



# standards

## Model document of an **International Standard**

“Rice model”







# **Model document** of an **International Standard**

The model document shown on the following pages demonstrates a simple application of the *ISO/IEC Directives, Part 2, 2016, Principles and rules for the structure and drafting of ISO and IEC documents*. It is not a real International Standard. The text has no technical significance.

Although this model document is based on an International Standard from one particular Technical Committee, it is applicable to all Technical Committees.

The right-hand pages show the model standard ; explanations and information about the content are shown on the left-hand pages.

The Title shall be concise and shall indicate the subject of the document.

It shall comprise a maximum of three elements.

For further information on the Title, see **ISO/IEC Directives, Part 2, 2016, Clause 11**.

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**Cereals and pulses —  
Specification and test  
methods —**

**Part 1:  
Rice**

*Céréales et légumineuses — Spécifications et  
méthodes d'essai — Partie 1: Riz*



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A Foreword shall appear in each document. The generic text is shown here. It does not contain requirements, recommendations or permissions.

For further information on the Foreword, see **ISO/IEC Directives, Part 2, 2016, Clause 12**.

The generic text may be revised periodically by ISO.

In addition to the generic text, the designation and name of the technical committee (and subcommittee, if applicable) that prepared the document are given, together with the following, if appropriate:

- ▶ an indication of any other international organization that has contributed to the preparation of the document
- ▶ a statement that the document cancels and replaces other documents in whole or in part
- ▶ a statement of significant technical changes from the previous edition
- ▶ if it is a minor revision, an indication that it is a minor revision and a list of updates and editorial changes made

For a series, reference is made to the ISO website. The user can find an up-to-date list of parts there.

## 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 34, *Food products*, Subcommittee SC 4, *Cereals and pulses*.

This second edition cancels and replaces the first edition (ISO 17301-1:2009), which has been technically revised.

The main changes compared to the previous edition are:

- updated normative references;
- deletion of 4.3.

A list of all parts in the ISO 17301 series can be found on the ISO website.

The Introduction is an optional element containing commentary about the technical content of the document or background information.

For further information on the Introduction, see **ISO/IEC Directives, Part 2, 2016, Clause 13**.

The Introduction appears on a separate page, after the Foreword and before the page containing the Scope.

It shall not contain requirements (indicated by the word “shall”).

If a patent right has been identified, the fixed text shown opposite shall be included.

Details concerning the references to the patent right and the patent holder shall be provided. The details provided in this model document are fictitious.

For further information on Patents, see **ISO/IEC Directives, Part 2, 2016, Clause 30**.

## Introduction

This document was developed in response to worldwide demand for minimum specifications for rice traded internationally, since most commercial bulks of grain, which have not been screened or aspirated, contain a proportion of other grains, weed seeds, chaff, straw, stones, sand, etc. The vegetable materials can have physical and biological properties which differ from those of the main constituent and can therefore affect the storage behaviour.

Rice is a permanent host to a considerable microflora; most of these microorganisms are cosmopolitan, the majority are innocuous, but some produce harmful by-products. Microflora communities present on freshly harvested rice include many types of bacteria, moulds and yeasts. While the rice is ripening and its moisture content is falling, the number of field microorganisms, mainly bacteria, diminishes. When the rice is harvested, it is invaded by storage microorganisms and the field microflora gradually dies out. If the mass fraction of moisture (formerly expressed as moisture content) is less than 18 %, the microflora does not multiply, whereas above 18 % it does so rapidly. Thus, at harvest, the qualitative and the quantitative composition of the microflora depends more upon ecological factors than upon the variety of the rice. During transport and storage, additions to the microfloral population occur. Microorganisms on the rice at harvest tend to die out during storage and are replaced by microorganisms adapted to storage conditions.

Storage losses have been estimated as being an average of 5 %, and as much as 30 %, especially in countries with climates favourable to the rapid development of agents of deterioration and where storage techniques are poorly developed, such as developing countries in the damp tropics. The magnitude of these figures highlights the need to promote throughout the world a rapid improvement in techniques of conservation.

The International Organization for Standardization (ISO) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning sample dividers given in [Annex A](#) and shown in Figure A.1.

ISO takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent right has assured ISO that he/she is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with ISO. Information may be obtained from:

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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 other than those identified above. ISO shall not be held responsible for identifying any or all such patent rights.



The Scope is a mandatory clause which describes what the document does (“specifies”, “establishes”, “gives guidelines for”, “defines terms”). It shall be worded as a series of statements of fact. It shall not contain requirements (“shall”), recommendations (“should”) or permissions (“may”).

The Scope shall be succinct so that it can be used as an abstract for bibliographic purposes (e.g. it is used on the ISO website). It shall explain the applicability of the document (and, if necessary, cases where it is not applicable).

For further information on the Scope, see **ISO/IEC Directives, Part 2, 2016, Clause 14.**

This title and the fixed introductory paragraph are used for the Normative references clause. The Normative references clause is mandatory. It appears even if there are no normative references in the document.

The list shall contain only those reference documents which are cited in such a way that they need to be consulted in order to use the document (e.g. “shall be in accordance with ISO #####”). The list shall not include:

- ▶ reference documents which are not publicly available (e.g. documents which have not yet reached the enquiry stage)
- ▶ reference documents to which only informative reference is made
- ▶ reference documents which have merely served as references in the preparation of the document

Such reference documents are listed in a Bibliography.

