

TECHNICAL INFORMATION CATEGORY

BALANCE STANDARD FORMULA LIST

Z-2

REFERENCE DETAILS

Z-3~5

BALANCE STANDARD FORMULA LIST

Balance Grade		G0.4	G1	G2.5	G6.3	G16	G40	G100	G250	G630	G1600	G4000
Precision Required	exw (mm/s)	0.4	1	2.5	6.3	16	40	100	250	630	1600	4000
Precision Required	exw (µm *rpm)	3820	9549	23875	60165	152800	382000	954900	2387500	6016500	15280000	38200000

SETTING OF THE BALANCE SERIES IS ACCORDING TO ISO 1940 STANDARD .

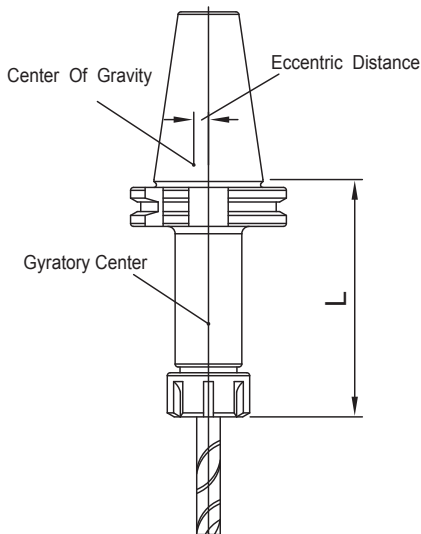
THE FORMULA AS FOLLOWS:

$$U = M \times e$$

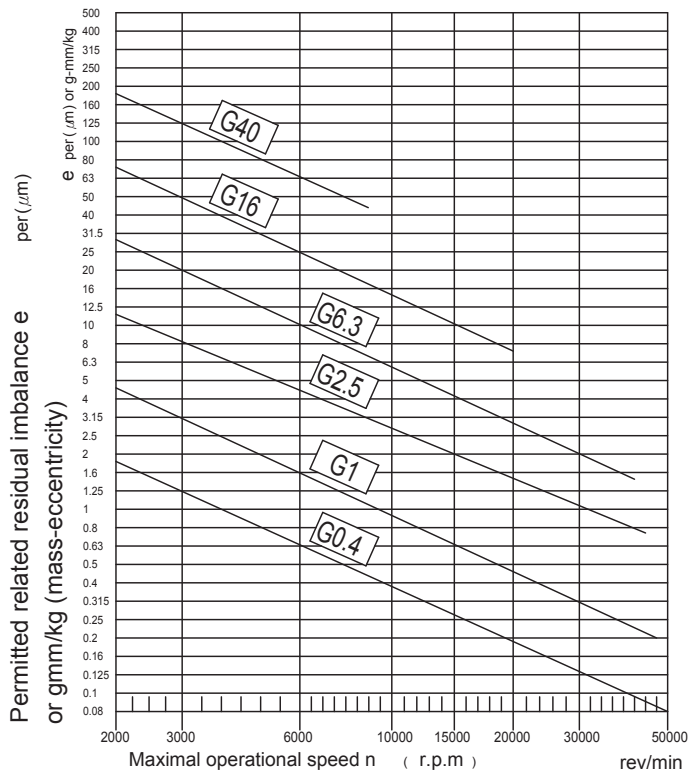
$$U = \frac{G \times M}{n} \times 9549$$

