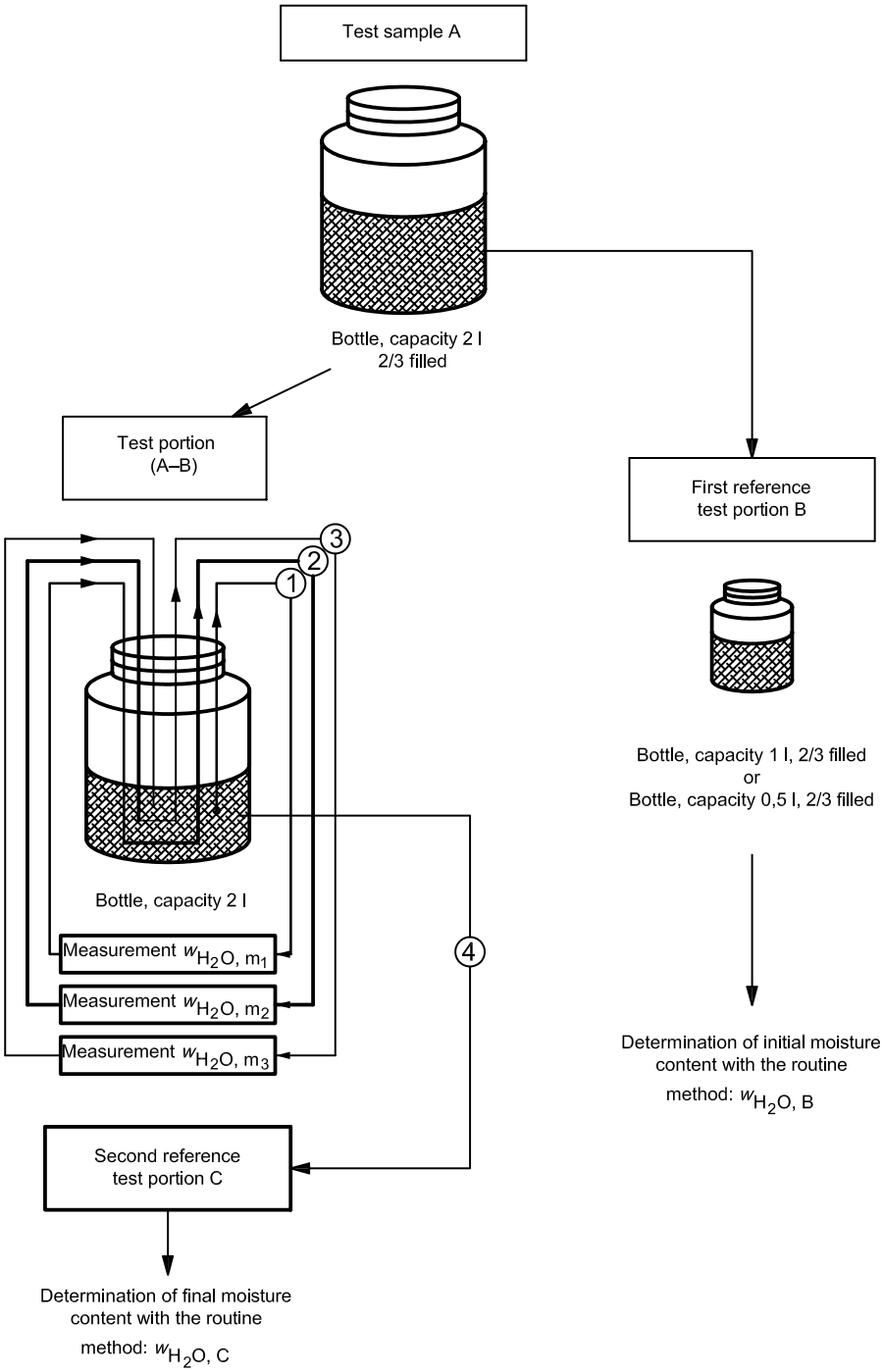
f) all the information necessary for the complete identification of the samples used;

g) the test method used with reference to this part of ISO 7700;

h) all operating details not specified in this part of ISO 7700 or regarded as optional, together with details or any incidents which can have influenced the test results.

Annex A
(informative)

Schematic representation of the procedure for each sample A



Key

1, 2, 3, 4 sampling operations from test portion (A minus B)

Figure A.1 — Schematic representation of the procedure for each sample A

Bibliography

[1] OIML[1)] R 59, *Moisture meters for cereal grain and oilseeds*

1) International Organization of Legal Metrology.

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