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**Pulps — Laboratory wet disintegration —  
Part 2:  
Disintegration of mechanical pulps at  
20 °C**

*Pâtes — Désintégration humide en laboratoire —*

*Partie 2: Désintégration des pâtes mécaniques à 20 °C*



Reference number  
ISO 5263-2:2004(E)

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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 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 5263-2 was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 5, *Test methods and quality specifications for pulps*.

This first edition cancels and partially replaces ISO 5263:1995 which has been technically revised. In the revision, ISO 5263 has been divided into three parts; Part 1 which is applicable to chemical pulps, Part 2 which is applicable to mechanical pulps without latency and Part 3 which is applicable to mechanical pulps exhibiting latency. In Part 3, an informative Annex has been inserted describing the effect of latency in mechanical pulps.

ISO 5263 consists of the following parts, under the general title *Pulps — Laboratory wet disintegration*:

- *Part 1: Disintegration of chemical pulps*
- *Part 2: Disintegration of mechanical pulps at 20 °C*
- *Part 3: Disintegration of mechanical pulps at  $\geq 85$  °C*

# Pulps — Laboratory wet disintegration —

## Part 2: Disintegration of mechanical pulps at 20 °C

### 1 Scope

This part of ISO 5263 specifies an apparatus and the procedures for the laboratory-wet disintegration of mechanical pulps that do not exhibit latency or mechanical pulps where latency has already been removed. This apparatus and procedure are required for preparation of the test portion in a number of other International Standards dealing with pulps.

In principle, this method is applicable to all kind of mechanical pulps (i.e. mechanical, semi-chemical and chemi-mechanical pulps) that do not exhibit latency, including recovered fibres from mechanical pulps. It is not suitable for mechanical pulps exhibiting latency for which the disintegration procedure described in ISO 5263-3 shall be used.

The procedure specified by ISO 5263-2 should also be used to disintegrate all mechanical pulps to be measured for brightness.

**NOTE** Brightness is not significantly altered by the presence of latency; however, hot disintegration of mechanical pulps can lead to significant loss of brightness.

### 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 638, *Pulps — Determination of dry matter content*

ISO 4119, *Pulps — Determination of stock concentration*

ISO 14487, *Pulps — Standard water for physical testing*

### 3 Definition

For the purposes of this part of ISO 5263, the following definitions apply.

#### 3.1

##### **disintegration of mechanical pulp**

mechanical treatment in water so that interlaced fibres, which were free in the pulp stock, are again separated from one another without appreciably changing their structural properties

### 3.2

#### latency

condition of a mechanical pulp in which some of its properties are inhibited and require disintegration of the pulp at elevated temperature to be developed

NOTE 1 Latency is due to the distorted form of the fibres, acquired in mechanical processing, especially at high consistency, and subsequently preserved upon cooling at high consistency. It is assumed that its preservation is caused by the hardening of the lignin.

NOTE 2 The degree of latency in a pulp is generally related to the consistency and energy applied during the mechanical processing.

### 3.3

#### latency removal

procedure using a combination of mechanical treatment and heat treatment, i.e. disintegration at a temperature exceeding the softening temperature of lignin

NOTE The procedure for latency removal is described in ISO 5263-3.

## 4 Apparatus

Ordinary laboratory apparatus and the following:

**4.1 Standard disintegrator**, as described in Annex A.

NOTE The procedure for checking the Standard disintegrator is given in Annex B.

**4.2 Balance**, capable of weighing with an accuracy of  $\pm 0,2$  g.

**4.3 Standard water**, for physical testing, as specified in ISO 14487.

## 5 Preparation of test portion

If the pulp is wet or air-dry, determine the dry matter content in accordance with ISO 638. If the pulp is in slush form, determine the dry matter content in accordance with ISO 4119.

If the concentration of a slush pulp sample is less than 1,5 % by mass, thicken it to the appropriate volume, carefully avoiding the loss of fines. This is most easily done by sedimentation of the suspension and removing a part of the water phase or by dewatering through a filter paper on a Büchner funnel.

Use standard water (4.3) for disintegrating pulps to be used in tests where drainability properties are of importance. In all cases, use water of the same quality as required in the procedure for which the pulp is disintegrated.

For each disintegration, take a test portion corresponding to a mass of  $(50 \pm 5)$  g of oven-dry pulp. If the sample is in sheet-form, do not cut the sheets and avoid taking cut edges.

