

Les écarts limites indiqués pour alésages sont extraits de la norme internationale ISO 286-2 (NF EN 20286-2). **Les écarts sont donnés dans trois tableaux successifs :**

- un tableau pour les écarts limites **A, B et C,**
- un tableau pour les écarts limites **D, E, F, G, H, JS, J, K, M, N et P,**
- un tableau pour les écarts limites **R, S, T, U, X et Z.**

Remarque : la norme propose d'autres écarts (ZC, CD...) que ceux retenus dans cette partie. De même, pour chaque écart ou lettre existe des qualités supplémentaires (A10, A12...). Pour certains écarts, les dimensions nominales vont jusqu'à 3150 mm, pour d'autres elles s'arrêtent à 500 mm, etc.

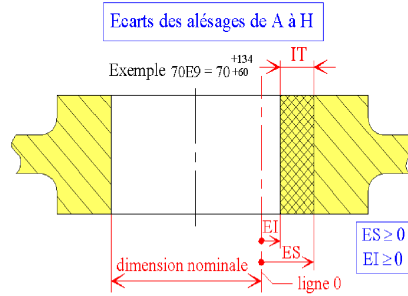


Figure22

Extraits de valeurs normalisées: écarts limites pour alésages: - écarts A, B, C													
extrait ISO 286-2 (NF EN 20286-2) Tableau 15													
Dimensions nominales mm		Ecart supérieur (ES) et Ecart inférieur (EI) en micromètre (1 µm = 0,001 mm) fonction des dimensions nominales											
au-delà de	à (inclus)	A9	A11	A13	B8	B9	B10	B11	B13	C8	C10	C11	C12
	3	+295 +270	+330 +270	+410 +270	+154 +140	+165 +140	+180 +140	+200 +140	+280 +140	+74 +60	+100 +60	+120 +60	+160 +60
3	6	+300 +270	+345 +270	+450 +270	+158 +140	+170 +140	+188 +140	+215 +140	+320 +140	+88 +70	+118 +70	+145 +70	+190 +70
6	10	+316 +280	+370 +280	+500 +280	+172 +150	+186 +150	+208 +150	+240 +150	+370 +150	+102 +80	+138 +80	+170 +80	+230 +80
10	18	+333 +290	+400 +290	+560 +290	+177 +150	+193 +150	+220 +150	+260 +150	+420 +150	+122 +95	+165 +95	+205 +95	+275 +95
18	30	+352 +300	+430 +300	+630 +300	+193 +160	+212 +160	+244 +160	+290 +160	+490 +160	+143 +110	+194 +110	+240 +110	+320 +110
30	40	+372 +310	+470 +310	+700 +310	+209 +170	+232 +170	+270 +170	+330 +170	+560 +170	+159 +120	+220 +120	+280 +120	+370 +120
40	50	+382 +320	+480 +320	+710 +320	+219 +180	+242 +180	+280 +180	+340 +180	+570 +180	+169 +130	+230 +130	+290 +130	+380 +130
50	65	+414 +340	+530 +340	+800 +340	+236 +190	+264 +190	+310 +190	+380 +190	+650 +190	+186 +140	+260 +140	+330 +140	+440 +140
65	80	+434 +360	+550 +360	+820 +360	+246 +200	+274 +200	+320 +200	+390 +200	+660 +200	+196 +150	+270 +150	+340 +150	+450 +150
80	100	+467 +380	+600 +380	+920 +380	+274 +220	+307 +220	+360 +220	+440 +220	+760 +220	+224 +170	+310 +170	+390 +170	+520 +170
100	120	+497 +410	+630 +410	+950 +410	+294 +240	+327 +240	+380 +240	+460 +240	+780 +240	+234 +180	+320 +180	+400 +180	+530 +180
120	140	+560 +460	+710 +460	+1090 +460	+323 +260	+360 +260	+420 +260	+510 +260	+890 +260	+263 +200	+360 +200	+450 +200	+600 +200
140	160	+620 +520	+770 +520	+1150 +520	+343 +280	+380 +280	+440 +280	+530 +280	+910 +280	+273 +210	+370 +210	+460 +210	+610 +210
160	180	+680 +580	+830 +580	+1210 +580	+373 +310	+410 +310	+470 +310	+560 +310	+940 +310	+293 +230	+390 +230	+480 +230	+630 +230
180	200	+775 +660	+950 +660	+1380 +660	+412 +340	+455 +340	+525 +340	+630 +340	+1060 +340	+312 +240	+425 +240	+530 +240	+700 +240
200	225	+855 +740	+1030 +740	+1460 +740	+452 +380	+495 +380	+565 +380	+670 +380	+1100 +380	+332 +260	+445 +260	+550 +260	+720 +260
225	250	+935 +820	+1110 +820	+1540 +820	+492 +420	+535 +420	+605 +420	+710 +420	+1140 +420	+352 +280	+465 +280	+570 +280	+740 +280
250	280	+1050 +920	+1240 +920	+1730 +920	+561 +480	+610 +480	+690 +480	+800 +480	+1290 +480	+381 +300	+510 +300	+620 +300	+820 +300
280	315	+1180 +1050	+1370 +1050	+1860 +1050	+621 +540	+670 +540	+750 +540	+860 +540	+1350 +540	+411 +330	+540 +330	+650 +330	+850 +330
315	355	+1340 +1200	+1560 +1200	+2090 +1200	+689 +600	+740 +600	+830 +600	+960 +600	+1490 +600	+449 +360	+590 +360	+720 +360	+930 +360
355	400	+1490 +1350	+1710 +1350	+2240 +1350	+769 +680	+820 +680	+910 +680	+1040 +680	+1570 +680	+489 +400	+630 +400	+760 +400	+970 +400
400	450	+1655 +1500	+1900 +1500	+2470 +1500	+857 +760	+915 +760	+1010 +760	+1160 +760	+1730 +760	+537 +440	+690 +440	+840 +440	1070 +440
450	500	+1805 +1650	+2050 +1650	+2620 +1650	+937 +840	+995 +840	+1090 +840	+1240 +840	+1810 +840	+577 +480	+730 +480	+880 +480	1110 +480

