International Standard 5970

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Furniture — Chairs and tables for educational institutions — Functional sizes

Ameublement — Sièges et tables pour établissements d'enseignement — Dimensions fonctionnelles

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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 5970 was developed by Technical Committee ISO/TC 136, *Furniture*, and was circulated to the member bodies in July 1977.

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

Austria	Iran	Romania
Bulgaria	Ireland	South Africa, Rep. of
Canada	Israel	Spain
Czechoslovakia	Italy	United Kingdom
Germany, F. R.	Japan	Yugoslavia
Hungary	Mexico	
India	Poland	

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Denmark
France
Netherlands
Sweden

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Furniture — Chairs and tables for educational institutions — Functional sizes

0 Introduction

This International Standard has been prepared adopting the principle that seating and tables should be designed to encourage good postures for all those using them in educational institutions. The dimensions specified in this International Standard are confined to those which derive from anthropometric data. Compliance with this International Standard ensures that the furniture permits good seating postures, yet allows designers and manufacturers the freedom to meet local technical, educational and economic circumstances.

A reference stature for each of the seven sizes of furniture is given as a guide to its distribution; adjustments to the distribution of the seven sizes to populations with significantly different body proportions may, however, be necessary. It is recommended that national surveys are made in order to establish the best distribution of the furniture sizes for local school populations.

The seven sizes for seating and related tables in this International Standard can satisfy the seating requirements in all educational institutions (other than "special schools").

The higher table heights may also serve as standing work heights for smaller pupils; for standing work heights for taller pupils the range of heights will eventually be extended in a further part of this International Standard.

1 Scope and field of application

This International Standard specifies the basic functional sizes for seating and tables in educational institutions. It does not include any special requirements that apply to "special schools" or to adjustable furniture. This International Standard does not include requirements for materials, design, construction or quality.

2 Dimensions

Dimensions for seating are given in table 1, and for tables in table 2. The references to the dimensions are shown in figure 1 (dimensions in section) and figure 2 (dimensions in plan).[1)]

In table 2 the minimum depth (t_1) and the minimum length (b_1) are for tables specifically for single and dual use.

The leg clearance zone as defined by dimensions h_2, h_3, h_4, b_2, t_2 and t_3 must be provided under all tables at which pupils will be seated.

Any construction or storage under the table top shall be designed to provide a leg clearance zone that is not less than the minimum specified.

1) Tolerances in table 1 and table 2 are not manufacturing tolerances but intervals for the functional dimensions.

Table 1 — Seating

Dimensions in millimetres

Identification		Sizemark	0[1]	1	2	3	4	5	6
		Colour	white	orange	violet	yellow	red	green	blue
Reference stature — average body height			900	1 050	1 200	1 350	1 500	1 650	1 800
h_5	Height of seat[2] (tolerance ± 10)		220	260	300	340	380	420	460
t_4	Effective depth of seat[3] (tolerance ± 10)		—	260	290	330	360	380	400
b_3	Minimum width of seat		—	250	270	290	320	340	360
W	Reference point for β[4]		—	160	170	190	200	210	220
h_6	Maximum height to bottom of backrest[5][6]		—	120	130	150	160	170	190
h_7	Height to top of backrest[6]	min.	—	210	250	280	310	330	360
		max.	—	250	280	310	330	360	400
b_4	Minimum width of backrest[7]		—	250	250	250	280	300	320
r_1	Radius of front edge of the seat[8]		—	30 to 50	30 to 50	30 to 50	30 to 50	30 to 50	30 to 50
r_2	Minimum radius of backrest[9]		—	300	300	300	300	300	300
δ	Angle of seat[10]		—	0° to 4°	0° to 4°	0° to 4°	0° to 4°	0° to 4°	0° to 4°
β	Inclination of backrest[11]		—	95° to 106°	95° to 106°	95° to 106°	95° to 106°	95° to 106°	95° to 106°

1) For size 0, the identification colour and the height of seat only are standardized.

2) h_5 is measured to the highest point of the front of the seating area on the centre line.

3) t_4 is measured on the centre line of the seat plane from the front edge to a perpendicular line from reference point W.

