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Flywheel housings for reciprocating internal combustion engines — Nominal dimensions and tolerances

Carter de volant moteur pour moteurs alternatifs à combustion interne — Dimensions nominales et tolérances

Reference number
ISO 7648 : 1987 (E)

Foreword

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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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7648 was prepared by Technical Committee ISO/TC 22, *Road vehicles.*

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Flywheel housings for reciprocating internal combustion engines — Nominal dimensions and tolerances

1 Scope and field of application

This International Standard specifies the nominal dimensions and tolerances of flywheel housings for reciprocating internal combustion engines, in particular those which affect interchangeability with mating parts.

It applies to reciprocating internal combustion engines except engines for aircraft and passenger cars.

Flywheel housings of size codes 1 to 4 are recommended for commercial vehicles and buses.

2 References

ISO 273, *Fasteners — Clearance holes for bolts and screws.*

ISO 1101, *Technical drawings — Geometrical tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings.*

ISO 7649, *Commercial vehicles — Clutch housings for internal combustion engines — Nominal dimensions and tolerances.*[1)]

3 Nominal dimensions and tolerances

3.1 Flywheel housing

See figure 1 and table 1.

1) At present at the stage of draft.

Table 1 — Flywheel housing dimensions and tolerances

Dimensions in millimetres

Size code	*A* nom.	*A* tol.	Run-out (assembled flywheel housing) *t*	*B* nom.	*D** min.
02	1 245	+ 0,25 0	not applicable	1 400	10
01	1 010,00	+ 0,25 0	not applicable	1 165	10
00	787,40	+ 0,25 0	0,47	883	8
0	647,70	+ 0,25 0	0,39	711	8
1/2	584,20	+ 0,20 0	0,35	648	8
1	511,18	+ 0,13 0	0,31	553	8
2	447,68	+ 0,13 0	0,27	489	8
3	409,58	+ 0,13 0	0,25	451	8
4	361,95	+ 0,13 0	0,25	404	8
5	314,32	+ 0,13 0	0,25	356	8
6	266,70	+ 0,13 0	0,25	308	8

* Dimension *D* relates to flywheel housings without rubber sealing. However, this dimension may be increased if a rubber seal is necessary.

NOTE — Run-out tolerances *t* shall be measured on the assembled engine mounted on its supports in accordance with the annex. (See ISO 1101 for definition of run-out.)