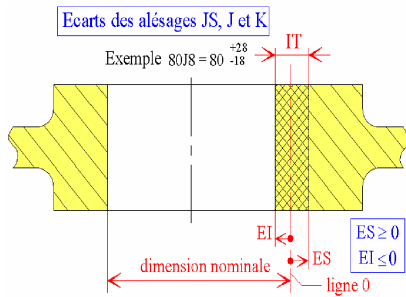


Figure 33

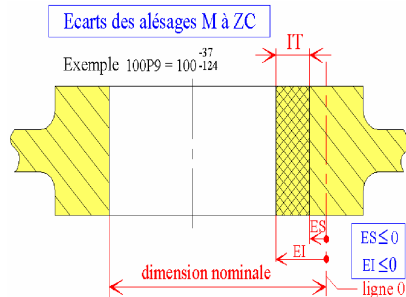


Figure 23

Extraits de valeurs normalisées: écarts limites pour alésages - écarts D, E, F, G, H, JS, J, K, M, N, P, extrait ISO 286-2 (NF EN 20286-2) Tableau 16

Ecart supérieur (ES) et Ecart inférieur (EI) en micromètre (1 µm = 0,001 mm) fonction des dimensions nominales en mm													
au-delà de	-	3	6	10	18	30	50	80	120	180	250	315	400
A (inclus)	3	6	10	18	30	50	80	120	180	250	315	400	500
D7	+30 +20	+42 +30	+55 +40	+68 +50	+86 +65	+105 +80	+130 +100	+155 +120	+185 +145	+216 +170	+242 +190	+267 +210	+293 +230
D8	+34 +20	+48 +30	+62 +40	+77 +50	+98 +65	+119 +80	+146 +100	+174 +120	+208 +145	+242 +170	+271 +190	+299 +210	+327 +230
D9	+45 +20	+60 +30	+76 +40	+93 +50	+117 +65	+142 +80	+174 +100	+207 +120	+245 +145	+285 +170	+320 +190	+350 +210	+385 +230
D10	+60 +20	+78 +30	+98 +40	+120 +50	+149 +65	+180 +80	+220 +100	+260 +120	+305 +145	+355 +170	+400 +190	+440 +210	+480 +230
D11	+80 +20	+105 +30	+130 +40	+160 +50	+195 +65	+240 +80	+290 +100	+340 +120	+395 +145	+460 +170	+510 +190	+570 +210	+630 +230
D13	+160 +20	+210 +30	+260 +40	+320 +50	+395 +65	+470 +80	+560 +100	+660 +120	+775 +145	+890 +170	+1000 +190	+1100 +210	+1200 +230
E6	+20 +14	+28 +20	+34 +25	+43 +32	+53 +40	+66 +50	+79 +60	+94 +72	+110 +85	+129 +100	+142 +110	+161 +125	+175 +135
E7	+24 +14	+32 +20	+40 +25	+50 +32	+61 +40	+75 +50	+90 +60	+107 +72	+125 +85	+146 +100	+162 +110	+182 +125	+198 +135
E8	+28 +14	+38 +20	+47 +25	+59 +32	+73 +40	+89 +50	+106 +60	+126 +72	+148 +85	+172 +100	+191 +110	+214 +125	+232 +135