4) W is the maximum height of foremost point of backrest.

5) Room for free movement of the posterior in the writing position should be ensured.

6) h_6 and h_7 are measured on the centre line of the seat plane from the lowest part of the seating surface.

7) The upper and lower edge of the backrest should be well rounded.

8) r_1 is the approximate radius of the top surface. The curve need not be an exact arc of a circle.

9) r_2 is the radius of the backrest in a horizontal plane.

10) δ : the main part of the seating surface shall lie between the horizontal and a slope of 4° maximum. The seating surface may be flat or include dishing. Any dishing shall occur in the back two-thirds of the effective seat depth. The deepest part of the dishing shall occur at the back part of the effective seat depth.

11) β is the angle between the horizontal and the plane of the backrest between h_7 and W on the centre line of the seat. The profile of the backrest between h_6 and W is not defined.

Table 2 — Tables

Dimensions in millimetres

Identification	Sizemark	0[1]	1	2	3	4	5	6
	Colour	white	orange	violet	yellow	red	green	blue
Reference stature — average body height		900	1 050	1 200	1 350	1 500	1 650	1 800
h_1 Height of top[2)3)] (tolerance ± 10)		400	460	520	580	640	700	760
h_2 Minimum height of legroom[3)]		—	350	410	470	530	590	650
h_3 Minimum height of knee zone		—	350	350	400	400	450	500
h_4 Minimum height of tibia zone		—	250	250	300	300	350	350
t_1 Minimum depth of top[4)]		—	450	500	500	500	500	500
b_1 Minimum length of top[4)]	single table	—	600	600	700	700	700	700
	double table	—	1 200	1 200	1 300	1 300	1 300	1 300
b_2 Minimum width of knee zone		—	450	470	470	470	470	500
t_2 Minimum depth of knee zone		—	300	300	300	350	400	400
t_3 Minimum depth of tibia zone		—	400	400	400	400	450	450

1) For size 0, the identification colour and the height of top only are standardized.

2) h_1 : Table top surfaces specified in this International Standard are horizontal. However, should an inclined surface be required an inclination of 10 to 16° is recommended. The edge towards the pupil shall stay at approximately the same height as when the table is horizontal.

3) $h_1 - h_2$: If a shelf is provided within this zone, the opening should be not less than 60 mm high.

4) Table 2 gives the preferred sizes of the minimum depth and length of table tops. For standardization purposes it is recommended that these sizes be applied. However, if it is necessary to deviate from these sizes, the following incremental sizes should be used :

size b_1 : from 450 mm to 800 mm : 50 mm increment
from 800 mm to 2 000 mm : 100 mm increment

