Tolerances and fits

General section

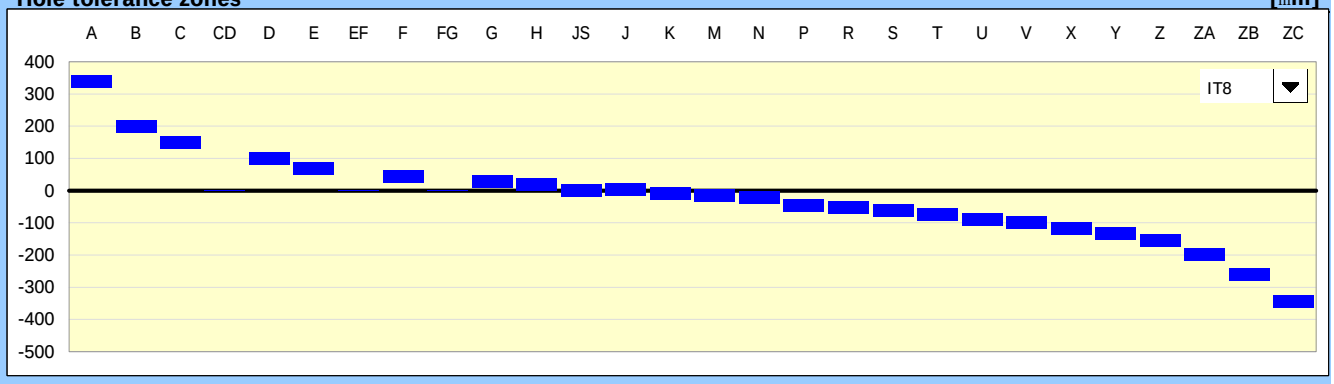
1.0 ☑ ISO system of limits and fits — ISO 286

1.1 Basic size: 50.00 [mm]

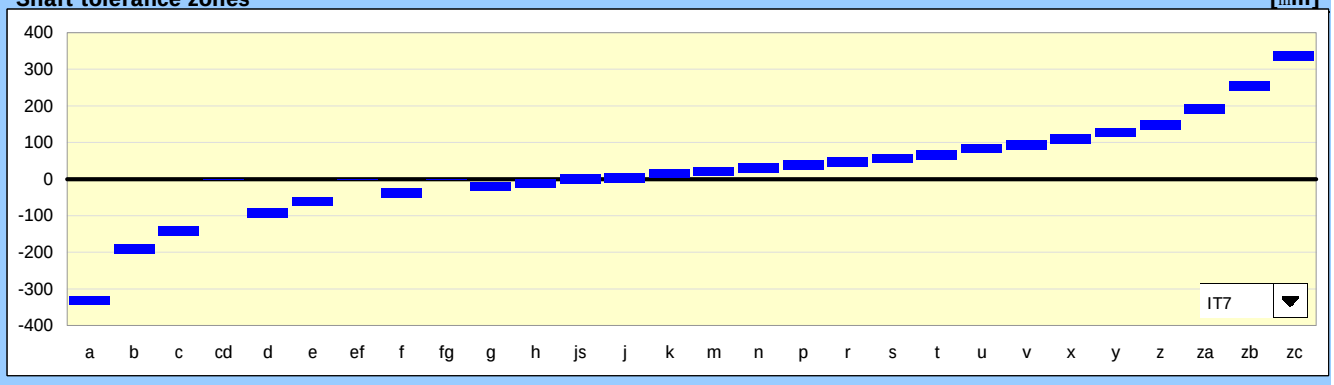
1.2 **Tolerance of a basic size for specific tolerance grade** [mm]

IT01	IT0	IT1	IT2	IT3	IT4	IT5	IT6	IT7	IT8	IT9	IT10	IT11	IT12	IT13	IT14	IT15	IT16	IT17	IT18
0.6	1	1.5	2.5	4	7	11	16	25	39	62	100	160	250	390	620	1000	1600	2500	3900

1.3 **Hole tolerance zones** [mm]



1.4 **Shaft tolerance zones** [mm]



1.5 **Selection of fit**

1.6 System of fit: Hole basis system

1.7 Type of fit: Clearance fit

1.8 Recommended fits: H8/f7 *

1.9 **Hole tolerance zone** H 8

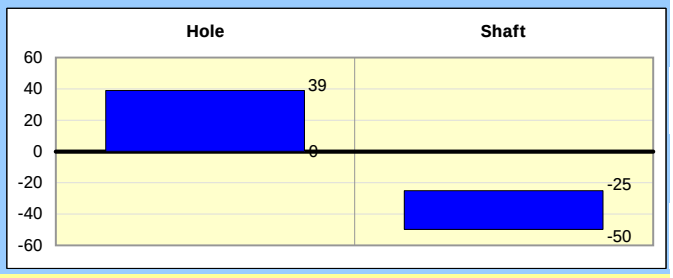
H8			
Upper deviation	ES	39	[µm]
Lower deviation	EI	0	[µm]

1.10 **Shaft tolerance zone** f 7

f7			
Upper deviation	es	-25	[µm]
Lower deviation	ei	-50	[µm]

1.11 **Parameters of the selected fit**

H8/f7			
	Basic size	50	[mm]
	Maximum clearance	0.089	[mm]
	Minimum clearance	0.025	[mm]



2.0 ☑ Preferred limits and fits for cylindrical parts — ANSI B4.1

2.1 Basic size: 2.000 [in]

2.2 **Tolerance of a basic size for specific tolerance grade**

Tolerance grade	4	5	6	7	8	9	10	11	12	13	
Tolerance	0.3	0.5	0.7	1.2	1.8	3	4.5	7	12	18	[10^{-3} in]

