TECHNICAL INFORMATION CATEGORY

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 .

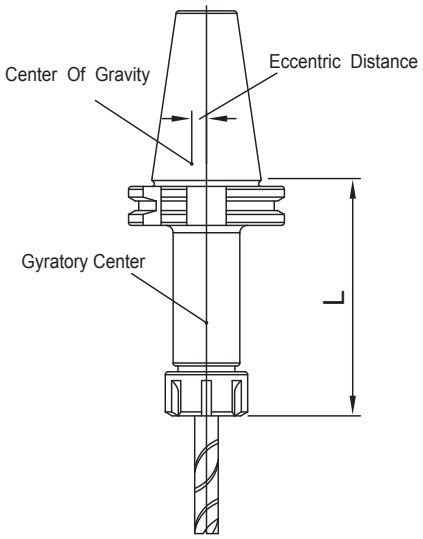
THE FORMULA AS FOLLOWS:

$$U = M \times e$$

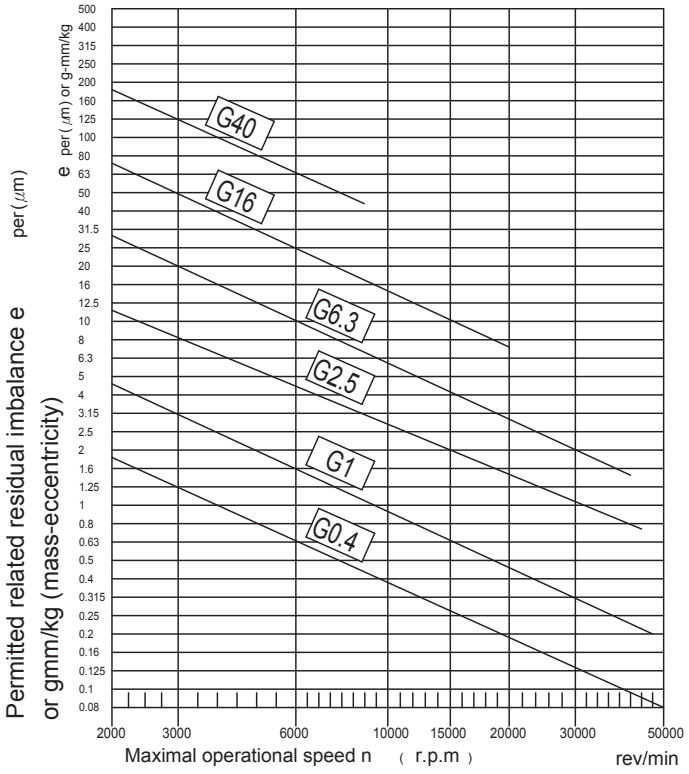
$$U = \frac{G \times M}{n} \times 9549$$

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

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



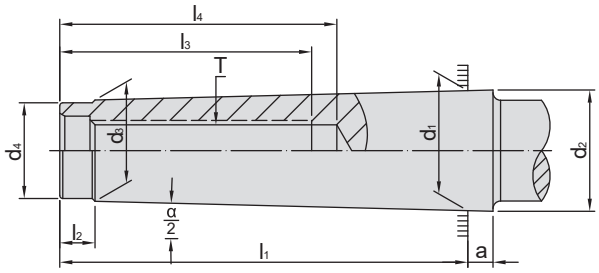
REFERENCE DETAILS

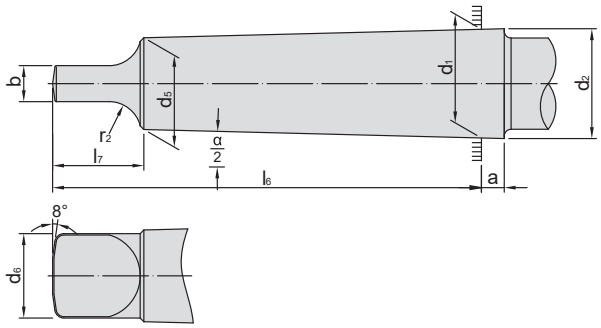
mm		H																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14[1)]	15[1)]	16[1)]	17[1)]	18[1)]
Over	Under	μm											mm						
-	3[1)]	+ 0.8 0	+ 1.2 0	+ 2 0	+ 3 0	+ 4 0	+ 6 0	+ 10 0	+ 14 0	+ 25 0	+ 40 0	+ 60 0	+ 0.1 0	+ 0.14 0	+ 0.25 0	+ 0.4 0	+ 0.6 0		
3	6	+ 1 0	+ 1.5 0	+ 2.5 0	+ 4 0	+ 5 0	+ 8 0	+ 12 0	+ 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 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"

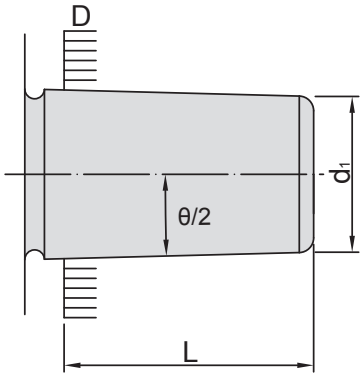
JACOBS TAPER

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

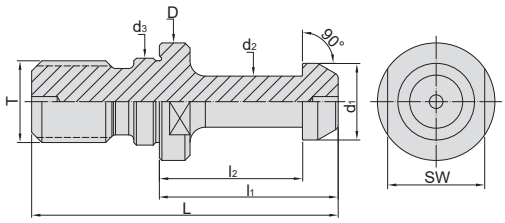
DRILL CHUCK HOLE TAPER SPECIFICATION



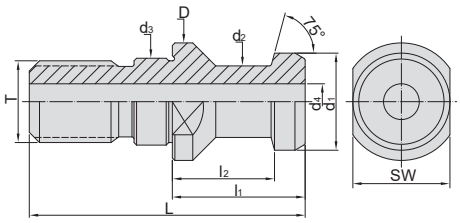
REFERENCE DETAILS

參 考 資 料

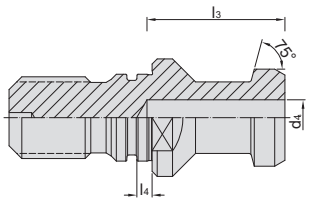
MAS BT



DIN 69872 - A



DIN 69872 - B



MAS BT PULL STUDS SPECIFICATION

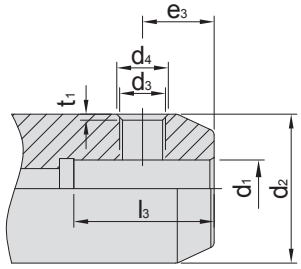
TYPE	D 0 - 0.2	d_1 0 - 0.1	d_2 0 - 0.1	d_3 h7	L	l_1 0 - 0.1	l_2 0 - 0.1	θ ±15´	SW 0 - 0.35	T 6h	
BT30 - 45°	16.5	11	7	12.5	43	23	18	45°	13	M12 x 1.75P	P30T - 1
BT40 - 45°	23	15	10	17	60	35	28	45°	19	M16 x 2.0P	P40T - 1
BT50 - 45°	38	23	17	25	85	45	35	45°	30	M24 x 3.0P	P50T - 1
BT30 - 60°	16.5	11	7	12.5	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

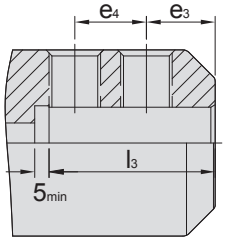
DIN 69872 A & B PULL STUDS SPECIFICATION

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





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