INTERNATIONAL STANDARD ISO 2632/II

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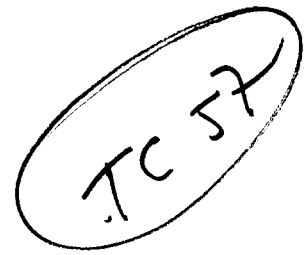

Roughness comparison specimens — Part II — Spark-eroded, shot blasted and grit blasted, and polished

Échantillons de comparaison viso-tactile de rugosité — Partie II : Électro-érosion, grenaillage sphérique et angulaire, et polissage

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2632/II was developed by Technical Committee ISO/TC 57, *Metrology and properties of surfaces*, and was circulated to the member bodies in March 1976.

It has been approved by the member bodies of the following countries :

Australia	Hungary	Romania
Austria	India	South Africa, Rep. of
Belgium	Italy	Spain
Brazil	Japan	Sweden
Canada	Korea, Rep. of	Switzerland
Chile	Mexico	United Kingdom
Czechoslovakia	Netherlands	U.S.A.
France	Norway	U.S.S.R.
Germany	Poland	Yugoslavia

No member body expressed disapproval of the document.

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Roughness comparison specimens – Part II – Spark-eroded, shot blasted and grit blasted, and polished

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the characteristics of specimens of spark-eroded, shot blasted and grit blasted, and polished surfaces which are intended for tactile and visual comparison with workpiece surfaces of similar lay, produced by similar manufacturing methods.

It is complementary to ISO 2632/I, *Roughness comparison specimens – Part I : Turned, ground, bored, milled, shaped and planed.*

2 REFERENCES

ISO 3, *Preferred numbers – Series of preferred numbers.*

ISO/R 468, *Surface roughness.*

ISO 1302, *Technical drawings – Method of indicating surface texture on drawings.*

3 DEFINITIONS

3.1 roughness comparison specimen : A specimen surface of known average roughness height (R_a) representing a particular machining or other production process. The specimen is used to give design personnel guidance on the feel and appearance of the particular production process and roughness grade, and to enable workshop personnel to evaluate and control workpiece surfaces by tactile and visual comparison with the specimen surface.

3.2 lay : The direction of the predominant surface pattern, ordinarily determined by the process used in producing the surface.

Other terms used to describe surface characteristics or measurement are defined in ISO/R 468.

4 METHODS OF MANUFACTURE

The specimens shall be manufactured as follows :

4.1 By electro-forming positive replicas of master surfaces.

4.2 By making positive replicas in plastics of master surfaces. By coating or otherwise, the feel and appearance of the natural manufactured surface should be represented.

4.3 By direct application of the production process which the specimen is intended to represent (individually manufactured specimens).

5 SURFACE CHARACTERISTICS

Master surfaces for reproduction, their resultant electro-formed and plastics replicas, and individually manufactured specimens (see 4.1, 4.2 and 4.3) shall exhibit only the characteristics resulting from the natural action of the manufacturing process which they are intended to represent.

6 RANGES OF ROUGHNESS GRADES

The ranges of roughness grades shall be as given in table 1, overleaf.

7 SAMPLING LENGTHS

The sampling lengths given in table 2 overleaf shall be used in evaluating the specimens. In the case of repetitive profiles, the sampling length shall be increased to include the nearest greater whole number of cycles (see note under table 2).

TABLE 1 – **Ranges of roughness grades of roughness comparison specimens**

Mean arithmetic deviation R_a					
Spark-eroded		Shot and grit blasted		Polished	
μm	μin	μm	μin	μm	μin
–	–	–	–	0,012 5	0.5
–	–	–	–	0,025	1
–	–	–	–	0,05	2
–	–	–	–	0,1	4
–	–	0,2	8	0,2	8
0,4	16	0,4	16	–	–
0,8	32	0,8	32	–	–
1,6	63	1,6	63	–	–
3,2	125	3,2	125	–	–
6,3	250	6,3	250	–	–
12,5	500	12,5	500	–	–
–	–	25	1000	–	–

NOTES

1 The values given in table 1 are selected from one of the preferred series of ISO/R 468. In cases when it is necessary to provide specimens in intermediate values, these should be chosen from the R 10 series of preferred numbers.