Dimensions in millimetres

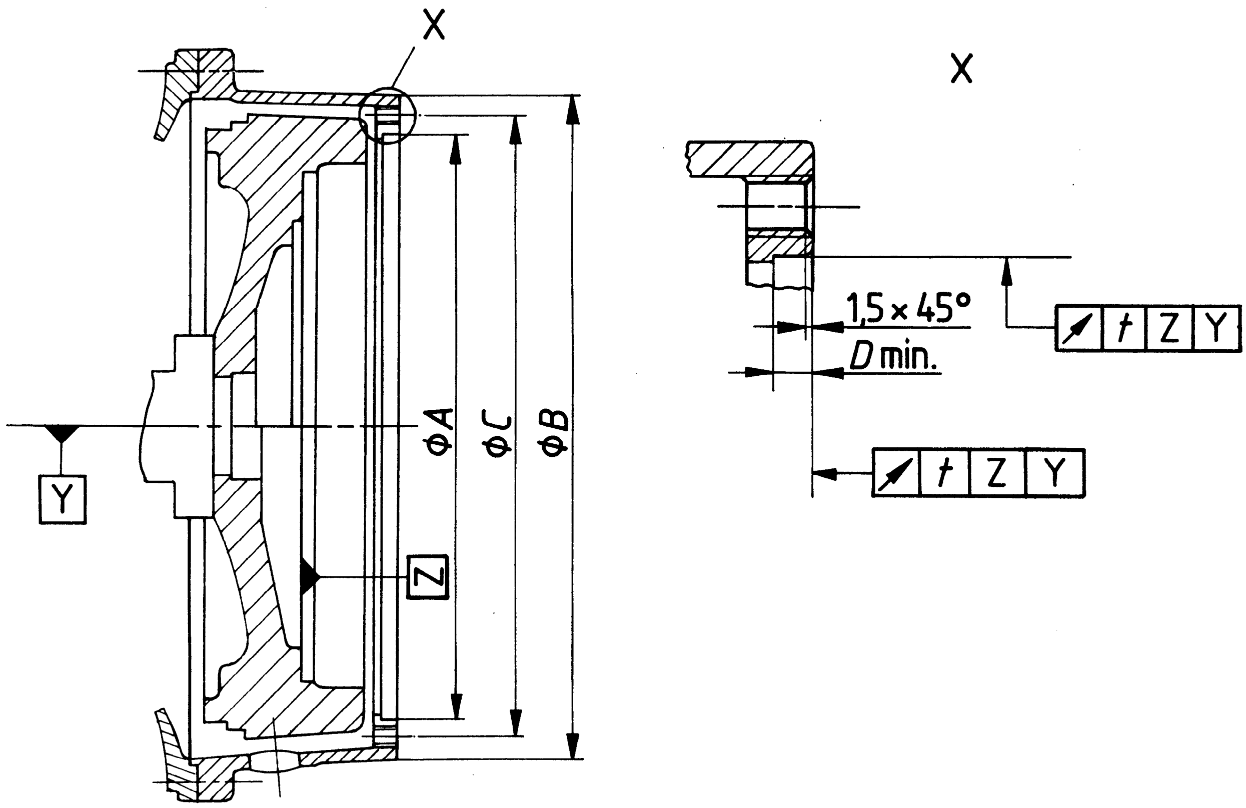


Figure 1 — Flywheel housing

3.2 Bolt or screw spacing and size

3.2.1 Dimensions and tolerances

See figure 1 and table 2.

Table 2 — Tapped holes and bolt or screw spacing and dimensions

Size code	Tapped holes		Recommended thread engagement		*C* nom. mm (see figures 1 and 2)
	Number	Size			
02	24	M16	For cast iron flywheel housing 1,5 × ø nom. of bolt or screw	For aluminium flywheel housing 2 × ø nom. of bolt or screw	1 340,00
01	24	M16			1 105,00
00	16	M12			850,90
0	16	M12			679,45
1/2	12	M12			619,12
1	12	M10*			530,22
2	12	M10			466,72
3	12	M10			428,62
4	12	M10			381,00
5	8	M10			333,38
6	8	M10			285,75

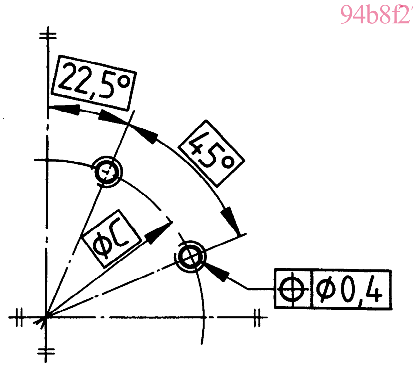
* M12 may be used for high engine torque applications.

NOTE — 24 tapped holes are optional for aluminium flywheel housings of size code 1.

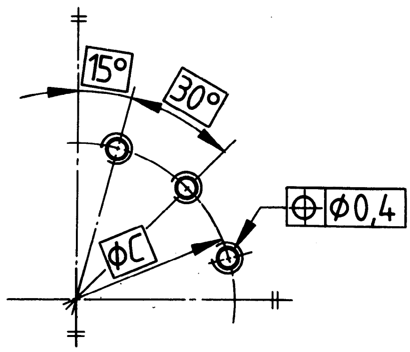
3.2.2 Spacing

Tapped holes shall be spaced equally on each side of the vertical and horizontal axis lines as shown in figure 2.