E9	+39 +14	+50 +20	+61 +25	+75 +32	+92 +40	+112 +50	+134 +60	+159 +72	+185 +85	+215 +100	+240 +110	+265 +125	+290 +135
E10	+54 +14	+68 +20	+83 +25	+102 +32	+124 +40	+150 +50	+180 +60	+212 +72	+245 +85	+285 +100	+320 +110	+355 +125	+385 +135
F5	+10 +6	+15 +10	+19 +13	+24 +16	+29 +20	+36 +25	+43 +30	+51 +36	+61 +43	+70 +50	+79 +56	+87 +62	+95 +68
F6	+12 +6	+18 +10	+22 +13	+27 +16	+33 +20	+41 +25	+49 +30	+58 +36	+68 +43	+79 +50	+88 +56	+98 +62	+108 +68
F7	+16 +6	+22 +10	+28 +13	+34 +16	+41 +20	+50 +25	+60 +30	+71 +36	+83 +43	+96 +50	+108 +56	+119 +62	+131 +68
F8	+20 +6	+28 +10	+35 +13	+43 +16	+53 +20	+64 +25	+76 +30	+90 +36	+106 +43	+122 +50	+137 +56	+151 +62	+165 +68
F9	+31 +6	+40 +10	+49 +13	+59 +16	+72 +20	+87 +25	+104 +30	+123 +36	+143 +43	+165 +50	+185 +56	+202 +62	+223 +68
G4	+5 +2	+8 +4	+9 +5	+11 +6	+13 +7	+16 +9							
G5	+6 +2	+9 +4	+11 +5	+14 +6	+16 +7	+20 +9	+23 +10	+27 +12	+32 +14	+35 +15	+40 +17	+43 +18	+47 +20
G6	+8 +2	+12 +4	+14 +5	+17 +6	+20 +7	+25 +9	+29 +10	+34 +12	+39 +14	+44 +15	+49 +17	+54 +18	+60 +20
G7	+12 +2	+16 +4	+20 +5	+24 +6	+28 +7	+34 +9	+40 +10	+47 +12	+54 +14	+61 +15	+69 +17	+75 +18	+83 +20
G8	+16 +2	+22 +4	+27 +5	+33 +6	+40 +7	+48 +9	+56 +10	+66 +12	+77 +14	+87 +15	+98 +17	+107 +18	+117 +20
H3	+2 0	+2,5 0	+2,5 0	+3 0	+4 0	+4 0	+5 0	+6 0	+8 0	+10 0	+12 0	+13 0	+15 0
H4	+3 0	+4 0	+4 0	+5 0	+6 0	+7 0	+8 0	+10 0	+12 0	+14 0	+16 0	+18 0	+20 0
H5	+4 0	+5 0	+6 0	+8 0	+9 0	+11 0	+13 0	+15 0	+18 0	+20 0	+23 0	+25 0	+27 0
H6	+6 0	+8 0	+9 0	+11 0	+13 0	+16 0	+19 0	+22 0	+25 0	+29 0	+32 0	+36 0	+40 0
H7	+10 0	+12 0	+15 0	+18 0	+21 0	+25 0	+30 0	+35 0	+40 0	+46 0	+52 0	+57 0	+63 0