$$G = \frac{n \times U}{9549 \times M}$$

G = UNBALANCE SERIES
U = UNBALANCE (g-mm)
e = ECCENTRIC DISTANCE (mm)
M = ROTER WEIGHT (kg)
n = rpm
9549 = CONSTANT



Quality levels according to ISO 1940 and permitted residual imbalance or speed



REFERENCE DETAILS

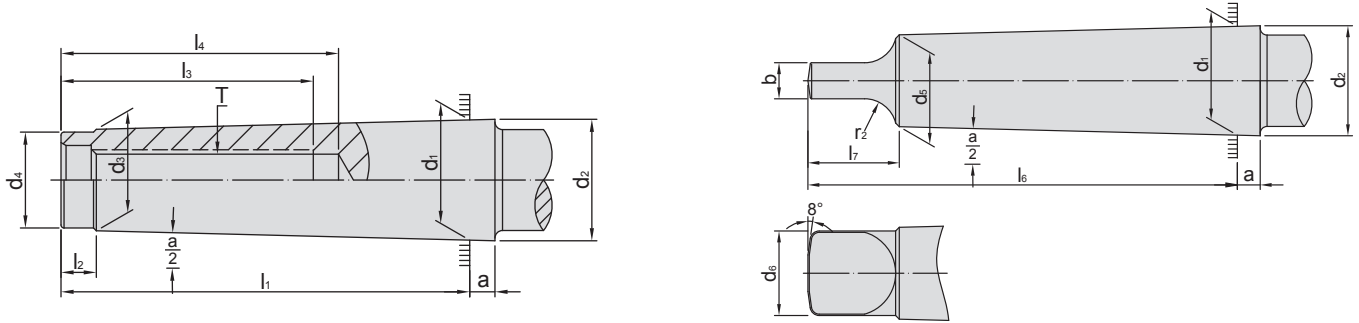
mm		H																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14 ¹⁾	15 ¹⁾	16 ¹⁾	17 ¹⁾	18 ¹⁾
Over	Under	µm											mm						
-	3 ¹⁾	+0.8 0	+1.2 0	+2 0	+3 0	+4 0	+6 0	+10 0	+14 0	+25 0	+40 0	+60 0	+0.1 0	+0.14 0	+0.25 0	+0.4 0	+0.6 0		
3	6	+1 0	+1.5 0	+2.5 0	+4 0	+5 0	+8 0	+12 0	+18 0	+30 0	+48 0	+75 0	+0.12 0	+0.18 0	+0.3 0	+0.48 0	+0.75 0	+1.2 0	+1.8 0
6	10	+1 0	+1.5 0	+2.5 0	+4 0	+6 0	+9 0	+15 0	+22 0	+36 0	+58 0	+90 0	+0.15 0	+0.22 0	+0.36 0	+0.58 0	+0.9 0	+1.5 0	+2.2 0
10	18	+1.2 0	+2 0	+3 0	+5 0	+8 0	+11 0	+18 0	+27 0	+43 0	+70 0	+110 0	+0.18 0	+0.27 0	+0.43 0	+0.7 0	+1.1 0	+1.8 0	+2.7 0
18	30	+1.5 0	+2.5 0	+4 0	+6 0	+9 0	+13 0	+21 0	+33 0	+52 0	+84 0	+130 0	+0.21 0	+0.33 0	+0.52 0	+0.84 0	+1.3 0	+2.1 0	+3.3 0
30	50	+1.5 0	+2.5 0	+4 0	+7 0	+11 0	+16 0	+25 0	+39 0	+62 0	+100 0	+160 0	+0.25 0	+0.39 0	+0.62 0	+1 0	+1.6 0	+2.5 0	+3.9 0
50	80	+2 0	+3 0	+5 0	+8 0	+13 0	+19 0	+30 0	+46 0	+74 0	+120 0	+190 0	+0.3 0	+0.46 0	+0.74 0	+1.2 0	+1.9 0	+3 0	+4.6 0
80	120	+2.5 0	+4 0	+6 0	+10 0	+15 0	+22 0	+35 0	+54 0	+87 0	+140 0	+220 0	+0.35 0	+0.54 0	+0.87 0	+1.4 0	+2.2 0	+3.5 0	+5.4 0
120	180	+3.5 0	+5 0	+8 0	+12 0	+18 0	+25 0	+40 0	+63 0	+100 0	+160 0	+250 0	+0.4 0	+0.63 0	+1 0	+1.6 0	+2.5 0	+4 0	+6.3 0
180	250	+4.5 0	+7 0	+10 0	+14 0	+20 0	+29 0	+46 0	+72 0	+115 0	+185 0	+290 0	+0.46 0	+0.72 0	+1.15 0	+1.85 0	+2.9 0	+4.6 0	+7.2 0
250	315	+6 0	+8 0	+12 0	+16 0	+23 0	+32 0	+52 0	+81 0	+130 0	+210 0	+320 0	+0.52 0	+0.81 0	+1.3 0	+2.1 0	+3.2 0	+5.2 0	+8.1 0
315	400	+7 0	+9 0	+13 0	+18 0	+25 0	+36 0	+57 0	+89 0	+140 0	+230 0	+360 0	+0.57 0	+0.89 0	+1.4 0	+2.3 0	+3.6 0	+5.7 0	+8.9 0
400	500	+8 0	+10 0	+15 0	+20 0	+27 0	+40 0	+63 0	+97 0	+155 0	+250 0	+400 0	+0.63 0	+0.97 0	+1.55 0	+2.5 0	+4 0	+6.3 0	+9.7 0