Normative references are generally left undated unless it is considered that future editions will not be applicable.

Normative references shall be dated if reference is made to a specific clause, subclause, figure, table or other element. When a normative reference is dated, that specific edition of the reference document (and only that edition) is applicable. No other edition (past or future) of the reference document, or any amendment or revision to that reference document, is applicable.

Dated reference documents, which have not yet been published, but are publicly available (enquiry and approval stages), are indicated as shown in the 5<sup>th</sup> reference in the list (ISO 16634): the year is replaced by a dash and an explanatory footnote is provided.

For further information on Referencing, see **ISO/IEC Directives, Part 2, 2016, Clause 10.**

For further information on the Normative references clause, see **ISO/IEC Directives, Part 2, 2016, Clause 15.**

This title and the fixed introductory paragraph are used for the Terms and definitions clause. The fixed text is plural even when there is only one term and definition.

For further information on the Terms and definitions clause, see **ISO/IEC Directives, Part 2, 2016, Clause 16.**

# Cereals and pulses — Specification and test methods —

## Part 1: Rice

### 1 Scope

This document specifies minimum requirements and test methods for rice (*Oryza sativa* L.).

It is applicable to husked rice, husked parboiled rice, milled rice and milled parboiled rice, suitable for human consumption, directly or after reconditioning.

It is not applicable to cooked rice products.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 712, *Cereals and cereal products — Determination of moisture content — Reference method*

ISO 6646, *Rice — Determination of the potential milling yield from paddy and from husked rice*

ISO 8351-1:1994, *Packaging — Method of specification for sacks — Part 1: Paper sacks*

ISO 8351-2, *Packaging — Method of specification for sacks — Part 2: Sacks made from thermoplastic flexible film*

ISO 16634:—<sup>1)</sup>, *Cereals, pulses, milled cereal products, oilseeds and animal feeding stuffs — Determination of the total nitrogen content by combustion according to the Dumas principle and calculation of the crude protein content*

ISO 20483:2013, *Cereals and pulses — Determination of the nitrogen content and calculation of the crude protein content — Kjeldahl method*

ISO 24333:2009, *Cereals and cereal products — Sampling*

### 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <http://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

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1) Under preparation. (Stage at the time of publication ISO/DIS 16634.)

If a definition is quoted directly from another document, the source document is cited as shown in 3.1 in square brackets.

If changes have been made to the original terminological entry, these are indicated as shown in 3.2.

If a term is no longer used, this is indicated in light type face preceded by “DEPRECATED:” as shown in 3.2.

Source references for individual entries are informative and are listed in the Bibliography.

Source references cited in the introductory sentence of Clause 3 (e.g. “For the purposes of this document, the terms and definitions given in ISO ##### apply”) are considered to be normative and are listed in Clause 2.

A definition shall not take the form of, or contain, a requirement or recommendation. The form of a definition shall be a single phrase that can replace the term in context.

See **ISO/IEC Directives, Part 2, 2016, 16.5.5.**

If a term can have multiple meanings, the domain to which it belongs (e.g. “rice” in 3.6) shall be indicated in angle brackets before the definition. Where both a term and an abbreviated term are given, list that which is preferred first. In 3.6, the term is preferred over the abbreviated term; in 3.7 the abbreviated term is preferred over the term.

Notes to terminological entries are referred to as “Notes to entry”. Notes to entry only appear in the Terms and definitions clause. Unlike NOTES in the body of the document, Notes to entry can contain requirements, recommendations and permissions (relating to the use of the term). Notes to entry are always numbered.

In 3.9, the “preferred term” is given first in **bold** and the “admitted term” is indicated in light type face. See **ISO/IEC Directives, Part 2, 2016, 16.5.4.**

**3.1**

**paddy**

paddy rice

rough rice

rice retaining its husk after threshing

[SOURCE: ISO 7301:2011, 3.1]

**3.2**

**husked rice**

DEPRECATED: cargo rice

*paddy* (3.1) from which the husk only has been removed

[SOURCE: ISO 7301:2011, 3.2, modified — The term “cargo rice” is shown as deprecated, and Note 1 to entry is not included here]

**3.3**

**milled rice**

white rice

*husked rice* (3.2) from which almost all of the bran and embryo have been removed by milling

[SOURCE: ISO 7301:2011, 3.3]

**3.4**

**parboiled rice**

rice whose starch has been fully gelatinized by soaking *paddy* (3.1) rice or *husked rice* (3.2) in water followed by a heat treatment and a drying process

**3.5**

**waxy rice**

variety of rice whose kernels have a white and opaque appearance

Note 1 to entry: The starch of waxy rice consists almost entirely of amylopectin. The kernels have a tendency to stick together after cooking.

**3.6**

**extraneous matter**

EM

<rice> organic and inorganic components other than whole or broken kernels

EXAMPLE Foreign seeds, husks, bran, sand, dust.

**3.7**

**HDK**

heat-damaged kernel

kernel, whole or broken, which has changed its normal colour as a result of heating

Note 1 to entry: This category includes whole or broken kernels that are yellow due to alteration. Parboiled rice in a batch of non-parboiled rice is also included in this category.

