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Analogue quartz clocks — Fitting dimensions of movements to hands

Pendules et pendulettes analogiques à quartz — Dimensions d'ajustement des mouvements et des aiguilles

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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 13074 was prepared by Technical Committee ISO/TC 114, *Horology*.

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Introduction

The annual world trade of clocks represents hundreds of millions of units. Clock design, trade and after-sale service are complicated by the lack of standards in many areas. One of them is the fitting dimensions of movements to hands.

As there are no coherent standards to be referred to, unlimited numbers of fitting dimensions are used by the producers, increasing the stocks and the production costs of movements and hands. This also causes unnecessary problems between suppliers and purchasers because of the large numbers of available adjustments.

A standard dedicated to the fitting dimensions of movements to hands will significantly minimize the number of pieces and improve interchangeability. The aim is also to increase productivity, reduce production costs and reduce stocks, thus facilitating the global trade of quartz clocks.

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Analogue quartz clocks — Fitting dimensions of movements to hands

1 Scope

This International Standard specifies the fitting dimensions of movements to hands. It is applicable to analogue quartz table and wall clock movements, with and without alarm, that have the following properties:

— minute wheel shafts with an outer diameter of between 1,3 mm and 3,6 mm;

— hour wheel, minute wheel, second wheel and alarm wheel shafts made of metal and plastic material.

This International Standard can be referenced for other types of analogue quartz clock movements.

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 286-1, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 1: Basis of tolerances, deviations and fits*

ISO 286-2, *Geometrical product specifications (GPS) — ISO code system for tolerances on linear sizes — Part 2: Tables of standard tolerance classes and limit deviations for holes and shafts*

ISO 1119, *Geometrical product specifications (GPS) — Series of conical tapers and taper angles*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 286-1, ISO 286-2 and ISO 1119 apply.

4 Symbols and abbreviated terms

See Figure 1 to Figure 4.

|	
d_1, D_1	fitting nominal diameter of hour wheel shaft and hour hand
d_2, D_2	fitting nominal diameter of minute wheel shaft and minute hand
d_3, D_3	fitting nominal diameter of second wheel shaft and second hand
d_4, D_4	fitting nominal diameter of alarm wheel shaft and alarm hand
h_1	assembled height of hour wheel shaft to hour hand
h_2	assembled height of minute wheel shaft to minute hand
h_3	assembled height of second wheel shaft to second hand
h_4	assembled height of alarm wheel shaft to alarm hand
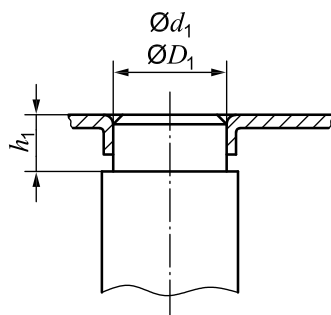
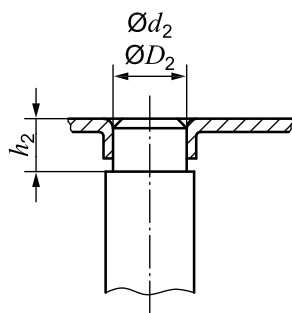**Figure 1 — Fitting dimensions of hour wheel shaft and hour hand**

Figure 2 — Fitting dimensions of minute wheel shaft and minute hand
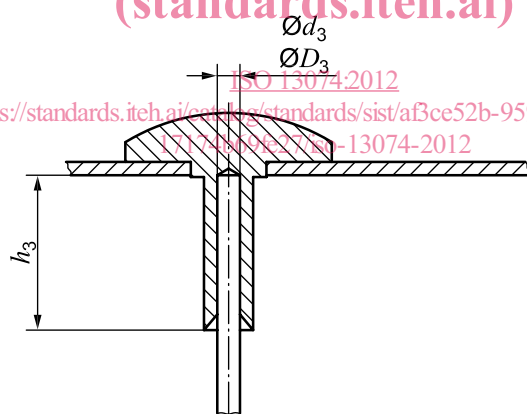
Figure 3 — Fitting dimensions of second wheel shaft and second hand
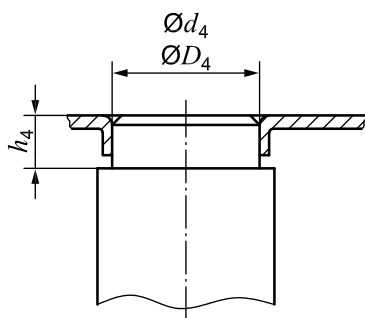
Figure 4 — Fitting dimensions of alarm wheel shaft and alarm hand

NOTE 1   The hour, minute, second and alarm wheel shafts can be cone- or cylinder-shaped and can be straight without step. Other shapes are also feasible, for instance cylindrical with two flat sides. When the shaft is cone-shaped, the dimension d indicates the top end of the shaft.

NOTE 2   In many kinds of movements, the minute wheel shaft and minute hand have an oblong shape. This International Standard does not take this shape into account.

5   Assembled heights and nominal diameters

5.1   Movements without alarm

The dimensions for movements without alarm are given in Table 1.

Table 1 — Dimensions for movements without alarm

Dimensions in millimetres

h_1, h_2	h_3	d_1 and D_1 ∅	d_2 and D_2 ∅	d_3 and D_3 ∅
0,7	2,0		2,2	
1,0	3,0	3,1	2,5	0,5
2,5	4,0	3,6	(3,17)	0,6
2,8	5,0	5,0	3,2	0,9
3,1	6,0	5,5	3,6	1,0
NOTE Values with parentheses are auxiliary dimensions.				

5.2   Movements with alarm

The dimensions for movements with alarm are given in Table 2.

Table 2 — Dimensions for movements with alarm

Dimensions in millimetres

h_1, h_2	h_3	h_4	d_1 and D_1 ∅	d_2 and D_2 ∅	d_3 and D_3 ∅	d_4 and D_4 ∅
	1,0			1,30		
	1,5		2,00	1,40		3,00
0,6	2,0	0,6	2,15	1,70	0,35	3,60
0,8	2,2	0,8	2,60	1,85	0,40	4,40
0,9	2,5	0,9	3,20	2,00	0,50	(4,45)
1,0	2,8	1,0	3,60	2,30	0,80	5,00
1,6	3,0	1,5	4,00	2,50	1,00	5,30
	3,5			3,00		
NOTE Values with parentheses are auxiliary dimensions.						

6   Assembling the fitting

Experience has shown that tightening values are included in a range from 0,01 mm to 0,09 mm, depending on the materials used for wheel shafts and hands. Manufacturers select the fit tolerance accordingly.

To obtain these tightening values, the fit tolerances of hour, minute, second and alarm wheel shafts can be chosen in h9, js9,5 and k9,5. As an auxiliary tolerance, d9,5 can be used.

7 Taper

If the hour, minute, second or alarm wheel shaft is cone-shaped, the taper can be applied at 1:50 to 1:10.

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