2.3 **Selection of fit**

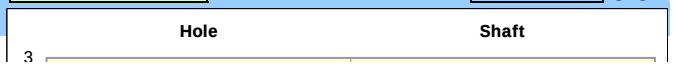
2.4 System of fit: Hole basis system

2.5 Type of fit: Running or sliding clearence fit

2.6 Fit: RC 4

2.9 **Parameters of the selected fit**

RC 4			
	Basic size	2	[in]
	Maximum clearance	0.0042	[in]
	Minimum clearance	0.0012	[in]

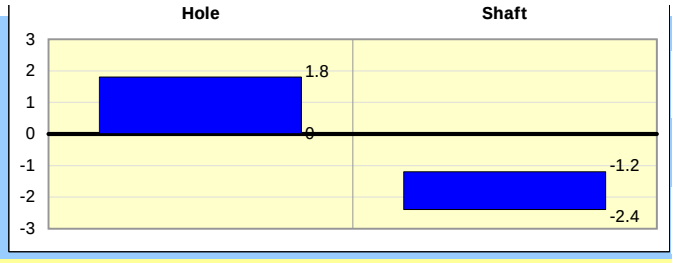


2.7 Hole tolerance zone

H8				
	Upper deviation	ES	1.8	[10^{-3} in]
	Lower deviation	EI	0	[10^{-3} in]

2.8 Shaft tolerance zone

f7				
	Upper deviation	es	-1.2	[10^{-3} in]
	Lower deviation	ei	-2.4	[10^{-3} in]



3.0 ☑ General tolerances for linear and angular dimensions without individual tolerance indications — ISO 2768 -1

3.1 Limit deviations for linear dimensions

Tolerance class		Limit deviations for basic size range [mm]							
		0.5 to 3	over 3 to 6	over 6 to 30	over 30 to 120	over 120 to 400	over 400 to 1000	over 1000 to 2000	over 2000 to 4000
f	fine	± 0,05	± 0,05	± 0,1	± 0,15	± 0,2	± 0,3	± 0,5	-
m	medium	± 0,1	± 0,1	± 0,2	± 0,3	± 0,5	± 0,8	± 1,2	± 2
c	coarse	± 0,15	± 0,2	± 0,5	± 0,8	± 1,2	± 2	± 3	± 4
v	very coarse	-	± 0,5	± 1	± 1,5	± 2,5	± 4	± 6	± 8

3.2 Limit deviations for broken edges (external radii and chamfer heights)

Tolerance class		Limit deviations for basic size range [mm]		
		0.5 to 3	over 3 to 6	over 6
f	fine	± 0,2	± 0,5	± 1
m	medium			
c	coarse	± 0,4	± 1	± 2
v	very coarse			

3.3 Limit deviations for angular dimensions

Tolerance class		Limit deviations for length range of shorter side of the angle concerned [mm]				
		to 10	over 10 to 50	over 50 to 120	over 120 to 400	over 400
f	fine	± 1 °	± 30 '	± 20 '	± 10 '	± 5 '
m	medium					
c	coarse	± 1 ° 30 '	± 1 °	± 30 '	± 15 '	± 10 '
v	very coarse	± 3 °	± 2 °	± 1 °	± 30 '	± 20 '

Supplements section

4.0 ☑ Design of fit for specific allowance

4.1 Desired parameters of the fit

4.2	System of fit	Hole basis system	
4.3	Type of fit	Clearance fit	
4.4	Basic size	200.00	[mm]
4.5	Maximum clearance	100.0	[µm]
4.6	Minimum clearance	25.0	[µm]

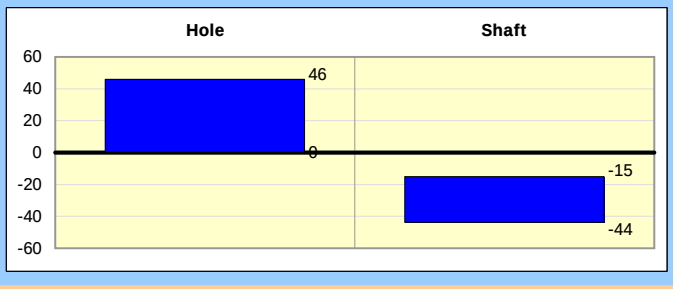
4.8 Parameters of the selected fit

H7/g6			
	Maximum clearance	90	[µm]
	Minimum clearance	15	[µm]

Tolerance zone		Hole	Shaft	
Upper deviation	ES/es	46	-15	[µm]
Lower deviation	EI/ei	0	-44	[µm]

4.7 Design and selection of the fit

	ID	Quality	Max. clearan.	Min. clearance	Fit
	Pref.	20	90	15	H7/g6
1.		11	101	15	H4/g8
2.		11	101	15	H8/g4
3.		13	97	15	H3/g8
4.		13	97	15	H8/g3
5.		16	94	15	H2/g8
6.		17	107	15	H5/g8
7.		17	107	15	H7/g7



5.0 ☑ Relationship of tolerance to surface finish

Tolerance grade	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Lapping															
Honing															
Superfinishing															
Cylindrical/centrelees grinding															
Diamond turning															

Plan grinding															
Broaching															
Reaming															
Boring, Turning															
Sawing															
Milling															
Planing, Shaping															
Extruding															
Cold Rolling, Drawing															
Drilling															
Die Casting															
Forging															
Sand Casting															
Hot rolling, Flame cutting															