Nom	X.Ecarts limites ISO pour alésages - "Extraits ISO 286-2 (NF EN 20286-2)"												PJ
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H8	+14 0	+18 0	+22 0	+27 0	+33 0	+39 0	+46 0	+54 0	+63 0	+72 0	+81 0	+89 0	+97 0
H9	+25 0	+30 0	+36 0	+43 0	+52 0	+62 0	+74 0	+87 0	+100 0	+115 0	+130 0	+140 0	+155 0
H10	+40 0	+48 0	+58 0	+70 0	+84 0	+100 0	+120 0	+140 0	+160 0	+185 0	+210 0	+230 0	+250 0
H11	+60 0	+75 0	+90 0	+110 0	+130 0	+160 0	+190 0	+220 0	+250 0	+290 0	+320 0	+360 0	+400 0
H12	+100 0	+120 0	+150 0	+180 0	+210 0	+250 0	+300 0	+350 0	+400 0	+460 0	+520 0	+570 0	+630 0
H13	+140 0	+180 0	+220 0	+270 0	+330 0	+390 0	+460 0	+540 0	+630 0	+720 0	+810 0	+890 0	+970 0
H14	+250 0	+300 0	+360 0	+430 0	+520 0	+620 0	+740 0	+870 0	1000 0	1150 0	1300 0	1400 0	1550 0
H15	+400 0	+480 0	+580 0	+700 0	+840 0	+1000 0	+1200 0	+1400 0	1600 0	1850 0	2100 0	2300 0	2500 0
JS5	±2	±2,5	±3	±4	±4,5	±5,5	±6,5	±7,5	±9	±10	±11,5	±12,5	±13,5
JS6	±3	±4	±4,5	±5,5	±6,5	±8	±9,5	±11	±12,5	±14,5	±16	±18	±20
JS7	±5	±6	±7,5	±9	±10,5	±12,5	±15	±17,5	±20	±23	±26	±28,5	±31,5
JS8	±7	±9	±11	±13,5	±16,5	±19,5	±23	±27	±31,5	±36	±40,5	±44,5	±48,5
JS9	±12,5	±15	±18	±21,5	±26	±31	±37	±43,5	±50	±57,5	±65	±70	±77,5
JS10	±20	±24	±29	±35	±42	±50	±60	±70	±80	±92,5	±105	±115	±125
JS11	±30	±37,5	±45	±55	±65	±80	±95	±110	±125	±145	±160	±180	±200
JS12	±50	±60	±75	±90	±105	±125	±150	±175	±200	±230	±260	±285	±315
JS13	±70	±90	±110	±135	±165	±195	±230	±270	±315	±360	±405	±445	±485
JS14	±125	±150	±180	±215	±260	±310	±370	±435	±500	±575	±650	±700	±775
J6	+2 -4	+5 -3	+5 -3	+6 -5	+8 -5	+10 -6	+13 -6	+16 -6	+18 -7	+22 -7	+25 -7	+29 -7	+33 -7
J7	+4 -6	+6 -6	+8 -7	+10 -8	+12 -9	+14 -11	+18 -12	+22 -13	+26 -14	+30 -16	+36 -16	+39 -18	+43 -20
J8	+6 -8	+10 -8	+12 -10	+15 -12	+20 -13	+24 -15	+28 -18	+34 -20	+41 -22	+47 -25	+55 -26	+60 -29	+66 -31
