

Paper and board — Determination of roughness/smoothness (air leak methods) —

Part 4: Print-surf method

ICS 85.060

National foreword

This British Standard is the UK implementation of ISO 8791-4:2007.

The UK participation in its preparation was entrusted to Technical Committee PAI/11, Methods of test for paper, board and pulps.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Part 4: Print-surf method

*Papier et carton — Détermination de la rugosité/du lissé (méthodes du
débit d'air) —*

Partie 4: Méthode Print-surf



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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 8791-4 was prepared by Technical Committee ISO/TC 6, *Paper, board and pulps*, Subcommittee SC 2, *Test methods and quality specifications for paper and board*.

This second edition cancels and replaces the first edition (ISO 8791-4:1992), which has been technically revised.

This version of ISO 8791-4 differs from the previous (1992) version as follows:

- a definition of Print-surf compressibility has been added;
- a description of a modified backing holder for testing high-stiffness papers and board has been added;
- Annex D describing the calibration of Print-surf instruments has been revised and expanded;
- some minor editorial changes have been made.

ISO 8791 consists of the following parts, under the general title *Paper and board — Determination of roughness/smoothness (air leak methods)*:

- *Part 1: General method*
- *Part 2: Bendtsen method*
- *Part 3: Sheffield method*
- *Part 4: Print-surf method*

Paper and board — Determination of roughness/smoothness (air leak methods) —

Part 4: Print-surf method

1 Scope

This part of ISO 8791 specifies a method for determining the roughness of paper and board using an apparatus which complies with the Print-surf method, as defined in this part of ISO 8791. It is applicable to all printing papers and boards with which it is possible to form a substantially airtight seal against the guard lands of the measuring head.

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 186, *Paper and board — Sampling to determine average quality*

ISO 187, *Paper, board and pulps — Standard atmosphere for conditioning and testing and procedure for monitoring the atmosphere and conditioning of samples*

ISO 4094, *Paper, board and pulps — International calibration of testing apparatus — Nomination and acceptance of standardizing and authorized laboratories*

3 Terms and definitions

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

3.1

Print-surf roughness

mean gap between a sheet of paper or board and a flat circular land pressed against it under specified conditions

NOTE The mean gap is expressed as the cube root mean cube gap calculated as specified in Annex A. The Print-surf roughness is expressed directly as the average value of roughness, in micrometres.

3.2

Print-surf compressibility

K

percentage decrease in surface roughness when measurements are made consecutively at the two standard clamping pressures specified in this part of ISO 8791

4 Principle

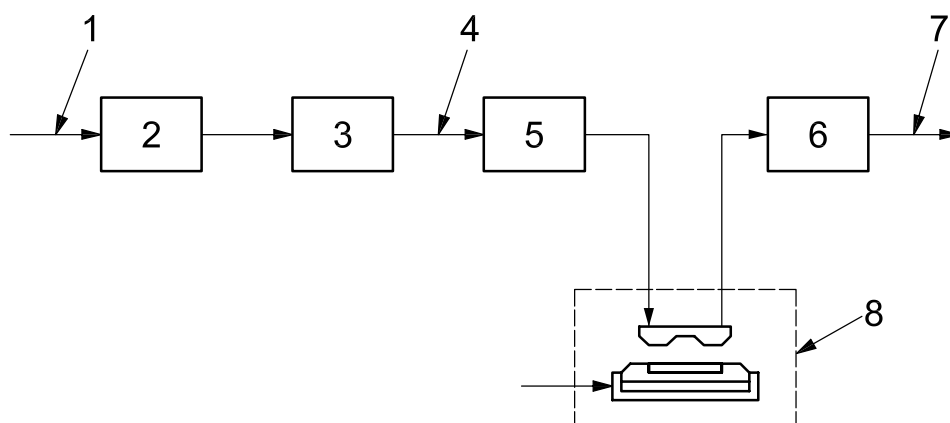
The test piece is placed between a circular flat metal sensing surface and a resilient backing, and inner and outer circular lands form a seal with the test piece. Under the influence of a pressure difference, air flows across the measuring land between the measuring land and the test piece. The rate of air flow is measured on a variable-area flowmeter, or the pressure difference across the measuring land is compared to the pressure difference across a known impedance. In both cases, the result is expressed as the air gap, in micrometres.