**3.8**

**damaged kernel**

kernel, whole or broken, showing obvious deterioration due to moisture, pests, disease or other causes, but excluding *HDK* (3.7)

**3.9**

**immature kernel**

unripe kernel

kernel, whole or broken, which is unripe and/or underdeveloped

The source document is dated (as in 3.10) because the definition might change when a standard is revised.

The unit shall not be part of the definition but shall be given in a separate Note to entry. See 3.11.

If there is a symbol, it is given after the term as shown in 3.15. Variables are presented in *italic*. Descriptive subscripts may be affixed to the symbol to provide additional information. If the subscript is not a variable, it is upright.

Symbols and abbreviated terms used in the document can be listed in a separate clause.  
For further information on Symbols and abbreviated terms, see **ISO/IEC Directives, Part 2, 2016, Clause 17**.

Clauses and subclauses serve as the basic components in the subdivision of the content of a document.  
For further information on Clauses and subclauses, see **ISO/IEC Directives, Part 2, 2016, Clause 22**.



**3.10****husked rice yield**

amount of husked rice obtained from paddy

[SOURCE: ISO 6646:2011, 3.1]

**3.11****nitrogen content**

quantity of nitrogen determined after application of the procedure described

Note 1 to entry: It is expressed as a mass fraction of dry product, as a percentage.

[SOURCE: ISO 20483:2013, 3.1]

**3.12****crude protein content**

quantity of crude protein obtained from the nitrogen content as determined by applying the specified method, calculated by multiplying this content by an appropriate factor depending on the type of cereal or pulse

Note 1 to entry: It is expressed as a mass fraction of dry product, as a percentage.

[SOURCE: ISO 20483:2013, 3.2]

**3.13****gelatinization**

hydration process conferring the jelly-like state typical of the coagulated colloids, which are named “gels”, on kernels

Note 1 to entry: See Figure C.1.

[SOURCE: ISO 14864:1998, 3.1]

**3.14****gel state**

condition reached as a consequence of *gelatinization* (3.13), when the kernel is fully transparent and absolutely free from whitish and opaque granules after being pressed between two glass sheets

[SOURCE: ISO 14864:1998, 3.2]

**3.15****gelatinization time**

$t_{90}$

time necessary for 90 % of the kernels to pass from their natural state to the *gel state* (3.14)

[SOURCE: ISO 14864:1998, 3.3]

**4 Specifications****4.1 General, organoleptic and health characteristics**

Kernels of rice, whether parboiled, husked or milled, and whether whole or broken, shall be sound, clean and free from foreign odours or odour which indicates deterioration.

The levels of additives and pesticide residues and other contaminants shall not exceed the maximum limits permitted in the country of destination.

The presence of living insects which are visible to the naked eye is not permitted. This should be determined before separating the bulk sample into test samples.

In 4.2.1, ISO 712 is cited normatively and so is listed in Clause 2. However, IEC 61010-2 is cited for information only and so is listed in the Bibliography. It is not necessary to consult IEC 61010-2, only to know that the oven meets the specified requirements.

Notes and Examples shall only be used for giving additional information to assist the understanding or use of the document. They shall not contain requirements (“shall”) or any information indispensable for the use of the document, e.g. instructions (imperative mood), recommendations (“should”) or permission (“may”). Notes may be written as a statement of fact. Notes and Examples are not numbered unless more than one appears in the same clause, subclause, figure or table.

For further information on Notes, see **ISO/IEC Directives, Part 2, 2016, Clause 24**.

For further information on Examples, see **ISO/IEC Directives, Part 2, 2016, Clause 25**.

All annexes shall be cited in the text. The status of an annex (normative/informative) is determined by the way it is cited. Annex A is normative because it is required to determine a mass fraction “in accordance with the method given in Annex A”.

Column headings in Tables are given in **bold**.

When applicable, symbols (e.g.  $w_{\max}$ ) and units (e.g. %) are given on separate lines after the heading. Symbols and units shall be presented in accordance with ISO 80000 and IEC 80000 wherever possible.

The decimal sign shall be a comma on the line.

If a requirement refers to the whole table, put it as a separate paragraph within the frame of the table, before any notes and footnotes to the table.

Notes to tables shall only be used for giving additional information intended to assist the understanding or use of the table. They shall follow any table requirements. If there is more than one note, the notes shall be numbered.

In Table 1, the reference to ISO 7301:2011 is useful supplementary information. It is listed in the Bibliography because it does not constitute a normative reference. It is dated because a specific element (a table) is cited.

Requirements that refer to specific element(s) in a table may be written as table footnotes. They shall be located within the frame of the table and shall follow any notes to the table. They shall be identified using alphabetic characters in superscript, starting with “<sup>a</sup>” for each table.

For further information on Tables, see **ISO/IEC Directives, Part 2, 2016, Clause 29**.

The expressions % ( $m/m$ ) and % ( $V/V$ ) are deprecated. The correct terminology is mass fraction ( $w$ ) and volume fraction ( $\phi$ ), expressed as a percentage. If users are unfamiliar with the correct terminology, add a footnote as shown in 4.2.1.

For further information on Footnotes, see **ISO/IEC Directives, Part 2, 2016, Clause 26**.