If the dry matter content of the pulp is 20 % or more, soak the test portion in 1 l to 1,5 l of water (standard water or other) at  $(20 \pm 5)$  °C for at least the minimum soaking time specified in Table 1. If the pulp is in the form of sheets or slabs, after soaking tear the sample into pieces of dimensions approximately 25 mm  $\times$  25 mm. Soaking for a time longer than the minimum specified, for example overnight, has been found not to have any significant effect on the results. The soaking time shall, however, never be longer than 24 h for any pulp grade.

NOTE Flash-dried mechanical pulp needs to be soaked for a minimum of 10 min.

**Table 1 — Recommended soaking time for mechanical pulps**

Dry matter content of the pulp, % by mass	Minimum soaking time
< 20	0 min
20 to 60	30 min
> 60	4 h

Where necessary for climatic reasons, a temperature of between 25 °C and 30 °C may be used, provided that this is stated in the test report.

## 6 Procedure

Transfer the test portion after preparing as above into the container of the Standard disintegrator (4.1).

Add water of the same quality as used in Clause 5, at  $(20 \pm 5)$  °C, to give a volume of  $(2\ 500 \pm 25)$  ml. Set the revolution counter to zero. Switch the motor on and allow the propeller to make the number of revolutions specified in Table 2. Stop the propeller and check visually that the pulp is completely disintegrated, for instance by diluting a small portion from the disintegrator with water in a glass cylinder and inspecting it under transmitted light. If it is not completely disintegrated, continue the disintegration until complete separation of fibres is achieved and/or the fibre bundles and fragments are separated to the extent expected in the pulp at the time of manufacture.

**Table 2 — Recommended number of revolutions for mechanical pulps**

Dry matter content of the pulp % by mass	Number of revolutions
< 20	10 000
$\geq 20$	30 000

If for any reason a different pulp charge or a different number of revolutions is used, this shall be stated in the test report.

## 7 Test report

The test report shall include the following particulars:

- a) reference to this part of ISO 5263 (e.g., ISO 5263-2:2004);
- b) all the information necessary for complete identification of the sample;
- c) the water grade (standard water, distilled water or tap water) used;
- d) the soaking time;
- e) the dry matter content of the sample;
- f) any unusual features observed in the course of the test;
- g) any operations not specified in this International Standard, or that are regarded as optional, which might have affected the results.

## Annex A (normative)

### Construction of the Standard disintegration

#### A.1 Materials

All components that come into contact with pulp suspensions shall be resistant to water and to dilute acids and alkalis. Stainless steel or glass-fibre-reinforced plastic material is normally used.

#### A.2 Standard disintegrator

The cylindrical container, Figure A.1, is fitted with four equally spaced spiral baffles extending between 32 mm from the bottom and 57 mm from the lid, each baffle traversing half the internal circumference of the container. The baffles spiral downwards in a clockwise direction. There is a fillet of radius 13 mm around the inside of the base of the container. The three-bladed propeller is mounted on a vertical shaft centrally in the container, at a fixed distance above the bottom. It is driven at the specified speed in the stock and a counter is fitted to record the number of revolutions. The counter should preferably be of the pre-set type, which will switch off the disintegrator after the required number of revolutions. Viewed from above, the propeller rotates in a clockwise direction.

The container is provided with a lid, which, in most disintegrators, is fitted to the propeller/motor assembly.

The container is fixed firmly in position during operation of the disintegrator, but it is capable of being removed and replaced easily and quickly.