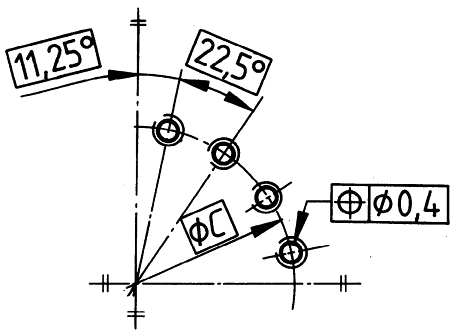
Dimensions in millimetres



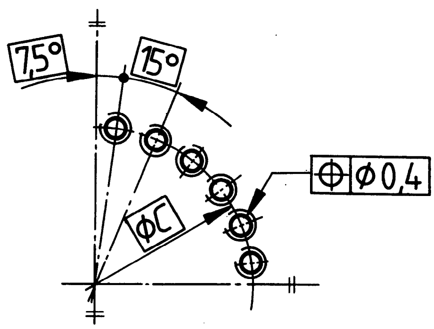
a) **8 tapped hole spacing**



b) **12 tapped hole spacing**



c) **16 tapped hole spacing**



d) **24 tapped hole spacing**

Figure 2 — Bolt or screw hole spacing

4 Relationship of pilot bearing bore to flywheel housing

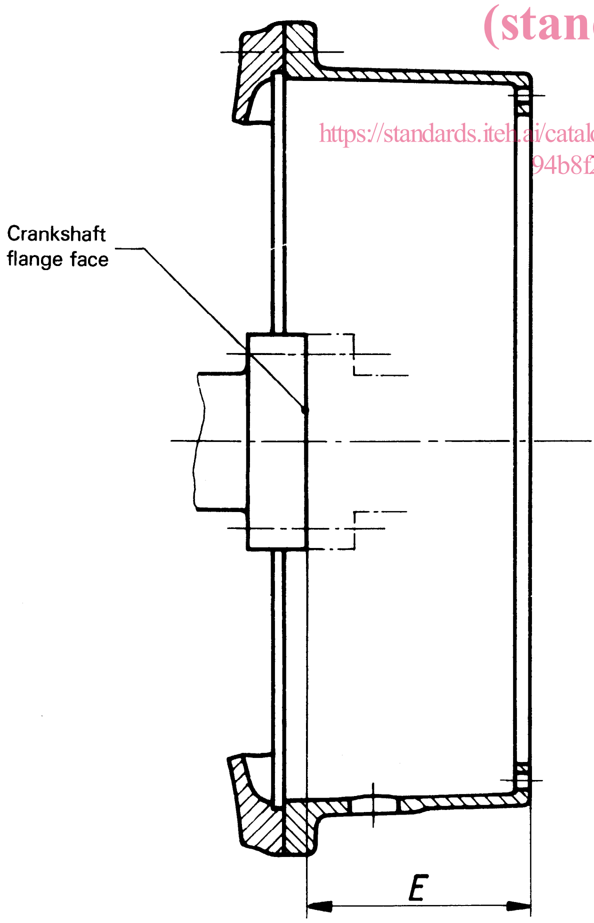
The depth of the pilot bearing bore (see *E* in figure 3) extends from the flywheel housing face to a shoulder in the flywheel, to a shoulder within the crankshaft or to the crankshaft flange face.

Table 3 — Depth of pilot bearing bore

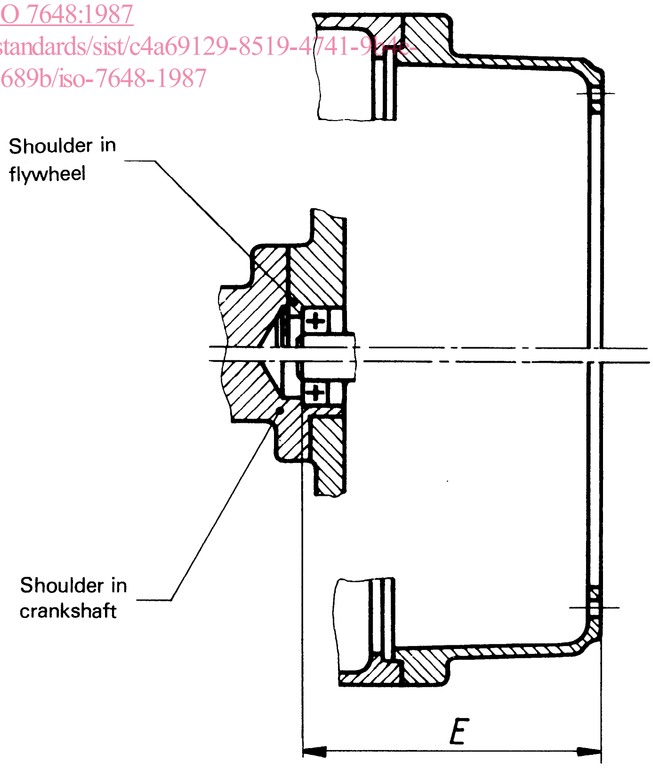
Dimensions in millimetres

Size code	*E* nom.	*E* nom. optional for: double plate clutches when extra-heavy flywheel is used	*E* nom. optional for: overcentre clutch
02	265	—	—
01	265	—	—
00	100	133,4	—
0	100	133,4	—
1/2	100	133,4	—
1	100 — 112[1)]	133,4	—
2	100 — 112[1)]	—	—
3	100	—	—
4	100	—	71
5	71	—	100
6	71	—	—

