

# INTERNATIONAL STANDARD

# ISO 7301

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## Rice — Specification

*Riz — Spécifications*

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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 7301 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 7301:1988), which has been technically revised.

Annexes A and B form a normative part of this International Standard.

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# Rice — Specification

## 1 Scope

This International Standard gives the minimum specifications for rice (*Oryza sativa* L.) which is the subject of international trade. It is applicable to the following types: husked rice and milled rice, parboiled or not, intended for direct human consumption. It is not applicable to other products derived from rice, nor to waxy rice (glutinous rice).

## 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 712, *Cereals and cereal products — Determination of moisture content — Routine reference method*

ISO 5223, *Test sieves for cereals*

ISO 13690:1999, *Cereals, pulses and milled products — Sampling of static batches*

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## 3 Terms and definitions

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

### 3.1

#### **paddy**

paddy rice

rough rice

rice retaining its husk after threshing

### 3.2

#### **husked rice**

brown rice

cargo rice

paddy from which the husk only has been removed

NOTE The processes of husking and handling may result in some loss of bran.

### 3.3

#### **milled rice**

white rice

husked rice from which all or part of the bran and embryo have been removed by milling

NOTE It should further be classified into the following degrees of milling.

#### 3.3.1

##### **undermilled rice**

rice obtained by milling husked rice but not to the degree necessary to meet the requirements of well-milled rice

**3.3.2**

**well-milled rice**

rice obtained by milling husked rice in such a way that most of the bran and part of the embryo have been removed

**3.3.3**

**extra-well-milled rice**

rice obtained by milling husked rice in such a way that all of the bran and almost all of the embryo have been removed

**3.4**

**parboiled rice**

husked or milled rice processed from paddy or husked rice that has been soaked in water and subjected to a heat treatment so that the starch is fully gelatinized, followed by a drying process

**3.5**

**waxy rice**

glutinous rice

varieties of rice whose kernels have a white and opaque appearance

NOTE The starch of waxy rice consists almost entirely of amylopectin. The kernels have a tendency to stick together after cooking.

**3.6**

**whole kernel**

husked or milled kernel without any broken part, or part of kernel with a length greater than or equal to nine-tenths of the average length (3.12) of the test sample kernels

NOTE See Figure 1.

**3.7**

**head rice**

whole kernel (3.6) or part of kernel with a length greater than or equal to three-quarters of the average length (3.12) of the test sample kernels

NOTE See Figure 1.

**3.8**

**large broken kernel**

part of kernel with a length less than three-quarters but greater than one-half of the average length (3.12) of the test sample kernels

NOTE See Figure 1.

**3.9**

**medium broken kernel**

part of kernel with a length less than or equal to one-half but greater than one-quarter of the average length (3.12) of the test sample kernels

NOTE See Figure 1.