2 Certain of the finer values are included primarily to give design office personnel some idea of the differences that can be detected (between, say, 0,0125, 0,025, 0,05 and 0,1 μm) by visual means.

3 Specimens represent surfaces produced entirely by the process represented.

TABLE 2 – **Sampling lengths**

Mean arithmetic deviation R_a		Sampling length					
		Spark-eroded		Shot and grit blasted		Polished	
μm	μin	mm	in	mm	in	mm	in
0,012 5	0.5	–	–	–	–	0,08	0.003
0,025	1	–	–	–	–	0,08	0.003
0,05	2	–	–	–	–	0,25	0.01
0,1	4	–	–	–	–	0,25	0.01
0,2	8	–	–	0,8	0.03	0,8	0.03
0,4	16	0,8	0.03	0,8	0.03	–	–
0,8	32	0,8	0.03	0,8	0.03	–	–
1,6	63	0,8	0.03	0,8	0.03	–	–
3,2	125	2,5	0.1	2,5	0.1	–	–
6,3	250	2,5	0.1	2,5	0.1	–	–
12,5	500	2,5	0.1	2,5	0.1	–	–
25	1000	–	–	2,5	0.1	–	–

NOTE – The dominant spacing of the specimen surfaces shall be not greater than the given sampling length.

8 CALIBRATION

Sufficient readings shall be taken across the direction of lay of the surface at evenly distributed positions to enable the mean value and the standard deviation to be determined. 25 readings have been found sufficient for many engineering surfaces but this number may be decreased for periodic surfaces or increased to meet excessive scatter of results.

The mean value of the readings should not vary from the nominal value by an amount greater than the percentage of the nominal value as given in table 3.

The standard deviation from the mean value should not be greater than an amount equal to the percentage of the nominal value as given in table 3.

The figures are to be based on readings obtained with an instrument working correctly in accordance with ISO . . .[1] and which includes from 3 to 6 sampling lengths within a traversing length. If the instrument used for a determination has a known or assumed error, this error should be taken into consideration. If other numbers of sampling lengths are included in the instrument reading the value for standard deviation so derived from the 25 readings should be calculated in accordance with ISO . . .[2].

TABLE 3 – **Tolerance values for roughness comparison specimens**

Type of specimens	Tolerance on mean value (percentage of nominal value)		Standard deviation (percentage of effective value)
Spark-eroded	+ 12	– 17	12
Shot and grit blasted	+ 12	– 17	12
Polished	+ 12	– 17	12

NOTE – The values for standard deviation have been derived from measurements using instruments each having a traversing length containing from 3 to 6 sampling lengths. When other instruments which do not have this characteristic are used, the values for standard deviation should be derived in accordance with ISO . . .[2].

9 LAY

9.1 Direction

The general direction of the lay should preferably be parallel to the shorter side of the specimen.

9.2 Lay characteristics

The lay characteristics should be as given in table 4.

TABLE 4 – **Lay characteristics**

Lay description	Production process represented	Form of specimen
non-directional	Spark-erosion	flat
	Shot blasting Grit blasting	flat
multi-directional	Polishing	flat convex-cylindrical

10 MARKING

Each specimen, or its mounting, should be marked with the following :

10.1 The mark "ISO" together with, where applicable, the roughness number (see table 5).

10.2 *The nominal R_a value expressed in micrometres and,* where required, also in micro-inches.

10.3 The production process represented by the specimen, i.e. spark-eroded, shot blasted, etc.

NOTES

1 Consideration will be given to the inclusion of requirements for the additional marking of other parameters as these are defined and adopted.

2 Marking should not be applied to the reference surface of the specimen.

TABLE 5 – **Nominal values and related roughness numbers of roughness comparison specimens**

Roughness* number	Nominal values of R_a	
	μm	μin
**	0,012 5	0.5
N1	0,025	1
N2	0,05	2
N3	0,1	4
N4	0,2	8
N5	0,4	16
N6	0,8	32
N7	1,6	63
N8	3,2	125
N9	6,3	250
N10	12,5	500
N11	25	1 000

* ISO 1302.

** No roughness number is allocated to this R_a value.

1) In preparation.

2) International Standard on specimen calibration (in preparation).