

INTERNATIONAL STANDARD

ISO
12129-1

First edition
1995-04-01

Plain bearings —

Part 1: Fits

Paliers lisses —

Partie 1: Ajustements



Reference number
ISO 12129-1:1995(E)

Foreword

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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.

International Standard ISO 12129-1 was prepared by Technical Committee ISO/TC 123, *Plain bearings*, Subcommittee SC 3, *Dimensions, tolerances and construction details*.

ISO 12129 consists of the following parts, under the general title *Plain bearings*:

- *Part 1: Fits*
- *Part 2: Tolerances on form and position and surface roughness for shafts, flanges and thrust collars*

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International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Plain bearings —

Part 1: Fits

1 Scope

This part of ISO 12129 specifies a system of fits applicable to metallic plain bearings used in general engineering for mean relative bearing clearances ψ_m of 0,56 ‰ up to 3,15 ‰.

This system of fits is not applicable to half-bearings and bushes which, due to their special characteristics, are not measured by diameter but by wall thickness, and which are dimensionally changed on assembly.

This part of ISO 12129 is applicable preferably to rotating machine parts and shafting, but it may be used similarly in other ranges of application.

This part of ISO 12129 has been established because it is not possible to use the ISO deviations given in ISO 286-1 and ISO 286-2 to develop clearance fits which correspond to the requirements of plain bearing engineering for approximately uniform mean relative bearing clearances for all nominal size ranges.

Other clearance ranges may be used depending upon the requirements in specific applications.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 12129. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 12129 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of

IEC and ISO maintain registers of currently valid International Standards.

ISO 286-1:1988, *ISO system of limits and fits — Part 1: Bases of tolerances, deviations and fits.*

ISO 286-2:1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts.*

3 System of fits

The system of fits specified in this part of ISO 12129 is a normal system of fits, in which the tolerance zone H of the bearing bore is in accordance with ISO 286-2. The tolerance zone of the shaft is correlated to correspond to the mean relative bearing clearance ψ_m .

4 Mean relative bearing clearance

The mean relative bearing clearance ψ_m , in per mill (‰), of a range of nominal dimensions is given by

$$\psi_m = \frac{S_m}{D_m}$$

where

S_m is the mean absolute bearing clearance, in micrometres

$$S_m = \frac{\text{max. clearance} + \text{min. clearance}}{2}$$

D_m is the arithmetic mean of the range of nominal dimensions, in millimetres.

5 Tolerance zones

5.1 Size

The size of the tolerance zones is chosen so that for a uniform mean relative bearing clearance ψ_m , in each case from the minimum to the maximum range of nominal dimensions, an approximately uniform maximum deviation from the relative bearing clearance within a tolerance zone is not exceeded. The lower limit is dictated by economy and methods of production.

The tolerance zone of the shaft in each case is smaller by one IT (basic tolerance in accordance with ISO 286-1) than the tolerance zone of the correlated bearing bore.

5.2 Position

The position of the tolerance zone relative to the zero line is determined by the mean relative bearing clearance ψ_m .

5.3 Number

Each of the following values of ψ_m , in per mill, corresponds to one tolerance zone:

0,56; 0,8; 1,12; 1,32; 1,6; 1,9; 2,24; 3,15.

5.4 Symbol

The symbol for the mean relative bearing clearance is ψ_m . In view of the method of lettering with data processing and on typewriters, the letters PSI are used instead of the Greek letter ψ .

6 Ranges of nominal dimensions

The ranges of nominal dimensions are more closely stepped than in ISO 286-2 so that the maximum deviation from the mean relative bearing clearance ψ_m can be more closely adhered to.

7 Deviations

The deviations for the shafts are given in table 1.

8 Minimum and maximum clearances

The minimum and maximum clearances between the shaft and bearing bore, together with the deviations for the shaft which are required for the calculation of the plain bearings, are given in table 1.

9 Example

Shaft fit dimension 200 mm for a mean bearing clearance $\psi_m = 1,12 \%$.