**3.10**

**small broken kernel**

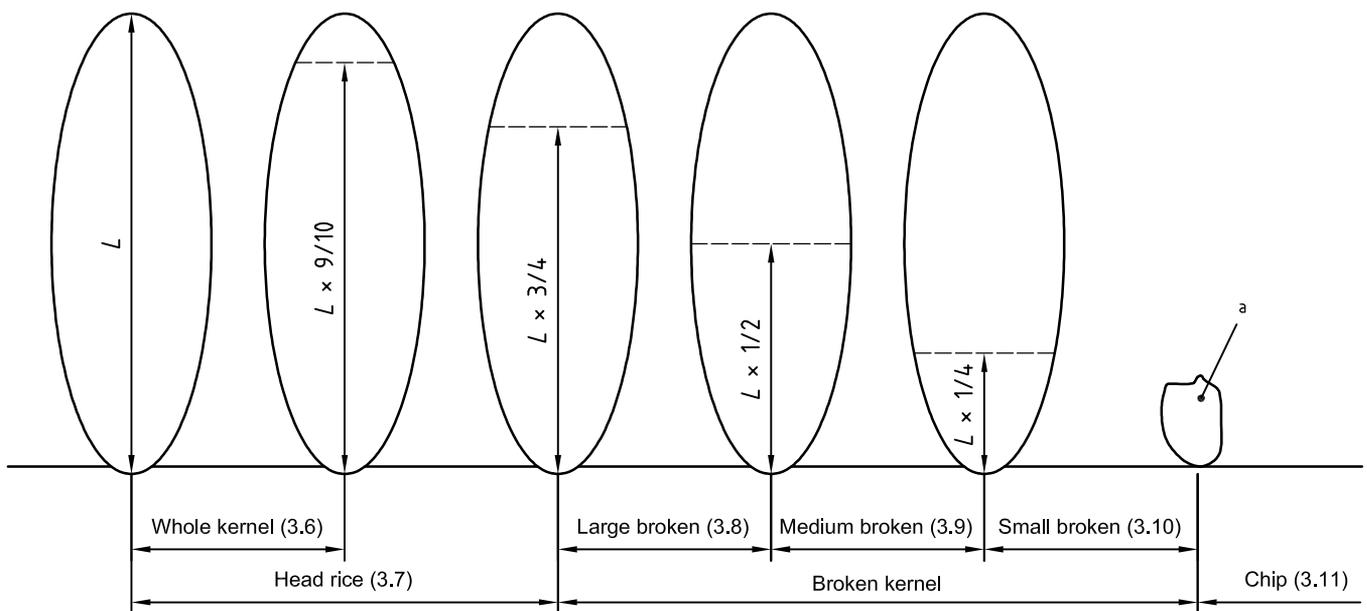
part of kernel with a length less than or equal to one-quarter of the average length (3.12) of the test sample kernels but which does not pass through a metal sieve with round perforations 1,4 mm in diameter

NOTE See Figure 1.

**3.11**

**chip**

part of kernel which passes through a metal sieve with round perforations 1,4 mm in diameter



<sup>a</sup> Not passing through a round perforation of 1,4 mm in diameter.

#### Key

$L$  is the average length (3.12)

Figure 1 — Size of kernels, broken kernels and chips  
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### 3.12 average length

arithmetic mean of the length of the test sample kernels that are not immature or malformed (3.16) and without any broken parts

NOTE Calculation of the average length is given in A.4.3.2.

### 3.13 extraneous matter

organic and inorganic components other than kernels of rice

NOTE 1 Organic extraneous matter are: foreign seeds, husks, bran, parts of straw, etc.

NOTE 2 Inorganic extraneous matter are: stones, sand, dust, etc.

### 3.14 heat-damaged kernel

head rice or broken kernel that has changed its normal colour as a result of a microbiological heating

NOTE This category includes kernel that is yellow/dark yellow in the case of non-parboiled rice and orange/dark orange in the case of parboiled rice, due to a microbiological alteration.

### 3.15 damaged kernel

head rice or broken kernel showing evident deterioration due to moisture, pests, disease or other causes, but excluding heat-damaged kernels (3.14)

### 3.16 immature kernel malformed kernel

head rice or broken kernel which is unripe and/or badly developed

3.17

**chalky kernel**

head rice or broken kernel of non-parboiled rice, except waxy rice (3.5), whose whole surface has an opaque and floury appearance

3.18

**red kernel**

head rice or broken kernel having a red bran covering more than one-quarter of its surface

3.19

**red-streaked kernel**

head rice or broken kernel with red bran streaks of length greater than or equal to one-half of that of the whole kernel, but where the surface covered by these red streaks is less than one-quarter of the total surface

3.20

**partly gelatinized kernel**

head rice or broken kernel of parboiled rice which is not fully gelatinized and shows a distinct white opaque area

3.21

**peck**

head rice or broken kernel of parboiled rice of which more than one-quarter of the surface is dark brown or black in colour due to the parboiling process

**4 Specifications**

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**4.1 General, organoleptic and health specifications**

ISO 7301:2002

Kernels of rice, husked or milled, broken or not, shall be sound, clean and free from foreign odours or odour which indicates deterioration. They shall also be free from toxic or any harmful matter.

The levels of additives and pesticides and other contaminants shall not exceed the maximum limits permitted by the national regulations of the country of destination or, in their absence, by the FAO/WHO Codex Alimentarius.

The presence of living insects which are visible to the naked eye is not allowed.