## 4.2 Physical and chemical characteristics

**4.2.1** The mass fraction of moisture, determined in accordance with ISO 712, using an oven complying with the requirements of IEC 61010-2, shall not be greater than 15 %<sup>2)</sup>.

The mass fraction of extraneous matter and defective kernels in husked and milled rice, whether or not parboiled, determined in accordance with [Annex A](#), shall not be greater than the values specified in Table 1.

**NOTE** Lower mass fractions of moisture are sometimes needed for certain destinations depending on the climate, duration of transport and storage. For further details, see ISO 6322-1, ISO 6322-2 and ISO 6322-3.

**4.2.2** The defect tolerance for the categories considered, and determined in accordance with the method given in [Annex A](#), shall not exceed the limits given in Table 1.

**Table 1 — Maximum permissible mass fraction of defects**

Defect	Maximum permissible mass fraction of defects $w_{\max}$ %			
	in husked rice	in milled rice (non-glutinous)	in husked parboiled rice	in milled parboiled rice
Extraneous matter:				
— organic <sup>a</sup>	1,0	0,5	1,0	0,5
— inorganic <sup>b</sup>	0,5	0,5	0,5	0,5
Paddy	2,5	0,3	2,5	0,3
Husked rice, non-parboiled	Not applicable	1,0	1,0	1,0
Milled rice, non-parboiled	1,0	Not applicable	1,0	1,0
Husked rice, parboiled	1,0	1,0	Not applicable	1,0
Milled rice, parboiled	1,0	1,0	1,0	Not applicable
Chips	0,1	0,1	0,1	0,1
HDK	2,0 <sup>c</sup>	2,0	2,0 <sup>c</sup>	2,0
Damaged kernels	4,0	3,0	4,0	3,0
Immature and/or malformed kernels	8,0	2,0	8,0	2,0
Chalky kernels	5,0 <sup>c</sup>	5,0	Not applicable	Not applicable
Red kernels and red-streaked kernels	12,0	12,0	12,0 <sup>c</sup>	12,0
Partly gelatinized kernels	Not applicable	Not applicable	11,0 <sup>c</sup>	11,0
Pecks	Not applicable	Not applicable	4,0	2,0
Waxy rice	1,0 <sup>c</sup>	1,0	1,0 <sup>c</sup>	1,0
Live insects shall not be present. Dead insects shall be included in extraneous matter.				
NOTE 1 This table is based on ISO 7301:2011, Table 1.				
NOTE 2 Some commercial contracts require information in addition to that provided in this table.				
NOTE 3 Only full red husked (cargo) rice is considered in this table.				
<sup>a</sup> Organic extraneous matter includes foreign seeds, husks, bran, parts of straw, etc.				
<sup>b</sup> Inorganic extraneous matter includes stones, sand, dust, etc.				
<sup>c</sup> The maximum permissible mass fraction of defects shall be determined with respect to the mass fraction obtained after milling.				

2) Formerly denoted as 15 % (m/m).

Reference is made to a specific document, e.g. ISO 24333:2009, Clause 5, rather than repeating the relevant text from that document.

References to documents in the Bibliography can be cited in a sentence, e.g. “see Reference [16]”.  
Alternatively, they can be presented in superscript, e.g. “...that is adapted to the type of cereals or pulses <sup>[13][14]</sup> and to their use.”

If needed, one of the following Warning notices is used:

**“DANGER”; “CAUTION”; “WARNING”; “IMPORTANT”; “SAFETY PRECAUTIONS”**

For further information on Warning notices, see **ISO/IEC Directives, Part 2, 2016, Clause 19**.

Examples of Warning notices are given in **ISO/IEC Directives, Part 2, 2016, 18.4**.

See ISO 78-2 for examples of presenting precision, repeatability and reproducibility.

## 5 Sampling

Sampling shall be carried out in accordance with ISO 24333:2009, Clause 5.

## 6 Test methods

### 6.1 Moisture content

Determine the mass fraction of moisture in accordance with the method specified in ISO 712.

### 6.2 Waxy rice content

Determine the mass fraction of waxy rice. [Annex B](#) gives an example of a suitable method.

### 6.3 Nitrogen content and crude protein content

Determine the nitrogen content and crude protein content in accordance with either ISO 16634:—, Clause 9, or ISO 20483. For details on the determination of protein content using the Kjeldahl method, see Reference [12] in the Bibliography. For details concerning the use of the Dumas method, see References [10] and [16].

Calculate the crude protein content of the dry product by multiplying the value of the nitrogen content by the conversion factor specified in ISO 20483:2013, Annex C and Table C.1, that is adapted to the type of cereals or pulses [13][14] and to their use.

### 6.4 Gelatinization time

Determine the gelatinization time,  $t_{90}$ , for rice kernels during cooking. An example of a typical curve is given in Figure C.1. Three typical stages of gelatinization are shown in Figure C.2.

Report the results as specified in [Clause 7](#).

### 6.5 Husked rice yield

#### 6.5.1 Determination

**CAUTION — Only use paddy or parboiled rice for the determination of husked rice yield.**

Determine the husked rice yield in accordance with ISO 6646.

#### 6.5.2 Precision

##### 6.5.2.1 Interlaboratory test

The results of an interlaboratory test are given in [Annex D](#) for information.

