

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 .

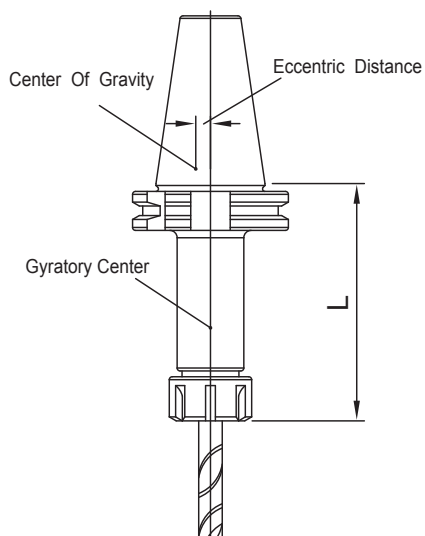
THE FORMULA AS FOLLOWS:

$$U = M \times e$$

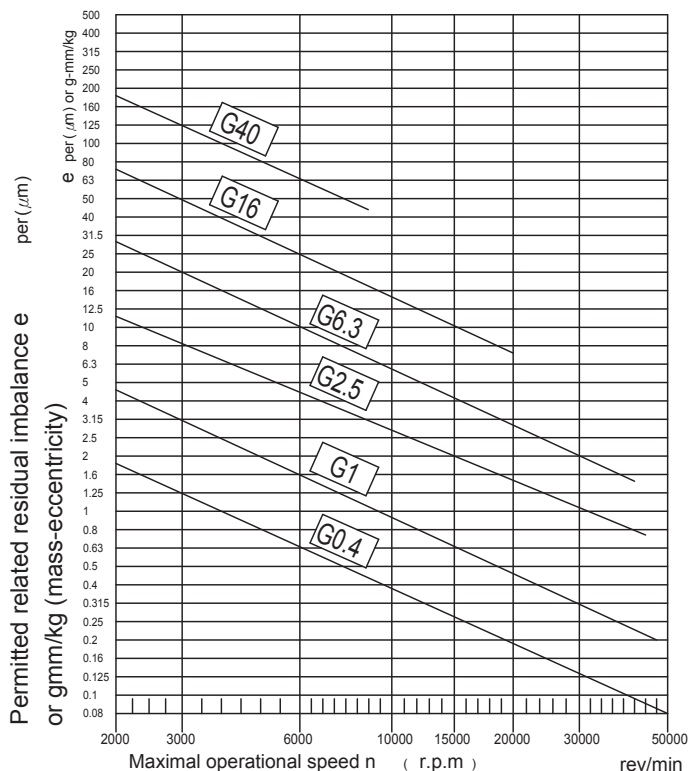
$$U = \frac{G \times M}{n} \times 9549$$

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

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

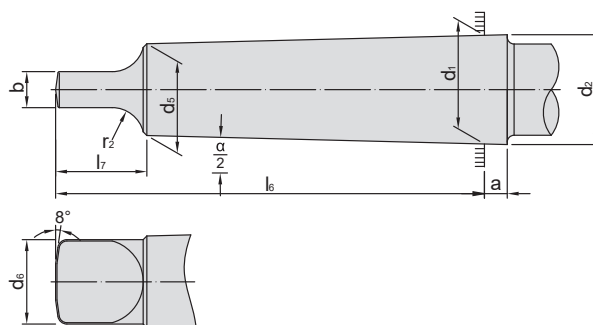
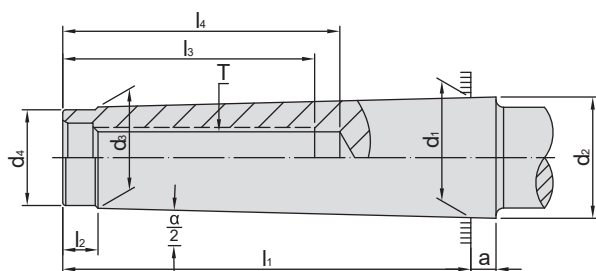
mm		H																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14 ¹⁾	15 ¹⁾	16 ¹⁾	17 ¹⁾	18 ¹⁾
- Over	3 ¹⁾ Under	µm											mm						
-	3 ¹⁾	+0.8 0	+1.2 0	+2 0	+3 0	+4 0	+6 0	+10 0	+14 0	+25 0	+40 0	+60 0	+0.1 0	+0.14 0	+0.25 0	+0.4 0	+0.6 0		
3	6	+1 0	+1.5 0	+2.5 0	+4 0	+5 0	+8 0	+12 0	+18 0	+30 0	+48 0	+75 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 _{h13}	d ₅	d ₆ max.	l ₆ ₀₋₁	l ₇ max.	r ₂	α/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"

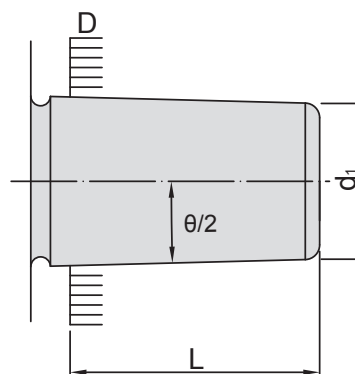
JACOBS TAPER

TYPE	θ/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	θ/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

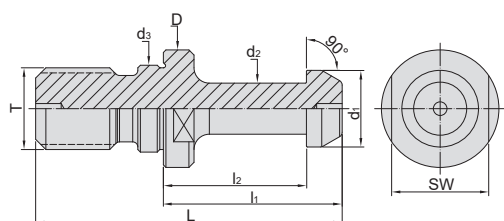
DRILL CHUCK HOLE TAPER SPECIFICATION



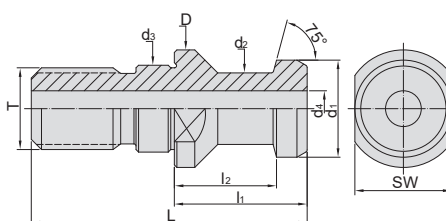
REFERENCE DETAILS

參考資料

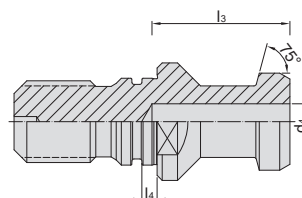
MAS BT



DIN 69872 - A



DIN 69872 - B



MAS BT PULL STUDS SPECIFICATION

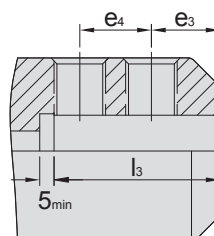
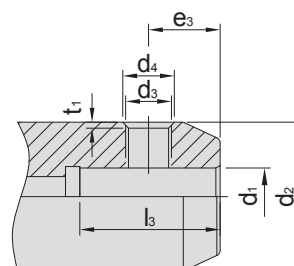
TYPE	D 0 -0.2	d ₁ 0 -0.1	d ₂ 0 -0.1	d ₃ h7	L	l ₁ 0 -0.1	l ₂ 0 -0.1	θ ±15°	SW 0 -0.35	T 6h	
BT30 - 45°	16.5	11	7	12.5	43	23	18	45°	13	M12 x 1.75P	P30T - 1
BT40 - 45°	23	15	10	17	60	35	28	45°	19	M16 x 2.0P	P40T - 1
BT50 - 45°	38	23	17	25	85	45	35	45°	30	M24 x 3.0P	P50T - 1
BT30 - 60°	16.5	11	7	12.5	43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