mm		h																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14 ¹⁾	15 ¹⁾	16 ¹⁾	17	18
Over	Under	µm											mm						
-	3 ¹⁾	0 -0.8	0 -1.2	0 -2	0 -3	0 -4	0 -6	0 -10	0 -14	0 -25	0 -40	0 -60	0 -0.1	0 -0.14	0 -0.25	0 -0.4	0 -0.6		
3	6	0 -1	0 -1.5	0 -2.5	0 -4	0 -5	0 -8	0 -12	0 -18	0 -30	0 -48	0 -75	0 -0.12	0 -0.18	0 -0.3	0 -0.48	0 -0.75	0 -1.2	0 -1.8
6	10	0 -1	0 -1.5	0 -2.5	0 -4	0 -6	0 -9	0 -15	0 -22	0 -36	0 -58	0 -90	0 -0.15	0 -0.22	0 -0.36	0 -0.58	0 -0.9	0 -1.5	0 -2.2
10	18	0 -1.2	0 -2	0 -3	0 -5	0 -8	0 -11	0 -18	0 -27	0 -43	0 -70	0 -110	0 -0.18	0 -0.27	0 -0.43	0 -0.7	0 -1.1	0 -1.8	0 -2.7
18	30	0 -1.5	0 -2.5	0 -4	0 -6	0 -9	0 -13	0 -21	0 -33	0 -52	0 -84	0 -130	0 -0.21	0 -0.33	0 -0.52	0 -0.84	0 -1.3	0 -2.1	0 -3.3
30	50	0 -1.5	0 -2.5	0 -4	0 -7	0 -11	0 -16	0 -25	0 -39	0 -62	0 -100	0 -160	0 -0.25	0 -0.39	0 -0.62	0 -1	0 -1.6	0 -2.5	0 -3.9
50	80	0 -2	0 -3	0 -5	0 -8	0 -13	0 -19	0 -30	0 -46	0 -74	0 -120	0 -190	0 -0.3	0 -0.46	0 -0.74	0 -1.2	0 -1.9	0 -3	0 -4.6
80	120	0 -2.5	0 -4	0 -6	0 -10	0 -15	0 -22	0 -35	0 -54	0 -87	0 -140	0 -220	0 -0.35	0 -0.54	0 -0.87	0 -1.4	0 -2.2	0 -3.5	0 -5.4
120	180	0 -3.5	0 -5	0 -8	0 -12	0 -18	0 -25	0 -40	0 -63	0 -100	0 -160	0 -250	0 -0.4	0 -0.63	0 -1	0 -1.6	0 -2.5	0 -4	0 -6.3
180	250	0 -4.5	0 -7	0 -10	0 -14	0 -20	0 -29	0 -46	0 -72	0 -115	0 -185	0 -290	0 -0.46	0 -0.72	0 -1.15	0 -1.85	0 -2.9	0 -4.6	0 -7.2
250	315	0 -6	0 -8	0 -12	0 -16	0 -23	0 -32	0 -52	0 -81	0 -130	0 -210	0 -320	0 -0.52	0 -0.81	0 -1.3	0 -2.1	0 -3.2	0 -5.2	0 -8.1
315	400	0 -7	0 -9	0 -13	0 -18	0 -25	0 -36	0 -57	0 -89	0 -140	0 -230	0 -360	0 -0.57	0 -0.89	0 -1.4	0 -2.3	0 -3.6	0 -5.7	0 -8.9
400	500	0 -8	0 -10	0 -15	0 -20	0 -27	0 -40	0 -63	0 -97	0 -155	0 -250	0 -400	0 -0.63	0 -0.97	0 -1.55	0 -2.5	0 -4	0 -6.3	0 -9.7