##### 6.5.2.2 Repeatability

The absolute difference between two independent single test results, obtained using the same method on identical test material in the same laboratory by the same operator using the same equipment within a short interval of time, shall not exceed the arithmetic mean of the values for  $r$  obtained from the interlaboratory study for husked rice in more than 5 % of cases:

$$r = 1 \%$$

where  $r$  is the repeatability limit.



This is an example of a typical Test report clause, listing the minimum information needed, including a reference to the document itself [shown in item b)] because the test report needs to include the number of the ISO document.

If there is a need to identify the elements of the test report, they can be designated using a lower-case letter followed by a parenthesis, i.e. a), b), c), etc. as shown in Clause 7.

For further information on Test reports, see **ISO/IEC Directives, Part 2, 2016, 18.5.8**.

Lists can be numbered or unnumbered.

For further information on Lists, see **ISO/IEC Directives, Part 2, 2016, Clause 23**.

ISO 8351-1:1994, Clause 9, and ISO 8351-2 are examples of dated and undated normative references.

### **6.5.2.3 Reproducibility**

The absolute difference between two single test results, obtained using the same method on identical test material in different laboratories by different operators using different equipment, shall not exceed the arithmetic mean of the values for  $R$  obtained from the interlaboratory study in more than 5 % of cases:

$$R = 3 \%$$

where  $R$  is the reproducibility limit.

## **7 Test report**

For each test method, the test report shall specify the following:

- a) all information necessary for the complete identification of the sample;
- b) a reference to this document (i.e. ISO 17301-1);
- c) the sampling method used;
- d) the test method used;
- e) the test result(s) obtained or, if the repeatability has been checked, the final quoted result obtained;
- f) all operating details not specified in this document, or regarded as optional, together with details of any incidents which may have influenced the test result(s);
- g) any unusual features (anomalies) observed during the test;
- h) the date of the test.

## **8 Packaging**

The packaging shall not transmit any odour or flavour to the product and shall not contain substances which may damage the product or constitute a health risk.

If bags are used, they shall comply with the requirements of ISO 8351-1:1994, Clause 9, or ISO 8351-2, as appropriate.

## **9 Marking**

The packages shall be marked or labelled as required by the country of destination.

Annexes shall be designated by a capital letter (A, B, C, ...).

The status of an annex (normative or informative) is determined by how it is cited in the text. In this case, Annex A is cited normatively in 4.2.

All annexes have a title.

For further information on Annexes, see **ISO/IEC Directives, Part 2, 2016, Clause 20**.

Test methods shall be presented in accordance with **ISO/IEC Directives, Part 2, 2016, Clause 18**.

For methods of chemical analysis, see *ISO 78-2*.

The text under the heading “Apparatus” is an introductory phrase before an apparatus list.

It is not a hanging paragraph (as described in **ISO/IEC Directives, Part 2, 2016, 22.3.3**).

The apparatus is listed in the Apparatus clause as shown here:

- ▶ reference number (in **bold**)
- ▶ name of item (in **bold**)
- ▶ descriptive text (if necessary)

For further information on Apparatus clauses, see **ISO/IEC Directives, Part 2, 2016, 18.5.4**.

Instructions to carry out the procedure, expressed here using the imperative, are requirements.

Recommendations are expressed using the verbal form “should”.

## **Annex A**

### **(normative)**

## **Determination of defects**

### **A.1 Principle**

Extraneous matter, broken kernels, damaged kernels and other kinds of rice are separated manually according to the following types: husked rice, milled rice, husked parboiled rice and milled parboiled rice. Each type is then weighed.

### **A.2 Apparatus**

The usual laboratory apparatus and, in particular, the following.

**A.2.1 Sample divider**, consisting of a conical sample divider or multiple-slot sample divider with a distribution system, e.g. "Split-it-right" sample divider, such as that shown in Figure A.1.

**A.2.2 Sieve**, with round perforations of diameter 1,4 mm.

**A.2.3 Tweezers**.

**A.2.4 Scalpel**.

**A.2.5 Paintbrush**.

**A.2.6 Steel bowls**, of diameter 100 mm  $\pm$  5 mm; seven per test sample.

**A.2.7 Balance**, which can be read to the nearest 0,01 g.

### **A.3 Sampling**

See [Clause 5](#).

### **A.4 Procedure**

#### **A.4.1 Preparation of test sample**

Carefully mix the laboratory sample to make it as uniform as possible, then proceed to reduce it, using a divider ([A.2.1](#)), until a quantity of about 30 g is obtained.

All parts of kernels which get stuck in the perforations of a sieve should be considered to be retained by the sieve.

Since the “Split-it-right” sample divider, shown in Figure A.1, is the subject of patent rights, it is necessary to provide details in the Introduction.

The meanings of the symbols used in a formula are explained in a list underneath (as shown) unless the symbols are listed in a separate Symbols clause (see **ISO/IEC Directives, Part 2, 2016, Clause 17**).

For further information on Mathematical formulae, see **ISO/IEC Directives, Part 2, 2016, Clause 27**.