1) An *E* dimension of 112 mm is optional for flywheel housing size codes 1 and 2 when the clutch shaft bearing is located in the pilot bearing bore of the flywheel or crankshaft end, i.e. when the bearing is not located in a separate carrier.



(for size code 01, 02)



Pilot bearing bore in crankshaft end or flywheel
(for size codes 00 to 6)

Figure 3 — Depth of pilot bearing bore

5 Mating part flange (for example, clutch housings)

The dimensions and tolerances of clutch housings for reciprocating internal combustion engines are given in ISO 7649.

Limits and fits of the pilot diameter of the mating part are at the discretion of the manufacturer of that component. The manufacturer shall also specify the tolerances of form and position of the mating part flange.

The clearance holes of the mating part flange shall have the same location as specified under 3.2.2 and shall be in accordance with ISO 273.

Annex

Procedure for measuring bore eccentricity and face deviation

(This annex forms an integral part of the Standard.)

A.1 Scope

This annex provides a uniform procedure for measuring bore eccentricity and face deviation (run-out) of flywheel housings after assembly to an engine. Limits of bore eccentricity and face deviation are given in table 1.

A.2 Measuring procedures

A.2.1 General

A.2.1.1 A dial indicator with rigid extension bars is required.

A.2.1.2 Surfaces which are to be measured shall be free from dirt and burrs.

A.2.1.3 Prepare a chart as shown in table 4 to help in determining bore eccentricity.

A.2.2 Eccentricity of housing

A.2.2.1 Mount the indicator base on the flywheel or crankshaft flange as close as possible to the housing pilot bore to minimize deflection.

A.2.2.2 Adjust the indicator point to be perpendicular to the housing pilot bore and set at zero in the 6 o'clock (mandatory) position (lower vertical).

A.2.2.3 Slowly rotate the crankshaft and record the indicator reading along with the appropriate positive or negative sign at the 9 o'clock (a), 12 o'clock (b), and 3 o'clock (c) locations. Confirm that the 6 o'clock reading is still zero. Record the readings on line A in table 4, being sure to include the positive or negative sign.

Table 4 — Data chart

Designation	6 o'clock	9 o'clock	12 o'clock	3 o'clock
A Observed indicator reading	0	a =	b =	c =
B Adjustment for bearing clearance	—	—	d =	—
C Half-bearing clearance adjustment	—	$d/2$ =	—	$d/2$ =
D Total corrected vertical indicator reading	I_V =			
E Corrected horizontal indicator reading	—	E_1 =	—	E_2 =
F Total horizontal indicator reading	I_H =			

$I_V = b + d$

$E_1 = a + d/2$

$E_2 = c + d/2$

$I_H = E_1 - E_2$

$I_R = \sqrt{(I_V)^2 + (I_H)^2}$

CAUTION — Sign designation relative to direction of indicator tip movement is not the same for all indicators. For all measurements in the calculations carried out in accordance with A.2.2, outward movement of the indicator tip with respect to the centre of the bore being measured is to be considered a negative reading.