**4.2 Physical and chemical specifications**

**4.2.1** The mass fraction of moisture shall be not greater than 15,0 % [previously designed as 15,0 % (*m/m*)].

NOTE Lower moisture contents may be required 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 [2], [3], [4].

**4.2.2** The defect tolerance for the categories considered, and determined in accordance with the method described in annex A, shall not exceed the limits given in Table 1.

**4.3 Contract specifications**

All commercial contracts shall show clearly the following:

- a) the total percentage of broken kernels permitted, classified according to the agreed categories, and the relative proportion of each category.
- b) the total percentage permitted of the categories detailed in Table 1, determined in accordance with the method described in annex A.

Table 1 — Specification of rice

Categories	Reference to the definition	Husked rice non-parboiled max. % (mass fraction)	Milled rice non-parboiled max. % (mass fraction)	Husked rice parboiled max. % (mass fraction)	Milled rice parboiled max. % (mass fraction)
Extraneous matter:					
organic	3.13, Note 1	1,0	0,5	1,0	0,5
inorganic	3.13, Note 2	0,5	0,5	0,5	0,5
Paddy	3.1	2,5	0,3	2,5	0,3
Husked rice, non-parboiled	3.2	Not applicable	1,0	1,0	1,0
Milled rice, non-parboiled	3.3	1,0	Not applicable	1,0	1,0
Husked rice, parboiled	3.2 and 3.4	1,0	1,0	Not applicable	1,0
Milled rice, parboiled	3.3 and 3.4	1,0	1,0	1,0	Not applicable
Chips	3.11	0,1	0,1	0,1	0,1
Heat-damaged kernels	3.14	2,0 <sup>a</sup>	2,0	2,0 <sup>a</sup>	2,0
Damaged kernels	3.15	4,0	3,0	4,0	3,0
Immature and/or malformed kernels	3.16	8,0	2,0	8,0	2,0
Chalky kernels	3.17	5,0 <sup>a</sup>	5,0	Not applicable	Not applicable
Red kernels and red-streaked kernels	3.18 and 3.19	12,0 <sup>b</sup>	12,0	12,0 <sup>b</sup>	12,0
Partly gelatinized kernels	3.20	Not applicable	Not applicable	11,0 <sup>a</sup>	11,0
Pecks	3.21	Not applicable	Not applicable	4,0	2,0
Waxy rice	3.5	1,0 <sup>a</sup>	1,0	1,0 <sup>a</sup>	1,0
<sup>a</sup> After milling. <a href="https://standards.iteh.ai/catalog/standards/sist/74410102-60c8-4ddc-b2cf-d00baa0dc5c0/iso-7301-2002">https://standards.iteh.ai/catalog/standards/sist/74410102-60c8-4ddc-b2cf-d00baa0dc5c0/iso-7301-2002</a>					
<sup>b</sup> Only full red husked (cargo) rice is considered here.					

## 5 Test methods

The moisture content shall be determined in accordance with ISO 712.

The other tests shall be carried out using the methods specified in annexes A and B.

## 6 Packaging

The packaging material shall not transmit any smell or taste, and shall not contain substances which may damage the product or constitute a health risk. If bags are used, they shall be clean, sufficiently strong and well stitched.

## Annex A (normative)

### Methods of analysis for rice specifications

#### A.1 Principle

Manual separation and weighing of the broken kernels and of the categories in Table 1.

#### A.2 Apparatus

**A.2.1 Sample divider**, conical sampler or multiple-slot sampler with a distribution system in accordance with ISO 13690.

**A.2.2 Metal sieve**, with round perforation 1,4 mm in diameter in accordance with ISO 5223.

**A.2.3 Tweezers, scalpel and paintbrush**

**A.2.4 Small bowls**

**A.2.5 Balance**, capable of weighing to the nearest 0,01 g.

**A.2.6 Tray**, or other means, coloured in contrast with the colour of the rice to be evaluated.

**A.2.7 Micrometer**, or other measuring device not deforming the kernels and capable of being read to the nearest 0,01 mm.

#### A.3 Sampling

Sampling is not part of the methods specified in this International Standard. A recommended sampling method is given in ISO 13690.

