ISO METRIC PIPE THREADS AND NEWALL STANDARD TAPPING DRILL SIZES

(NOTE: QUOTED BASIC SIZES ARE B.S. PIPE THREAD SIZES ADOPTED BY ISO)

BASIC SIZE (Designation based on nominal bore of pipe)	PITCH IN mm	TAPPING DRILL SIZE IN mm	BASIC SIZE (Designation based on nominal bore of pipe)	PITCH IN mm	TAPPING DRILL SIZE IN mm
$\frac{1}{8}$	0.907	8.90	$\frac{7}{8}$	1.814	28.50
$\frac{1}{4}$	1.337	12.00	1	2.309	31.25
$\frac{3}{8}$	1.337	15.50	$1\frac{1}{4}$	2.309	39.50
$\frac{1}{2}$	1.814	19.25	$1\frac{1}{2}$	2.309	45.50
$\frac{5}{8}$	1.814	21.25	$1\frac{3}{4}$	2.309	51.00
$\frac{3}{4}$	1.814	24.75	2	2.309	57.00

IMPLIED TOLERANCES FOR NOMINAL DIMENSIONS

DRAWING OFFICE CONVENTION	SIZE IN mm OVER	UP TO	TOLERANCE IN mm
UNTOLERANCED SIZE (e.g. 12.5) Written in multiples of 0.5 mm	0	500	±0.5
	500	→	±1.0
UNTOLERANCED SIZE (e.g. 12.50) Written to two places of decimal	ALL SIZES		±0.15

CONVERSION FORMULA

1. LINEAR TO ANGULAR MEASUREMENT

$$\frac{\text{DISTANCE IN UNITS OF 0.001 mm}}{\text{RADIUS IN MILLIMETRES} \times 0.3} = \text{MINS. OF ARC}$$

EXAMPLE: TO CONVERT TO ANGULAR DISPLACEMENT A LINEAR DISTANCE OF 0.025 mm ON A 250 mm RADIUS–

$$\frac{25}{250 \times 0.3} = \frac{1}{3} \text{ MINUTE} = 20 \text{ SECONDS}$$

2. ANGULAR TO LINEAR MEASUREMENT

ANGLE IN MINS. × RADIUS IN mm × 0.3 = UNITS OF 0.001 mm

(The constant 0.3 is based on 1 minute = 0.003 mm length of arc at 10 millimetres radius)

MINISTRY OF TECHNOLOGY

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Listed in the British Calibration Service Directory of Approved Laboratories

ISO METRIC SCREW THREADS

(ALL SIZES IN mm)

ASSOCIATED DATA TO NEWALL STANDARDS

(ALL SIZES IN mm)

NOMINAL SIZE AND THREAD DIAMETER			PITCH	TAPPING DRILL SIZE	CLEARANCE HOLE SIZE	C'BORE DIAMETERS FOR SOCKET HEAD CAP SCREWS
FIRST CHOICE	SECOND CHOICE	THIRD CHOICE				
M 1.6			.35	1.30	1.8	
	M 1.8		.35	1.50	2.0	
M 2			.40	1.65	2.4	
	M 2.2		.45	1.80	2.6	
M 2.5			.45	2.10	2.9	
M 3			.50	2.60	3.4	6.2
	M 3.5		.60	3.00	3.9	
M 4			.70	3.40	4.5	7.8
	M 4.5		.75	3.90	5.0	
M 5			.80	4.30	5.5	9.2
M 6			1.00	5.20	6.6	10.8
		M 7	1.00	6.20	7.6	
M 8			1.25	7.00	9.0	14.0
		M 9	1.25	8.00	10.0	
M 10			1.50	8.80	11.0	17.0
		M 11	1.50	9.80	12.0	
M 12			1.75	10.60	14.0	20.0
	M 14		2.00	12.40	16.0	23.0
M 16			2.00	14.25	18.0	26.0
	M 18		2.50	16.00	20.0	29.0
M 20			2.50	18.00	22.0	32.0
	M 22		2.50	20.00	24.0	35.0
M 24			3.00	21.50	26.0	38.0
	M 27		3.00	24.50	30.0	
M 30			3.50	27.00	33.0	
	M 33		3.50	30.00	36.0	
M 36			4.00	32.50	39.0	
	M 39		4.00	35.50	42.0	
M 42			4.50	38.00	45.0	
	M 45		4.50	41.00	48.0	
M 48			5.00	44.00	52.0	
	M 52		5.00	48.00	56.0	
M 56			5.50	51.00	62.0	
	M 60		5.50	55.00	66.0	
M 64			6.00	59.00	70.0	
	M 68		6.00	63.00	74.0	