REFERENCE DETAILS

參考資料



DIN 228 FORM A <Drawing Thread Type>

M.T.NO.	a	d_1	d_2	d_3	d_4 max.	T	l_1 max.	l_2	l_3 min.	l_4 min.
2	5	17.78	18	14.6	14	3/8" 16W, M10 x 1.5P	64	5	24	31.5
3	5	23.825	24.1	19.8	19	1/2" 12W, M12 x 1.75P	81	7	24	33.5
4	6.5	31.267	31.6	25.9	25	5/8" 11W, M16 x 2.0P	102.5	9	32	42.5
5	6.5	44.399	44.7	37.6	35.7	1" 8W, M24 x 3.0P	129.5	10	40	52.5
6	8	63.348	63.8	53.9	51	1" 8W, M24 x 3.0P	182	16	47	61.5

DIN 228 FORM B <Tang Type>

M.T.NO.	a	b h_{13}	d_5	d_6 max.	l_6 0 -1	l_7 max.	r_2	$\frac{\alpha}{2}$
2	5	6.3	14	13.5	75	16	6	1°25' 50"
3	5	7.9	19.1	18.5	94	20	7	1°26' 16"
4	6.5	11.9	25.2	24.5	117.5	24	8	1°29' 15"
5	6.5	15.9	36.5	35.7	149.5	29	10	1°30' 26"
6	8	19	52.4	51	210	40	13	1°29' 36"

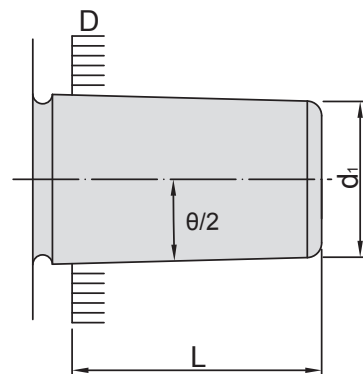
JACOBS TAPER

TYPE	$\theta/2$ TAPER	D	d_1	L
JT 2	2° 19'52"	14.199	12.386	22.225
JT 33	1° 49'01"	15.850	14.237	25.400
JT 6	1° 29'10"	17.170	15.852	25.400
JT 3	1° 31'26"	20.599	18.951	30.956
JT 4	1° 29'59"	28.550	26.346	42.069
JT 5	1° 29'05"	35.890	33.422	47.625

DIN 238

TYPE	$\theta/2$ TAPER	D	d_1	L
B12	1° 25'43"	12.065	11.1	18.5
B16	1° 25'50"	15.733	14.5	24.0
B18	1° 25'50"	17.780	16.2	32.0