Ø200_{PSI 1,12}

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Nominal dimension range mm		Deviations for the shaft 1)								Maximum and minimum clearances between shaft and bearing bore 2)							
		μm								μm							
		Mean relative clearance, ψ_{mr} , ‰								Mean relative clearance, ψ_{mr} , ‰							
over	up to and incl.	0,56	0,8	1,12	1,32	1,6	1,9	2,24	3,15	0,56	0,8	1,12	1,32	1,6	1,9	2,24	3,15
25	30	— —	— 15 — 21	— 23 — 29	— 29 — 35	— 37 — 43	— 45 — 51	— 51 — 60	— 76 — 85	— —	30 15	38 23	44 29	52 37	60 45	73 51	98 76
30	35	— —	— 17 — 24	— 27 — 34	— 34 — 41	— 43 — 50	— 48 — 59	— 59 — 70	— 89 — 100	— —	35 17	45 27	52 34	61 43	75 48	86 59	116 89
35	40	— 12 — 19	— 21 — 28	— 33 — 40	— 36 — 47	— 47 — 58	— 58 — 69	— 71 — 82	— 105 — 116	30 12	39 21	51 33	63 36	74 47	85 58	98 71	132 105
40	45	— 14 — 21	— 25 — 32	— 34 — 45	— 43 — 54	— 55 — 66	— 67 — 78	— 82 — 93	— 120 — 131	31 14	43 25	61 34	70 43	82 55	94 67	109 82	147 120
45	50	— 18 — 25	— 25 — 36	— 40 — 51	— 50 — 60	— 63 — 74	— 77 — 88	— 93 — 104	— 136 — 147	36 18	52 25	67 40	76 49	90 63	104 77	120 93	163 136
50	55	— 19 — 27	— 26 — 39	— 43 — 56	— 53 — 66	— 68 — 81	— 84 — 97	— 102 — 115	— 149 — 162	40 19	58 26	75 43	85 53	100 68	116 84	144 102	181 149
55	60	— 22 — 30	— 30 — 43	— 48 — 61	— 60 — 73	— 76 — 89	— 93 — 106	— 113 — 126	— 165 — 178	43 22	62 30	80 48	92 60	108 76	125 93	145 113	197 165
60	70	— 20 — 33	— 36 — 49	— 57 — 70	— 70 — 83	— 80 — 99	— 99 — 118	— 121 — 140	— 180 — 199	53 20	68 36	90 57	102 70	129 80	148 99	170 121	229 180
70	80	— 26 — 39	— 44 — 57	— 60 — 79	— 75 — 94	— 96 — 115	— 118 — 137	— 144 — 162	— 212 — 231	58 26	76 44	109 60	124 75	145 96	167 118	193 144	261 212
80	90	— 29 — 44	— 50 — 65	— 67 — 89	— 84 — 106	— 108 — 130	— 133 — 155	— 162 — 184	— 239 — 261	66 29	87 50	124 67	141 84	165 108	190 133	219 162	296 239
90	100	— 35 — 50	— 58 — 73	— 78 — 100	— 97 — 119	— 124 — 146	— 152 — 174	— 184 — 206	— 271 — 293	72 35	95 58	135 78	154 97	181 124	209 152	241 184	328 271
100	110	— 40 — 55	— 56 — 78	— 89 — 111	— 110 — 132	— 140 — 162	— 171 — 193	— 207 — 229	— 302 — 324	77 40	113 56	146 89	167 110	197 140	228 171	264 207	359 302
110	120	— 36 — 60	— 64 — 86	— 100 — 122	— 122 — 145	— 156 — 178	— 190 — 212	— 229 — 251	— 334 — 356	93 36	121 64	157 100	180 122	213 156	247 190	286 229	391 334
120	140	— 40 — 65	— 72 — 97	— 113 — 138	— 139 — 164	— 176 — 201	— 215 — 240	— 259 — 284	— 377 — 402	105 40	137 72	178 113	204 139	241 176	280 215	324 259	442 377
140	160	— 52 — 77	— 88 — 113	— 136 — 161	— 166 — 191	— 208 — 233	— 253 — 278	— 304 — 329	— 440 — 465	117 52	153 88	201 136	231 166	273 208	318 253	369 304	505 440
160	180	— 63 — 88	— 104 — 129	— 158 — 183	— 192 — 217	— 240 — 265	— 291 — 316	— 348 — 373	— 503 — 528	128 63	179 104	223 158	257 192	305 240	356 291	413 348	568 503
180	200	— 69 — 98	— 115 — 144	— 175 — 204	— 213 — 242	— 267 — 296	— 324 — 353	— 388 — 417	— 561 — 590	144 69	190 115	250 175	288 213	342 267	399 324	463 388	636 581
200	225	— 82 — 111	— 133 — 162	— 201 — 230	— 243 — 272	— 303 — 332	— 366 — 395	— 439 — 468	— 632 — 661	157 82	208 133	276 201	318 243	378 303	441 366	514 439	707 632
225	250	— 96 — 125	— 153 — 182	— 229 — 258	— 276 — 305	— 343 — 372	— 414 — 443	— 495 — 524	— 711 — 740	171 96	228 153	304 229	351 276	418 343	489 414	570 495	786 711

Table 1