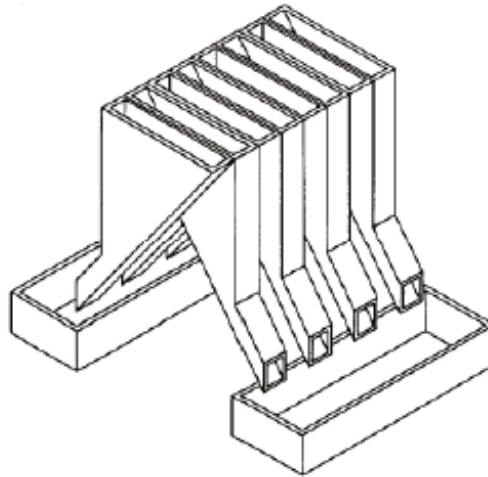


Figure A.1 — “Split-it-right” sample divider

## A.5 Determination

Weigh, to the nearest 0,1 g, one of the test samples obtained in accordance with [A.4.1](#) and separate the different defects into the bowls ([A.2.6](#)). When a kernel has several defects, classify it in the defect category for which the maximum permissible value is the lowest (see Table 1).

Weigh, to the nearest 0,01 g, the fractions so obtained.

## A.6 Calculation

Express the mass fraction of each defect using [Formula \(A.1\)](#):

$$w = \frac{m_D}{m_S} \quad (A.1)$$

where

$w$  is the mass fraction of grains with a particular defect in the test sample;

$m_D$  is the mass, in grams, of grains with that defect;

$m_S$  is the mass, in grams, of the test sample.

## A.7 Test report

Report the results as specified in [Clause 7](#).

Annex B is informative because the use of the method is optional (see 6.2 where Annex B is cited). However, it does contain requirements because it specifies the procedure to be followed if the user of the document chooses to follow this method.

An optional clause entitled “Principle” indicates the essential steps in a test method.

B.2.4 shows an example of how to express tolerances.

If any dangerous reagents are listed in the Reagents clause, provide a warning (in **bold**).

As in the Apparatus clauses (Clauses A.2 and B.2), if there is an introductory phrase before the list of reagents, this is not a hanging paragraph. The layout of a Reagents clause is similar to that of an Apparatus clause:

- ▶ reference number (in **bold**)
- ▶ name of item (in **bold**)
- ▶ descriptive text (if necessary)

For further information on Reagents clauses, see **ISO/IEC Directives, Part 2, 2016, 18.5.3**.

The use of trade names should be avoided. A designation or description of a product should be given instead.

If a trade name is given (see B.3.2), a footnote should be added.

Footnote 3) gives an example of suitable wording to be used when a trade name is given.

For further information on the Use of trade names and trademarks, see **ISO/IEC Directives, Part 2, 2016, Clause 31**.

## Annex B (informative)

### Determination of the waxy rice content of parboiled rice

#### B.1 Principle

Waxy rice kernels have a reddish brown colour when stained in an iodine solution, while non-waxy rice kernels show a dark blue colour.

#### B.2 Apparatus

The usual laboratory apparatus and, in particular, the following.

**B.2.1 Balance**, capable of weighing to the nearest 0,01 g.

**B.2.2 Glass beaker**, of capacity 250 ml.

**B.2.3 Small white colour bowls**, or any white colour container of a suitable size.

**B.2.4 Wire sieve**, with long rounded apertures of  $(1 \text{ mm } ^{+0,02}_0 \text{ mm}) \times (20 \text{ mm } ^{+2}_{-1} \text{ mm})$ .

**B.2.5 Stirrer rod**.

**B.2.6 Tweezers or forceps**.

**B.2.7 Tissue paper**.

#### B.3 Reagents

**WARNING** — Direct contact of iodine with skin can cause lesions so care should be taken in handling iodine. Iodine vapour is very irritating to eyes and mucous membranes.

**B.3.1 Deionized water**, Grade 3 quality as specified in ISO 3696.

**B.3.2 Iodine stock solution**, containing a mass fraction of 4,1 % iodine and 6,3 % potassium iodide in deionized water such as Lugols <sup>3)</sup>.

**B.3.3 Iodine working solution**, obtained by diluting the stock solution ([B.3.2](#)) two times (by volume) with deionized water ([B.3.1](#)).

Prepare fresh daily.

#### B.4 Sampling

Sampling shall be carried out in accordance with [Clause 5](#).

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3) Lugols is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

The International System of units (SI), as set out in ISO 80000 and IEC 80000, shall be used.

The numerical values of the measured quantities should have the same unit, otherwise a conversion factor is necessary.

For further information on Numbers, quantities, units and values, see **ISO/IEC Directives, Part 2, 2016, Clause 9**.

## B.5 Determination

**B.5.1** Weigh a portion of about 100 g of milled rice and put it into a glass beaker ([B.2.2](#)).

**B.5.2** Add enough iodine working solution ([B.3.3](#)) to soak the kernels, and stir ([B.2.5](#)) until all the kernels are submerged under the solution. Let the kernels soak in the solution for 30 s.

**B.5.3** Pour the rice and solution into a wire sieve ([B.2.4](#)), and shake the basket slightly in order to drain out the solution. Then place the wire sieve on a piece of tissue paper ([B.2.7](#)) to absorb the excess liquid.

**B.5.4** Pour the stained kernels into a bowl ([B.2.3](#)). Using tweezers or forceps ([B.2.6](#)), separate the reddish brown kernels of waxy rice from the dark blue kernels of non-waxy rice.