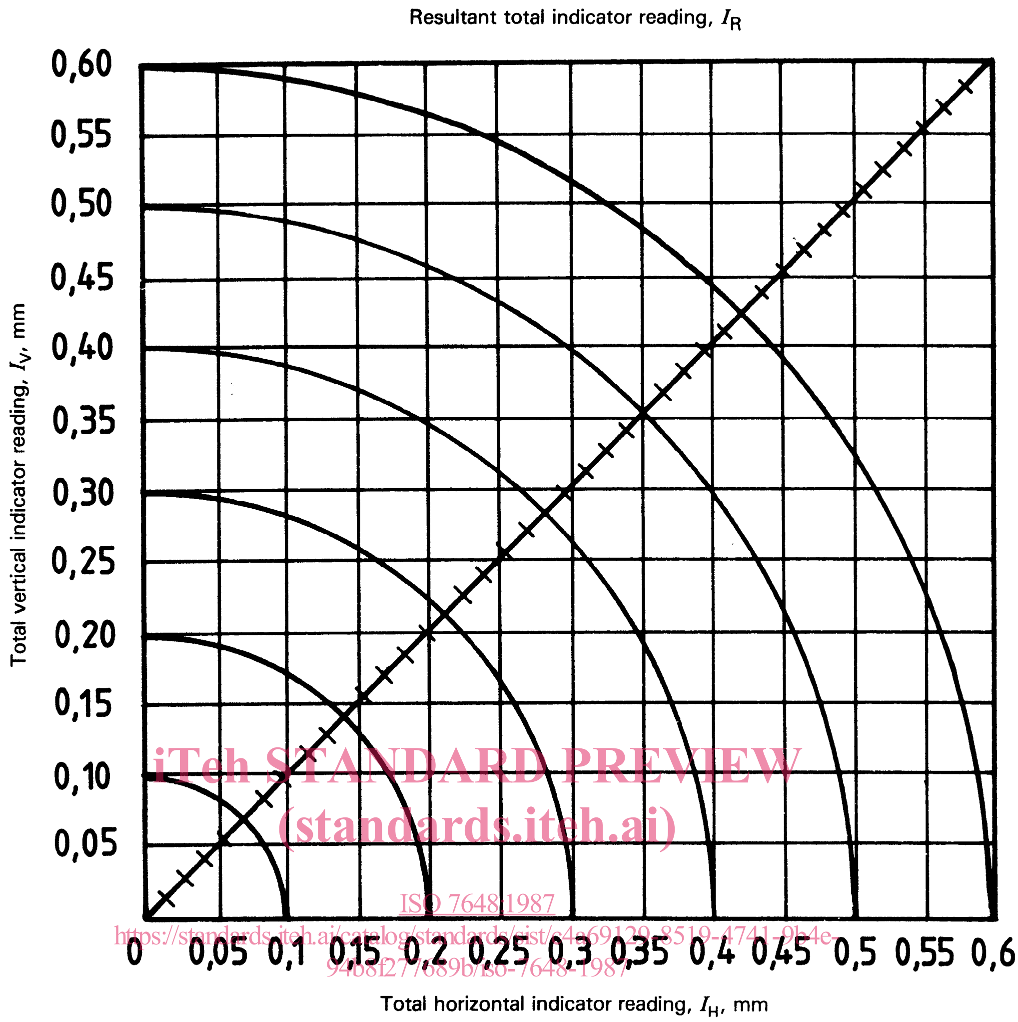


Figure 4 — Resultant total indicator reading, I_R

A.2.2.4 Position the indicator at the 12 o'clock location and determine *d*, the adjustment for clearance in the main bearing adjacent to the flywheel, by an appropriate method, for example by raising the crankshaft to its upper limit. Record the adjustment for bearing clearance on line B in table 4 in the 12 o'clock column. This value shall always be positive.

NOTE — A floor-mounted support with a padded prybar or other suitable means can be used to raise the flywheel; however it should not be forced beyond the point where the bearing clearance has been removed, nor should the housing be used as a fulcrum.

A.2.2.5 Correct the 12 o'clock reading obtained in A.2.2.3 by algebraically adding the adjustment for bearing clearance to it. This is the corrected total vertical indicator reading (I_V). Record this value on line D in table 4.

A.2.2.6 Correct the 3 o'clock and 9 o'clock readings from A.2.2.3 by algebraically adding an amount equal to one-half of the adjustment for bearing clearance determined in A.2.2.4 to each of them. This can be done by taking the clearance adjustment determined in A.2.2.4, dividing it by two, and entering it on line C in the 3 o'clock and 9 o'clock columns. Again, this value will always be positive. The readings, corrected for bearing clearance, can then be obtained by algebraically summing the values in lines A and C of the 3 o'clock and 9 o'clock columns. These values shall be denoted as E_1 and E_2 and entered on line E in table 4.