#### A.3 Dimensions

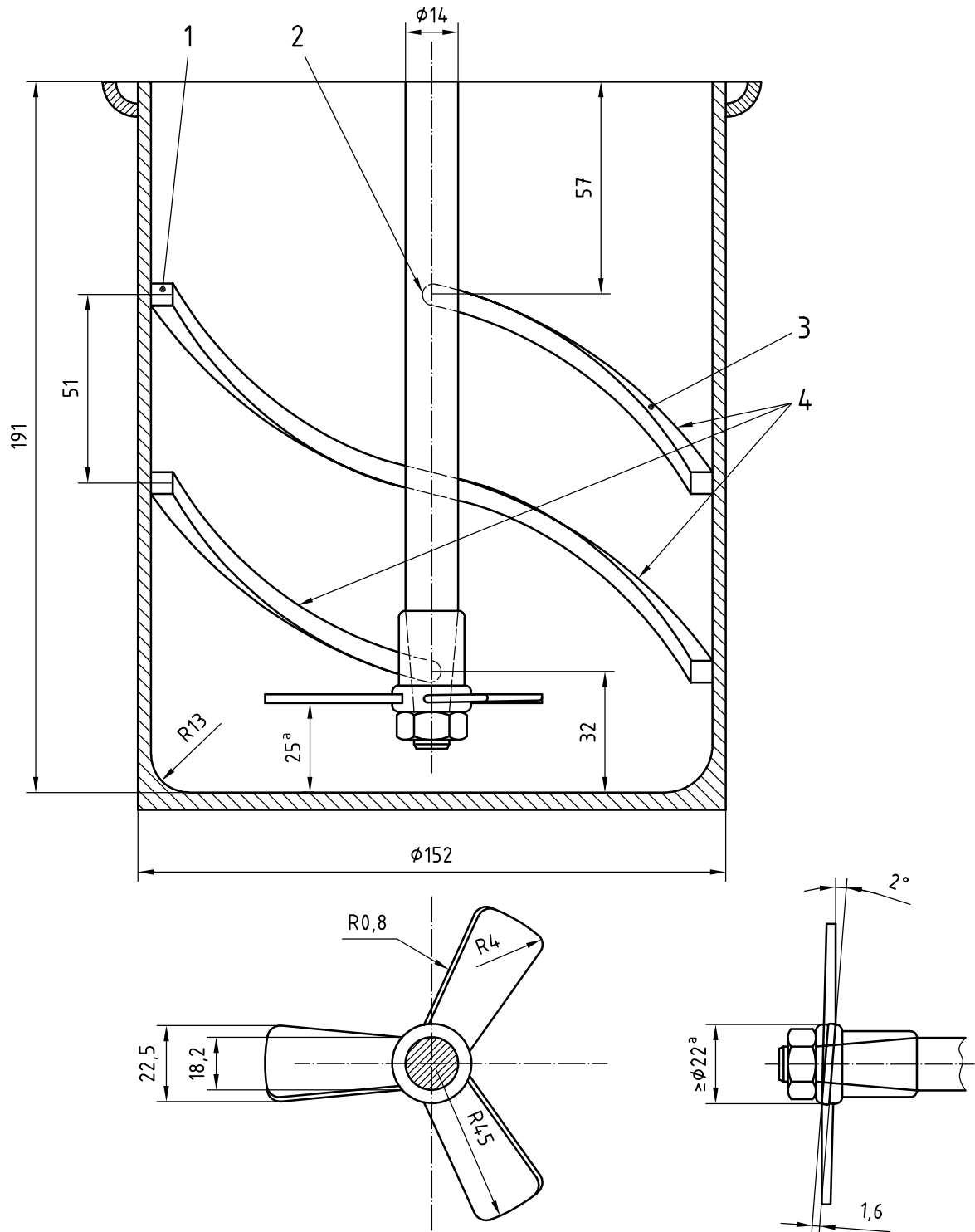
Part	Dimension	Specified value (unless otherwise stated)	Tolerance
container	internal height	191 mm	± 2 mm
	internal diameter	152 mm	± 2 mm
	radius of fillet	13 mm	± 2 mm
baffles	square section	6,5 mm	± 1 mm
	height from container base	32 mm	± 1 mm
	distance from rim	57 mm	± 1 mm
	ends radiused	3 mm	± 0,5 mm
	edges radiused	0,4 mm	± 0,1 mm
spacing (centres)	51 mm	± 1 mm	
propeller	diameter of swept circle at top of blades	90 mm	± 0,5 mm
	diameter of hub	≥ 22 mm	—
	distance between propeller blades and container base (lowest point)	25 mm	± 2 mm
propeller blades	width at hub	18,2 mm	± 0,5 mm
	maximum width	22,5 mm	± 0,5 mm
	thickness	1,6 mm	± 0,5 mm
	edges radiused	0,8 mm	± 0,2 mm
	ends radiused	4 mm	± 1 mm
	pitch	2°	± 15'
propeller shaft	diameter end taper	≤ 20 mm to fit any propeller hub	—



### A.4 Rotational frequency

The rotational frequency of the propeller shaft is  $(49 \pm 1,5) \text{ s}^{-1}$ .

Dimensions in millimetres



**Key**

- 1 6,5 mm × 6,5 mm section
- 2 end R 3
- 3 round edges R 0,4
- 4 four baffles, each a half-turn around the container (three shown)
- a Not to scale.

**Figure A.1 — Standard disintegrator details**

## **Annex B** (normative)

### **Checking the Standard disintegrator**

Check the Standard disintegrator regularly. Special care shall be taken to ensure that

- a) the propeller shaft rotates smoothly and is always centred with respect to the container;
- b) the propeller runs at the specified rotational frequency;
- c) the propeller blades are set as specified (this may be checked by means of a propeller gauge);
- d) the dimensions of the propeller blades are as specified (see A.3) and the propeller blades are not damaged.

If the apparatus is used properly, the other dimensions of the Standard disintegrator should remain constant; they shall, however, be checked at intervals.