size t_1 : from 450 mm to 1 200 mm : 50 mm increment

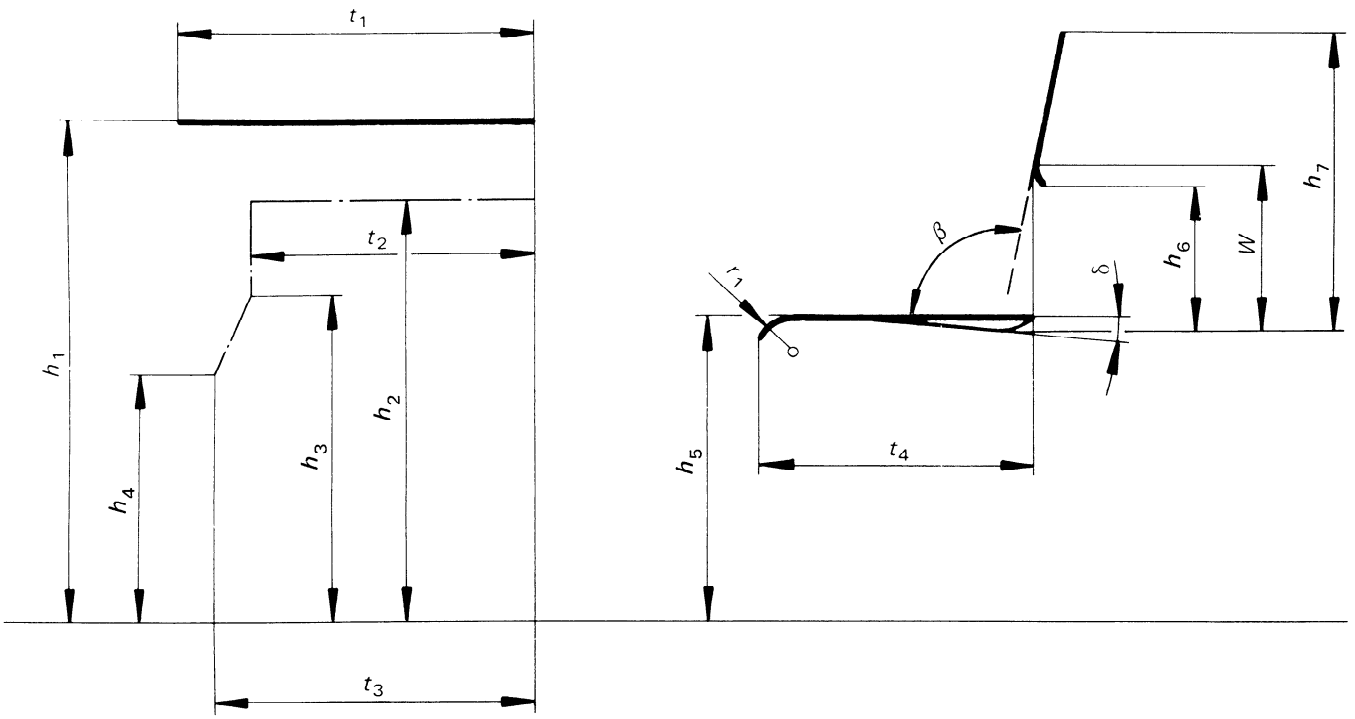


Figure 1 — Dimensions in section

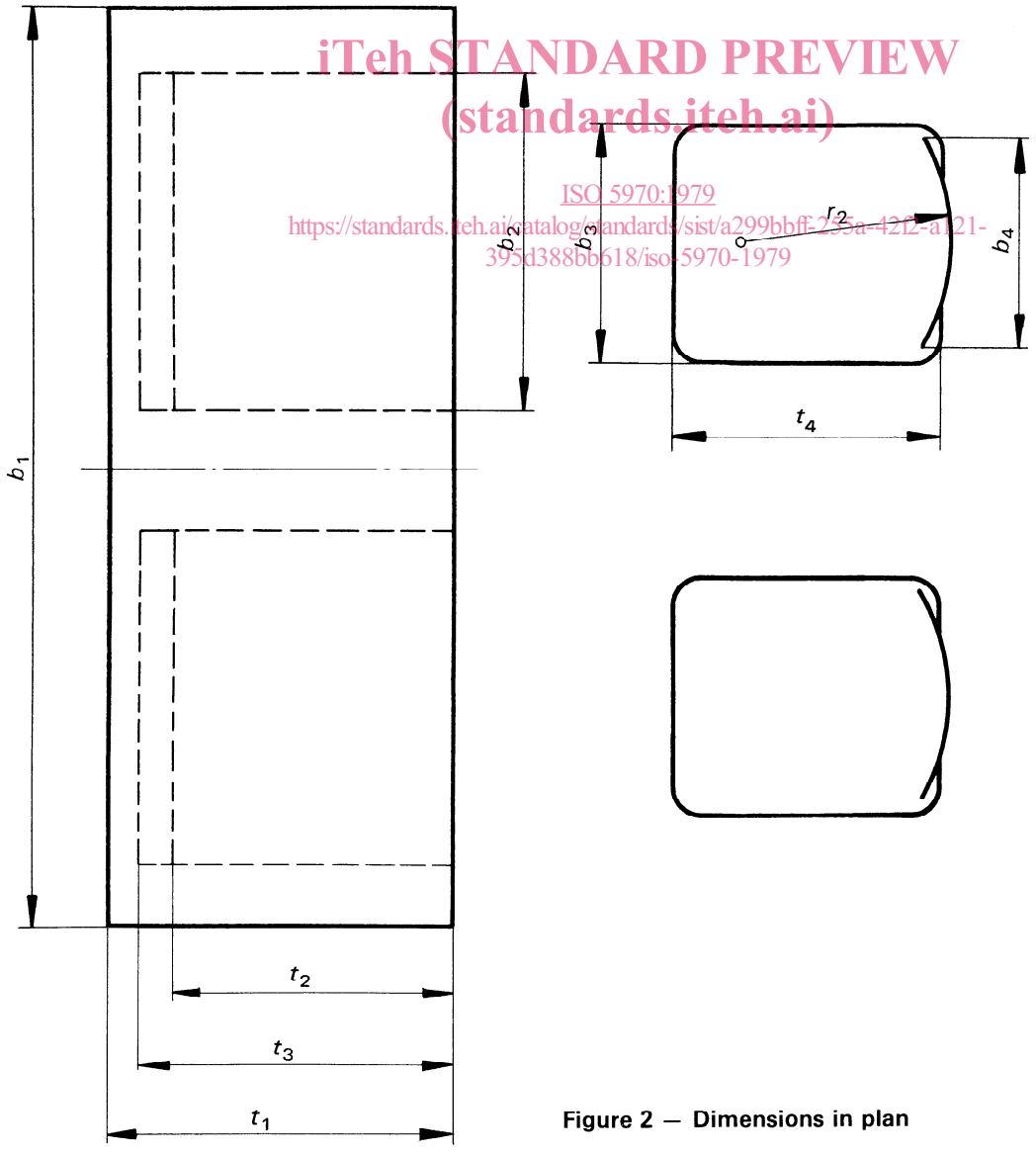


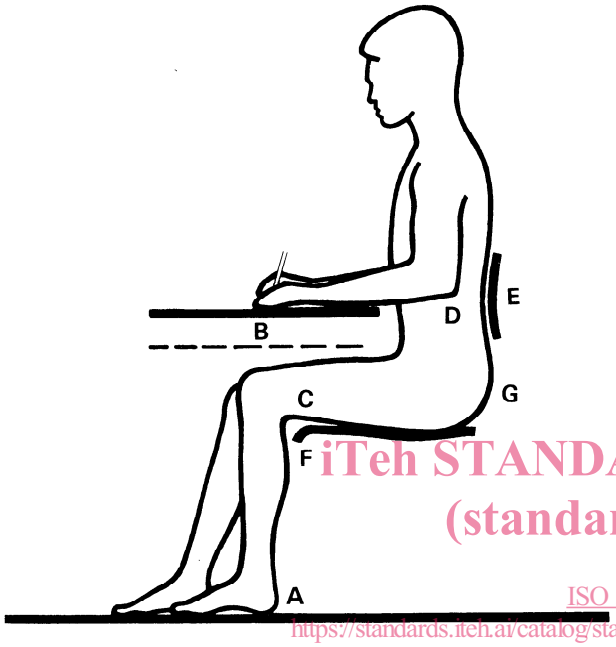
Figure 2 — Dimensions in plan

3 Relationship of seat and table

It is appreciated that there are many sitting postures which are adopted by pupils in schools. For assessing the fit of chair and table it is necessary to adopt the posture and check the seven criteria as illustrated in figure 3. The indication of a good fit is the simultaneous satisfaction of all the criteria illustrated in the figure.

4 Marking

Seating and tables made in accordance with this International Standard shall be indelibly marked with the sizemark reference or the colour code or both.



A Feet, with shoes on, shall be flat on the floor.

B There shall be sufficient clearance between thigh and underside of table to allow for freedom of movement.

C There shall be no pressure at the front of the seat between the seating surface and the thighs.

D The height of the table shall be selected so that the elbows are at approximately the same level as the front edge of the table top when the upper arm is suspended vertically.

E The backrest shall support the back in the lumbar region and below the shoulder blades in a firm manner.

F There shall be clearance between the back of the legs and the front edge of the seat.

G Adequate clearance between lumbar support and seat shall be provided to ensure free movement of the buttocks.

Figure 3 — Method of assessing fit of chair and table

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