It is important that the laboratory receive a sample which is truly representative of the lot and has not been damaged or changed during transport or storage.

#### A.4 Procedure

##### A.4.1 General

Note if an odour, particular or foreign to rice, is detected, as well as the presence of all anomalies.

Verify the presence of living or dead insects by visual examination and report their number.

##### A.4.2 Preparation of test sample

Weigh and carefully mix the laboratory sample to make it as uniform as possible. Then proceed to reduce it, if necessary, using a sample divider (A.2.1) to obtain a quantity of about 800 g.

Divide the test sample so obtained into two equal test portions of about 400 g, using the sample divider (A.2.1).

### A.4.3 Determination

#### A.4.3.1 General

When a kernel has several defects, it shall be classified in the category where the maximum permissible value is the lowest (see Table 1).

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

#### A.4.3.2 Average length

On one of the two test portions (A.4.2):

- a) separate two sets of 100 kernels without any broken part, by random sampling;
- b) measure the length of the kernels using the micrometer (A.2.7) and calculate the arithmetic means of the length for both sets of kernels ( $L_1$  and  $L_2$ );
- c) calculate the average length (3.12) of the two sets of kernels  $(L_1 + L_2)/2$ ; if the value of  $100(L_1 - L_2)/L$  is higher than 2, return all the kernels to the tray and repeat from step a);
- d) return all the kernels to the test portion.

#### A.4.3.3 Husked rice, non-parboiled (see Figure A.1)

Weigh one of the test portions (A.4.2) to the nearest 0,1 g ( $m_w$ ) and spread it on the tray (A.2.6). Separate the organic extraneous matter (3.13, Note 1), the inorganic extraneous matter (3.13, Note 2), the paddy (3.1), the milled rice, non-parboiled (3.3), the husked rice, parboiled (3.4), and the milled rice, parboiled (3.4), into small bowls (A.2.4), with the aid of tweezers, scalpel and paintbrush (A.2.3). Weigh the six fractions so obtained to the nearest 0,01 g ( $m_1, m_2, m_3, m_4, m_5$  and  $m_6$ ).

Divide the second test portion with the divider (A.2.1) in order to obtain four different aliquot parts of about 100 g each.

Weigh the first aliquot part to the nearest 0,01 g ( $m_x$ ). Spread it out and separate the damaged kernels (3.15), the immature and/or malformed kernels (3.16) and the red kernels (3.18) into small bowls. Weigh the three fractions so obtained to the nearest 0,01 g ( $m_7, m_8$  and  $m_9$ ).

Weigh the second aliquot part to the nearest 0,01 g ( $m_y$ ). Separate the chips (3.11) by the metal sieve (A.2.2), then spread out the remainder and separate the broken kernels, classifying them into large broken kernels (3.8), medium broken kernels (3.9) and small broken kernels (3.10). Put the fractions so obtained into small bowls. Weigh the four fractions to the nearest 0,01 g ( $m_{10}, m_{11}, m_{12}$  and  $m_{13}$ ).

Proceed with the laboratory milling of a third aliquot part. Weigh the obtained milled rice to the nearest 0,01 g ( $m_z$ ). Spread it out and separate the heat-damaged kernels (3.14), the chalky kernels (3.17) and waxy rice (3.5) into small bowls. Weigh the three fractions so obtained to the nearest 0,01 g ( $m_{14}, m_{15}$  and  $m_{16}$ ).

#### A.4.3.4 Milled rice, non-parboiled (see Figure A.2)

Weigh one of the test portions (A.4.2) to the nearest 0,1 g ( $m_w$ ) and spread it on the tray (A.2.6). Separate the organic extraneous matter (3.13, Note 1), the inorganic extraneous matter (3.13, Note 2), the paddy (3.1), the husked rice, non-parboiled (3.2), the husked rice, parboiled (3.4), and the milled rice, parboiled (3.4) into small bowls (A.2.4), with the aid of tweezers, scalpel and paintbrush (A.2.3). Weigh the six fractions so obtained to the nearest 0,01 g ( $m_1, m_2, m_3, m_4, m_5$  and  $m_6$ ).

Divide the second test portion with the divider (A.2.1) in order to obtain four different aliquot parts of about 100 g each.