UDC 62 – 408 : 681.2

Ref. No. : ISO/R 1880-1970 (E)

Transformell

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 1880

INSTRUMENTS FOR THE MEASUREMENT OF SURFACE ROUGHNESS BY THE PROFILE METHOD

CONTACT (STYLUS) INSTRUMENTS OF PROGRESSIVE PROFILE TRANSFORMATION

PROFILE RECORDING INSTRUMENTS

1st EDITION

August 1970

Printed in Switzerland

Also issued in French and Russian. Copies to be obtained through the national standards organizations.

BRIEF HISTORY

The ISO Recommendation R 1880, *Instruments for the measurement of surface roughness by the profile method – Contact (stylus) instruments of progressive profile transformation – Profile recording instruments,* was drawn up by Technical Committee ISO/TC 57, *Surface finish,* the Secretariat of which is held by the Komitet Standartov, Mer i Izmeritel'nyh Priborov pri Sovete Ministrov S.S.S.R. (GOST).

Work on this question led to the adoption of Draft ISO Recommendation No. 1880, which was circulated to all the ISO Member Bodies for enquiry in June 1969. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Austria	India	Romania
Belgium	Israel	South Africa, Rep. of
Canada	Italy	Sweden
Chile	Japan	Switzerland
Czechoslovakia	Norway	U.A.R.
Denmark	New Zealand	United Kingdom
Germany	Peru	U.S.A.
Greece	Poland	
Hungary	Portugal	

The following Member Bodies opposed the approval of the Draft :

Australia
France

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided to accept it as an ISO RECOMMENDATION.

ISO Recommendation | R 1880 | August 1970

INSTRUMENTS FOR THE MEASUREMENT OF SURFACE ROUGHNESS BY THE PROFILE METHOD

CONTACT (STYLUS) INSTRUMENTS OF PROGRESSIVE PROFILE TRANSFORMATION

PROFILE RECORDING INSTRUMENTS

1. SCOPE

This ISO Recommendation relates to contact profile recording instruments used for the measurement of surface roughness.

Its purpose is to establish

- the basic terms, definitions and symbols relating to profile recording instruments;
- the main parameters of these instruments and their numerical values;
- the standards of accuracy for profile recording instruments (admissible values for errors of vertical and horizontal magnifications, deviations of the tip radius of the stylus and stylus angle).

2. TERMS AND DEFINITIONS

2.1 *Profile recording instrument.* An instrument recording the coordinates of the profile of the surface.

2.2 *Vertical magnification of a profile recording instrument* (V_v). The scale of transformation of the profile coordinates, by the profile recording instrument, in the direction of stylus displacement normal to the surface.

2.3 *Horizontal magnification of a profile recording instrument* (V_h). The scale of transformation of the profile coordinates, by the profile recording instrument, in the direction of stylus displacement along the surface.

NOTE. – (Definitions 2.2 and 2.3). By "scale of transformation" is meant the relationship between the recorded quantity and the displacement of the stylus in the relevant direction. In the case of a profile graph it is therefore the ratio of the movement of a pen or a carrier to that of the stylus in the relevant direction.

2.4 *Relative error of vertical magnification of a profile recording instrument* (δ_v). The difference between the real and the nominal values of the vertical magnification of a profile recording instrument, referred to the nominal value and expressed as a percentage.

2.5 *Relative error of horizontal magnification of a profile recording instrument* (δ_h). The difference between the real and the nominal values of horizontal magnification of a profile recording instrument, referred to the nominal value and expressed as a percentage.

2.6 *Recording traversing length.* The maximum recording movement of the stylus along the surface, as permitted by the construction of the instrument.

2.7 *Static measuring force of a contact profile recording instrument.* The force which the stylus exerts on the examined surface, without taking into account the dynamic components arising in the process of traversing the surface by a stylus.

2.8 *Rate of change of measuring force of a contact profile recorder.* The change, per unit displacement, of the static measuring force acting on the stylus along its axis.

Definitions of the terms "Surface roughness" and "Irregularities" used in this ISO Recommendation are given in ISO Recommendation R 468, *Surface roughness.*

Definitions of the terms "Instrument for the measurement of surface roughness by the profile method" and "Contact (stylus) instrument of progressive transformation of a profile" are given in ISO Recommendation R 1879, *Instruments for the measurement of surface roughness by the profile method – General statements – Terms and definitions.*

3. BASIC PARAMETERS

3.1 Stylus tip radius

The nominal value of the tip radius of the stylus should be selected from the following series :

2 µm 5 µm 10 µm

3.2 Included angle of the stylus

The nominal value of the included angle of the stylus should be

1.05 rad (60°) or 1.57 rad (90°)

3.3 Measuring force

The measuring force of an instrument should ensure continuous contact of the stylus with the profile being measured.

The maximum values of static stylus force and the rate of change of measuring force shown in Table 1 are recommended.

TABLE 1 – **Measuring force**

Nominal value of the stylus tip radius, micrometres	2	5	10
Maximum static measuring force at mean level of the stylus, newtons (grammes-force)	0.0007 (0.07)	0.004 (0.4)	0.016 (1.6)
Maximum rate of change of measuring force, newtons per metre (grammes-force per micrometre)	35 (0.0035)	200 (0.02)	800 (0.08)

NOTE. – The values given in Table 1 for the maximum rate of change of measuring force are provisional and may be amended.