K4	0 -3	+0,5 -3,5	+0,5 -3,5	+1 -4	0 -6	+1 -6							
K5	0 -4	0 -5	+1 -5	+2 -6	+1 -8	+2 -9	+3 -10	+2 -13	+3 -15	+2 -18	+3 -20	+3 -22	+2 -25
K6	0 -6	+2 -6	+2 -7	+2 -9	+2 -11	+3 -13	+4 -15	+4 -18	+4 -21	+5 -24	+5 -27	+7 -29	+8 -32
K7	+0 -10	+3 -9	+5 -10	+6 -12	+6 -15	+7 -18	+9 -21	+10 -25	+12 -28	+13 -33	+16 -36	+17 -40	+18 -45
K8	0 -14	+5 -13	+6 -16	+8 -19	+10 -23	+12 -27	+14 -32	+16 -38	+20 -43	+22 -50	+25 -56	+28 -61	+29 -68
M5	-2 -6	-3 -8	-4 -10	-4 -12	-5 -14	-5 -16	-6 -19	-8 -23	-9 -27	-11 -31	-13 -36	-14 -39	-16 -43
M6	-2 -8	-1 -9	-3 -12	-4 -15	-4 -17	-4 -20	-5 -24	-6 -28	-8 -33	-8 -37	-9 -41	-10 -46	-10 -50
M7	-2 -12	0 -12	0 -15	0 -18	0 -21	0 -25	0 -30	0 -35	0 -40	0 -46	0 -52	0 -57	0 -63
M8	-2 -16	+2 -16	+1 -21	+2 -25	+4 -29	+5 -34	+5 -41	+6 -48	+8 -55	+9 -63	+9 -72	+11 -78	+11 -86
N5	-4 -8	-7 -12	-8 -14	-9 -17	-12 -21	-13 -24	-15 -28	-18 -33	-21 -39	-25 -45	-27 -50	-30 -55	-33 -60
N6	-4 -10	-5 -13	-7 -16	-9 -20	-11 -24	-12 -28	-14 -33	-16 -38	-20 -45	-22 -51	-25 -57	-26 -62	-27 -67
N7	-4 -14	-4 -16	-4 -19	-5 -23	-7 -28	-8 -33	-9 -39	-10 -45	-12 -52	-14 -60	-14 -66	-16 -73	-17 -80
N8	-4 -18	-2 -20	-3 -25	-3 -30	-3 -36	-3 -42	-4 -50	-4 -58	-4 -67	-5 -77	-5 -86	-5 -94	-6 -103
P5	-6 -10	-11 -16	-13 -19	-15 -23	-19 -28	-22 -33	-27 -40	-32 -47	-37 -55	-44 -64	-49 -72	-55 -80	-61 -88
P6	-6 -12	-9 -17	-11 -21	-15 -26	-18 -31	-21 -37	-26 -45	-30 -52	-36 -61	-41 -70	-47 -79	-51 -87	-55 -95
P7	-6 -16	-8 -20	-9 -24	-11 -29	-14 -35	-17 -42	-21 -51	-24 -59	-28 -68	-33 -79	-36 -88	-41 -98	-45 -108
P8	-6 -20	-12 -30	-15 -37	-18 -45	-22 -55	-26 -65	-32 -78	-37 -91	-43 -106	-50 -122	-56 -137	-62 -151	-68 -165
P9	-6 -31	-12 -42	-15 -51	-18 -61	-22 -74	-26 -88	-32 -106	-37 -124	-43 -143	-50 -165	-56 -186	-62 -202	-68 -223