DRILL CHUCK HOLE TAPER SPECIFICATION



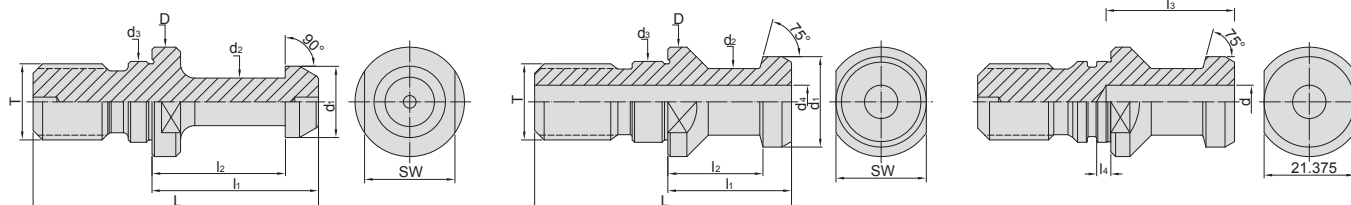
REFERENCE DETAILS

參考資料

MAS BT

DIN 69872 - A

DIN 69872 - B



MAS BT PULL STUDS SPECIFICATION

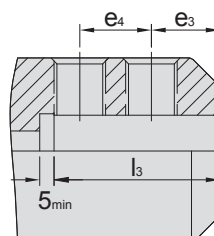
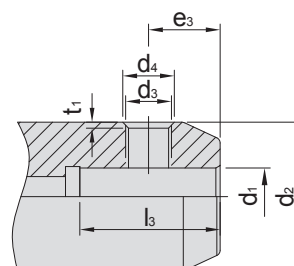
TYPE	D 0 -0.2	d ₁ 0 -0.1	d ₂ 0 -0.1	d ₃ h7	L	l ₁ 0 -0.1	l ₂ 0 -0.1	θ ±15°	SW 0 -0.35	T 6h	
BT30 - 45°	16.5	11	7	12.5	43	23	18	45°	13	M12 x 1.75P	P30T - 1
BT40 - 45°	23	15	10	17	60	35	28	45°	19	M16 x 2.0P	P40T - 1
BT50 - 45°	38	23	17	25	85	45	35	45°	30	M24 x 3.0P	P50T - 1
BT30 - 60°	16.5	11	7	12.5	43	23	18	60°	13	M12 x 1.75P	P30T - 2
BT40 - 60°	23	15	10	17	60	35	28	60°	19	M16 x 2.0P	P40T - 2
BT50 - 60°	38	23	17	25	85	45	35	60°	30	M24 x 3.0P	P50T - 2

DIN 69872 A & B PULL STUDS SPECIFICATION

TYPE	D 0 -0.2	d ₁ f7	d ₂ 0 -0.1	d ₃ f7	d ₄ +0.1 0	L	l ₁ ±0.1	l ₂ ±0.1	l ₃ +1 0	l ₄ 0 -0.1	SW 0 -0.1	T
DAT30 - A	17	13	9	13	-	44	24	19	-	-	14	M12 x 1.75P
DAT40 - A	23	19	14	17	7	54	26	20	-	-	19	M16 x 2.0P
DAT50 - A	36	28	21	25	11.5	74	34	25	-	-	30	M24 x 3.0P
DAT30 - B	17	13	9	13	-	44	24	19	-	2.3	14	M12 x 1.75P
DAT40 - B	23	19	14	17	7	54	26	20	27	3.0	19	M16 x 2.0P
DAT50 - B	36	28	21	25	11.5	74	34	25	37	4.5	30	M24 x 3.0P

DIN 1835 - B END MILL HOLDER SPECIFICATION

SIZE	d ₁ H5	d ₂ 0 -0.1	d ₃ 6H	d ₄ MIN	l ₃ ±1	e ₃ 0 -0.1	e ₄ ±0.5	t ₁
6	6	25	M6	8	35	18	-	1
8	8	28	M8	10	35	18	-	1.3
10	10	35	M10	12	39	20	-	1.5
12	12	42	M12	14	44	22.5	-	1.6
16	16	48	M14	16	47	24	-	1.7
20	20	52	M16	18	49	25	-	2.1
25	25	65	M18	20	54	24	25	2.1
32	32	72	M20	22	58	24	28	2.2
40	40	90	M24	26	68	30	32	2.2



MEMO

Blank memo area consisting of 18 horizontal grey lines for writing.