**B.5.5** Weigh the waxy rice portion ( $m_1$ ) and the non-waxy rice portion ( $m_2$ ) to the nearest 0,1 g.

## B.6 Calculation

Calculate the mass fraction, expressed as a percentage, of the waxy rice,  $w_{\text{wax}}$ , using [Formula \(B.1\)](#):

$$w_{\text{wax}} = \frac{m_1}{m_1 + m_2} \times 100 \quad (\text{B.1})$$

where

$m_1$  is the mass, expressed in grams, of the waxy rice portion;

$m_2$  is the mass, expressed in grams, of the non-waxy rice portion.

## B.7 Test report

Report the results as specified in [Clause 7](#), giving the results calculated using [Formula \(B.1\)](#).

If there is only one clause in an annex, it shall not be numbered and shall not have a clause heading.

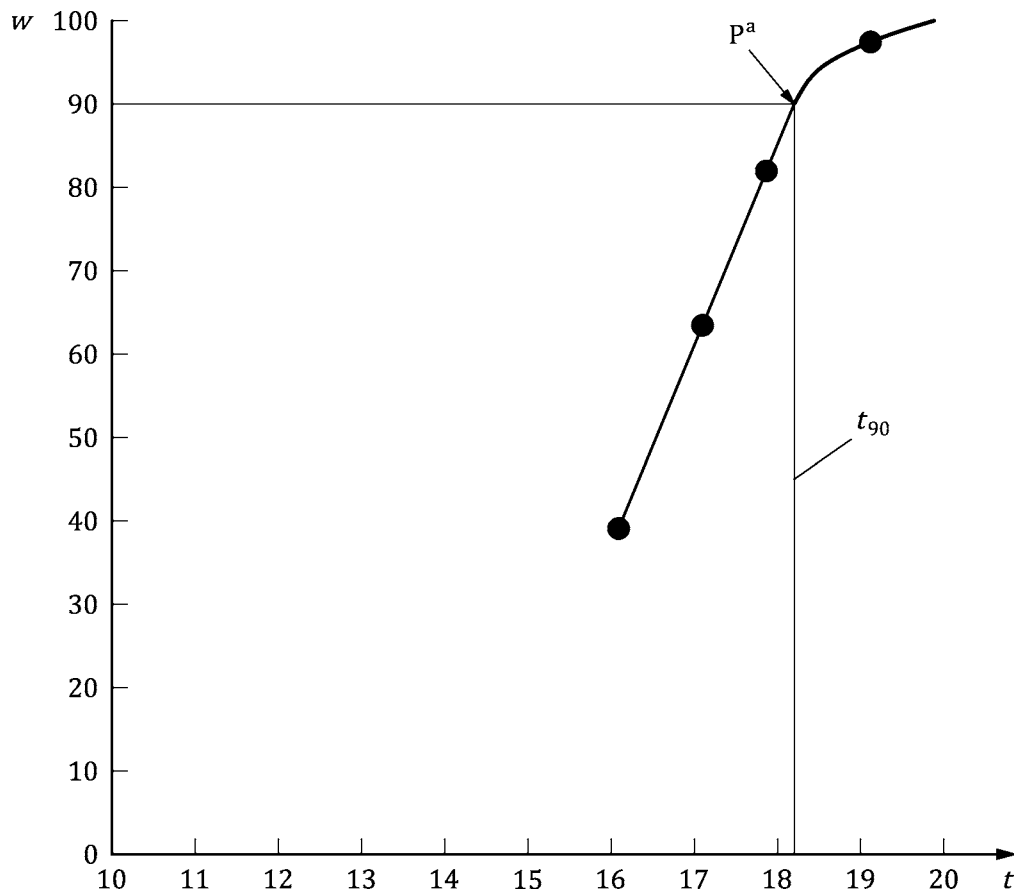
Figures shall be language independent. The axes shall be labelled using symbols (as shown here) or using X and Y, rather than using words.

For further information on Figures, see **ISO/IEC Directives, Part 2, 2016, Clause 28**.

## Annex C (informative)

### Gelatinization

Figure C.1 gives an example of a typical gelatinization curve. Figure C.2 shows the three stages of gelatinization.



#### Key

- $w$  mass fraction of gelatinized kernels, expressed in per cent
- $t$  cooking time, expressed in minutes
- $t_{90}$  time required to gelatinize 90 % of the kernels
- $P$  point of the curve corresponding to a cooking time of  $t_{90}$
- <sup>a</sup> The time  $t_{90}$  was estimated to be 18,2 min for this example.

NOTE These results are based on a study carried out on three different types of kernel.

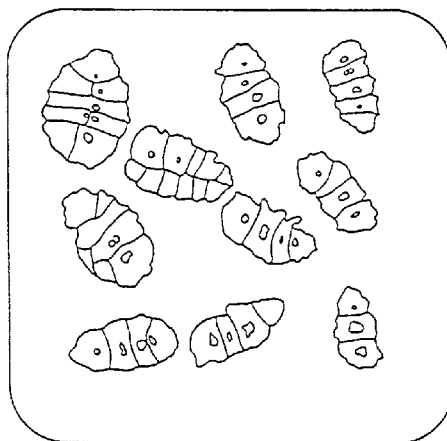
**Figure C.1 — Typical gelatinization curve**

Figures may be subdivided as shown in Figure C.2.