Extraits de valeurs normalisées: écarts limites pour alésages - écarts R, S, T, U, X et Z
 extrait ISO 286-2 (NF EN 20286-2) Tableau 17

Dimensions nominales mm		Ecart supérieur (ES) et Ecart inférieur (EI) en micromètre (1 µm = 0,001 mm) fonction des dimensions nominales											
au-delà de	à (inclus)	R6	R7	R8	S7	S8	T7	T8	U7	U8	X7	X8	Z7
	3	-10 -16	-10 -20	-10 -24	-14 -24	-14 -28	-	-	-18 -28	-18 -32	-20 -30	-20 -34	-26 -36
3	6	-12 -20	-11 -23	-15 -33	-15 -27	-19 -37	-	-	-19 -31	-23 -41	-24 -36	-28 -46	-31 -43
6	10	-16 -25	-13 -28	-19 -41	-17 -32	-23 -45	-	-	-22 -37	-28 -50	-28 -43	-34 -56	-36 -51
10	14	-20 -31	-16 -34	-23 -50	-21 -39	-28 -55	-	-	-26 -44	-33 -60	-33 -51	-40 -67	-43 -61
14	18	-20 -31	-16 -34	-23 -50	-21 -39	-28 -55	-	-	-26 -44	-33 -60	-38 -56	-45 -72	-53 -71
18	24	-24 -37	-20 -41	-28 -61	-27 -48	-35 -68	-	-	-33 -54	-41 -74	-46 -67	-54 -87	-65 -86
24	30	-24 -37	-20 -41	-28 -61	-27 -48	-35 -68	-33 -54	-41 -74	-40 -61	-48 -81	-56 -77	-64 -97	-80 -101
30	40	-29 -45	-25 -50	-34 -73	-34 -59	-43 -82	-39 -64	-48 -87	-51 -76	-60 -99	-71 -96	-80 -119	-103 -128
40	50	-29 -45	-25 -50	-34 -73	-34 -59	-43 -82	-45 -70	-54 -93	-61 -86	-70 -109	-88 -113	-97 -136	-127 -152
50	65	-35 -54	-30 -60	-41 -87	-42 -72	-53 -99	-55 -85	-66 -112	-76 -106	-87 -133	-111 -141	-122 -168	-161 -191
65	80	-37 -56	-32 -62	-43 -89	-48 -78	-59 -105	-64 -94	-75 -121	-91 -121	-102 -148	-135 -165	-146 -192	-199 -229
80	100	-44 -66	-38 -73	-51 -105	-58 -93	-71 -125	-78 -113	-91 -145	-111 -146	-124 -178	-165 -200	-178 -232	-245 -280
100	120	-47 -69	-41 -76	-54 -108	-66 -101	-79 -133	-91 -126	-104 -158	-131 -166	-144 -198	-197 -232	-210 -264	-297 -332
120	140	-56 -81	-48 -88	-63 -126	-77 -117	-92 -155	-107 -147	-122 -185	-155 -195	-170 -233	-233 -273	-248 -311	-350 -390
140	160	-58 -83	-50 -90	-65 -128	-85 -125	-100 -163	-119 -159	-134 -197	-175 -215	-190 -253	-265 -305	-280 -343	-400 -440
160	180	-61 -86	-53 -93	-68 -131	-93 -133	-108 -171	-131 -171	-146 -209	-195 -235	-210 -273	-295 -335	-310 -373	-450 -490
180	200	-68 -97	-60 -106	-77 -149	-105 -151	-122 -194	-149 -195	-166 -238	-219 -265	-236 -308	-333 -379	-350 -422	-503 -549
200	225	-71 -100	-63 -109	-80 -152	-113 -159	-130 -202	-163 -209	-180 -252	-241 -287	-258 -330	-368 -414	-385 -457	-558 -604
225	250	-75 -104	-67 -113	-84 -156	-123 -169	-140 -212	-179 -225	-196 -268	-267 -313	-284 -356	-408 -454	-425 -497	-623 -669
250	280	-85 -117	-74 -126	-94 -175	-138 -190	-158 -239	-198 -250	-218 -299	-295 -347	-315 -396	-455 -507	-475 -556	-690 -742
280	315	-89 -121	-78 -130	-98 -179	-150 -202	-170 -251	-220 -272	-240 -321	-330 -382	-350 -431	-505 -557	-525 -606	-770 -822
315	355	-97 -133	-87 -144	-108 -197	-169 -226	-190 -279	-247 -304	-268 -357	-369 -426	-390 -479	-569 -626	-590 -679	-879 -936
355	400	-103 -139	-93 -150	-114 -203	-187 -244	-208 -297	-273 -330	-294 -383	-414 -471	-435 -524	-639 -749	-660 -749	-979 -1036
400	450	-113 -153	-103 -166	-126 -223	-209 -272	-232 -329	-307 -370	-330 -427	-467 -530	-490 -587	-717 -780	-740 -837	-1077 -1140
450	500	-119 -159	-109 -172	-132 -229	-229 -292	-252 -349	-337 -400	-360 -457	-517 -580	-540 -637	-797 -860	-820 -917	-1227 -1290