5 Apparatus

5.1 Print-surf tester (two types)

5.1.1 Print-surf tester, which operates according to one of the following principles.

5.1.1.1 Variable-area flowmeter type, in which a standard pressure difference is created across the measuring land and the air-flow rate is measured on a variable-area flowmeter. The air-flow rate varies with roughness and the flow rate is converted to roughness, in micrometres. The flow diagram for this type of instrument is shown in Figure 1.

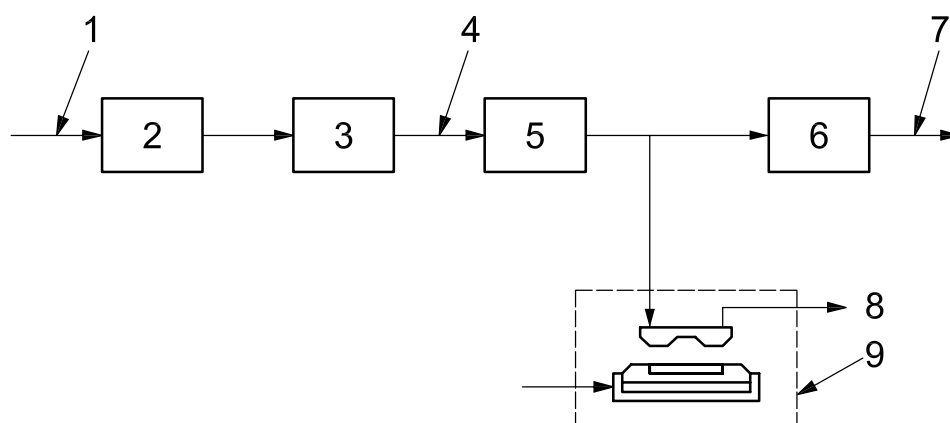


Key

- 1 incoming air 300 kPa to 600 kPa
- 2 filter
- 3 pressure-regulator valve
- 4 6,2 kPa or 19,6 kPa
- 5 on/off valve
- 6 flow indicator tubes
- 7 to atmosphere
- 8 sensing head and clamping device

Figure 1 — Flow diagram for variable-area flowmeter type

5.1.1.2 Impedance type, in which the air from the controlled pressure source passes first through a fluidic impedance and then through the sensing head, after which it discharges to atmosphere. The pressure differences across the fluidic impedance and across the land are each measured by a transducer. These pressure differences vary with roughness and the signals are converted to roughness, in micrometres. The flow diagram for this type of instrument is shown in Figure 2.



Key

- 1 incoming air 300 kPa to 600 kPa
- 2 filter
- 3 pressure-regulator valve
- 4 19,6 kPa
- 5 fluidic impedance
- 6 pressure transducer
- 7 analog signal
- 8 to atmosphere
- 9 sensing head and clamping device

Figure 2 — Flow diagram for impedance instrument type

5.1.2 Procedures for maintaining these testers in good working order are given in Annex B.

5.2 Principal components of the system

5.2.1 Air supply, supplying clean air, free of oil and water droplets, at a steady pressure within the range 300 kPa to 600 kPa.

5.2.2 Sensing-head pressure regulator, allowing setting of the sensing-head differential pressure to 19,6 kPa $\pm$ 0,1 kPa or, on variable-area flowmeter instruments only, to either 6,2 kPa $\pm$ 0,1 kPa or 19,6 kPa $\pm$ 0,1 kPa.

5.2.3 Sensing head, (see Figures 3 and 4), consisting of three concentric, annular lands composed of suitable material which have coplanar, polished surfaces. The centre or measuring land shall be 51,0 μ m $\pm$ 1,5 μ m wide and have an effective length of 98,0 mm $\pm$ 0,5 mm. The two guard lands shall each be at least 1 000 μ m wide at any point, and the radial distance between them at any point shall be 152 μ m $\pm$ 10 μ m. The measuring land shall be centred between them to within $\pm$ 10 μ m.

The lands shall be mounted in an airtight mounting, constructed so that air can be passed into the gap between one guard land and the measuring land, and exhausted from the gap between the measuring land and the other guard land. The back of the mounting shall be flat and form a ground mating surface with the flat surface of a manifold fitted with air inlet and outlet ports.

A spring-loaded protective collar may be fitted outside the guard lands. If such a protective collar is fitted, the force exerted by the loading spring shall be taken into account when setting the clamping pressure.

NOTE In many instruments fitted with the protective collar, the force exerted by the loading spring is 9,8 N.