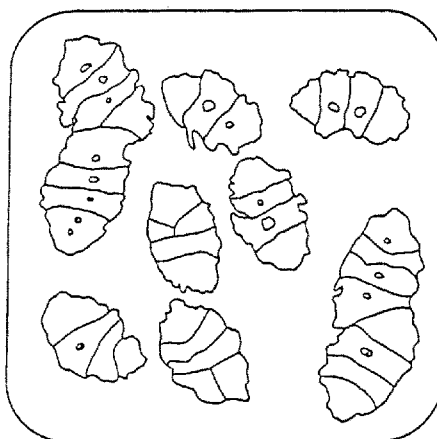
The subfigures are identified using alphabetic characters followed by a parenthesis, i.e. a), b), etc.

There should be only one key per figure – do not provide separate keys for each subfigure.

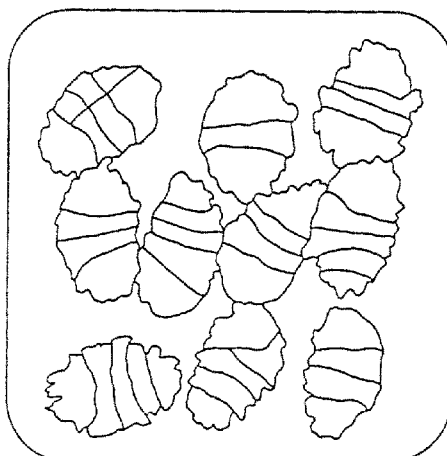




**a) Initial stages: No grains are fully gelatinized (ungelatinized starch granules are visible inside the kernels)**



**b) Intermediate stages: Some fully gelatinized kernels are visible**



**c) Final stages: All kernels are fully gelatinized**

**Figure C.2 — Stages of gelatinization**

Annex D is informative because of the way it is cited in 6.5.2.1. The results presented in Table D.1 are not part of the test method.

Tables and Figures are numbered even if there is only one.  
Each table and each figure should be explicitly referred to in the text.  
Table D.1 is an example of how to express precision results.

## Annex D

### (informative)

### Results of interlaboratory test for husked rice yields

An interlaboratory test [15] was carried out by the ENR [Rice Research Centre (Italy)] in accordance with ISO 5725-1 and ISO 5725-2, with the participation of 15 laboratories. Each laboratory carried out three determinations on four different types of kernel. The statistical results are shown in Table D.1.

**Table D.1 — Repeatability and reproducibility of husked rice yield**

Description	Rice sample			
	Arborio	Drago <sup>a</sup>	Balilla	Thaibonnet
Number of laboratories retained after eliminating outliers	13	11	13	13
Mean value, g/100 g	81,2	82,0	81,8	77,7
Standard deviation of repeatability, $s_r$ , g/100 g	0,41	0,15	0,31	0,53
Coefficient of variation of repeatability, %	0,5	0,2	0,4	0,7
Repeatability limit, $r$ ( $= 2,83 s_r$ )	1,16	0,42	0,88	1,50
Standard deviation of reproducibility, $s_R$ , g/100 g	1,02	0,20	0,80	2,14
Coefficient of variation of reproducibility, %	1,3	0,2	1,0	2,7
Reproducibility limit, $R$ ( $= 2,83 s_R$ )	2,89	0,57	2,26	6,06
<sup>a</sup> Parboiled rice.				

The Bibliography is an optional element. It is not an annex. When present, it shall be placed after the last annex. For further information on the Bibliography, see **ISO/IEC Directives, Part 2, 2016, Clause 21**.

Reference [7], for example, is dated because a specific part of it (a table) is cited in the text. See Table 1.

For online reference documents for which a URL is given, as far as possible, the URL should remain valid for the expected life of the document. If this cannot be guaranteed, sufficient information should be provided to identify and locate the source (preferably the primary source) of the reference document.

The bibliographic reference shall include the method of access to the reference document and the full network address, with the same punctuation and use of upper case and lower case letters as given in the source.

Reference [10] provides an example of a reference identified by a URL.

There are two ways of structuring the Bibliography:

- ▶ by numerical order of the standards, followed by literature references, as follows (and as shown opposite):
  - ISO standards followed by IEC standards and then other international standards
  - regional standards
  - national standards
  - literature references
- ▶ in the order in which the references are cited in the text

Examples are given of the correct styles for various types of bibliographic reference.

ISO 690 provides further examples.

It is good practice to list only those reference documents that are cited in the text.

## Bibliography

- [1] ISO 3696, *Water for analytical laboratory use — Specification and test methods*
- [2] ISO 5725-1, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions*
- [3] ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*
- [4] ISO 6322-1, *Storage of cereals and pulses — Part 1: General recommendations for the keeping of cereals*
- [5] ISO 6322-2, *Storage of cereals and pulses — Part 2: Practical recommendations*
- [6] ISO 6322-3, *Storage of cereals and pulses — Part 3: Control of attack by pests*
- [7] ISO 7301:2011, *Rice — Specification*
- [8] ISO 14864:1998, *Rice — Evaluation of gelatinization time of kernels during cooking*
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- [10] STANDARD NO I.C.C. 167. *Determination of the protein content in cereal and cereal products for food and animal feeding stuffs according to the Dumas combustion method* (see <http://www.icc.or.at>)
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