NOTE: MINIMUM DEPTH OF C'BORE TO EQUAL NOMINAL THREAD DIAMETER OF SCREW

NEWALL

METRIC TABLES

SELECTED LIMITS AND TOLERANCES

CONFORMING TO:– B.S. 4500
ISO/R286

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Issue 2

DIA. IN mm		LIMITS FOR STANDARD HOLES IN mm						DRIVE FIT			SHAFT LIMITS FOR VARIOUS FITS IN mm									DIA. IN mm	
		H7			E9			(H7 −)r6			DRIVE FIT (H7 −)p6			PUSH FIT (H7 −)g6			RUNNING FIT (H7 −)f7				
OVER	UP TO	HIGH	LOW	TOL.	HIGH	LOW	TOL.	HIGH	LOW	TOL.	HIGH	LOW	TOL.	HIGH	LOW	TOL.	HIGH	LOW	TOL.	OVER	UP TO
0	3	+.010	+0	.010	+.039	+.014	.025	+.016	+.010	.006				−.002	−.008	.006	−.006	−.016	.010	0	3
3	6	+.012	+0	.012	+.050	+.020	.030	+.023	+.015	.008				−.004	−.012	.008	−.010	−.022	.012	3	6
6	10	+.015	+0	.015	+.061	+.025	.036	+.028	+.019	.009				−.005	−.014	.009	−.013	−.028	.015	6	10
10	18	+.018	+0	.018	+.075	+.032	.043	+.034	+.023	.011				−.006	−.017	.011	−.016	−.034	.018	10	18
18	30	+.021	+0	.021	+.092	+.040	.052	+.041	+.028	.013				−.007	−.020	.013	−.020	−.041	.021	18	30
30	40	+.025	+0	.025	+.112	+.050	.062	+.050	+.034	.016				−.009	−.025	.016	−.025	−.050	.025	30	40
40	50	+.025	+0	.025	+.112	+.050	.062	+.050	+.034	.016				−.009	−.025	.016	−.025	−.050	.025	40	50
50	65	+.030	+0	.030	+.134	+.060	.074				+.051	+.032	.019	−.010	−.029	.019	−.030	−.060	.030	50	65
65	80	+.030	+0	.030	+.134	+.060	.074				+.051	+.032	.019	−.010	−.029	.019	−.030	−.060	.030	65	80
80	100	+.035	+0	.035	+.159	+.072	.087				+.059	+.037	.022	−.012	−.034	.022	−.036	−.071	.035	80	100
100	120	+.035	+0	.035	+.159	+.072	.087				+.059	+.037	.022	−.012	−.034	.022	−.036	−.071	.035	100	120
120	140	+.040	+0	.040	+.185	+.085	.100				+.068	+.043	.025	−.014	−.039	.025	−.043	−.083	.040	120	140
140	160	+.040	+0	.040	+.185	+.085	.100				+.068	+.043	.025	−.014	−.039	.025	−.043	−.083	.040	140	160
160	180	+.040	+0	.040	+.185	+.085	.100				+.068	+.043	.025	−.014	−.039	.025	−.043	−.083	.040	160	180
180	200	+.046	+0	.046	+.215	+.100	.115				+.079	+.050	.029	−.015	−.044	.029	−.050	−.096	.046	180	200
200	225	+.046	+0	.046	+.215	+.100	.115				+.079	+.050	.029	−.015	−.044	.029	−.050	−.096	.046	200	225
225	250	+.046	+0	.046	+.215	+.100	.115				+.079	+.050	.029	−.015	−.044	.029	−.050	−.096	.046	225	250
250	280	+.052	+0	.052	+.240	+.110	.130				+.088	+.056	.032	−.017	−.049	.032	−.056	−.108	.052	250	280
280	315	+.052	+0	.052	+.240	+.110	.130				+.088	+.056	.032	−.017	−.049	.032	−.056	−.108	.052	280	315
315	355	+.057	+0	.057	+.265	+.125	.140				+.098	+.062	.036	−.018	−.054	.036	−.062	−.119	.057	315	355
355	400	+.057	+0	.057	+.265	+.125	.140				+.098	+.062	.036	−.018	−.054	.036	−.062	−.119	.057	355	400
400	450	+.063	+0	.063	+.290	+.135	.155				+.108	+.068	.040	−.020	−.060	.040	−.068	−.131	.063	400	450
450	500	+.063	+0	.063	+.290	+.135	.155				+.108	+.068	.040	−.020	−.060	.040	−.068	−.131	.063	450	500

HOUSING AND SHAFT LIMITS	BEARINGS – GENERAL APPLICATION (Ball, Cylindrical, Needle, Taper, Spherical Roller)	
HOUSINGS	STATIONARY OUTER RING LOAD	J6
	ROTATING OUTER RING LOAD *OR* DIRECTION OF LOADING INDETERMINATE OR REVERSING *OR* BEARING APPLICATION EXTRA ACCURATE (Involving '00' – Two Dot – Normal Group Brgs.) *OR* SHELL TYPE (Drawn Cup) NEEDLE BEARINGS	M6
SHAFTS	STATIONARY INNER RING LOAD	g6
	ROTATING INNER RING LOAD *OR* DIRECTION OF LOADING INDETERMINATE OR REVERSING *OR* BEARING APPLICATION EXTRA ACCURATE (Involving '00' – Two Dot – Normal Group Brgs.) *OR* SHELL TYPE (Drawn Cup) NEEDLE BEARINGS	j5 k5 m6 n6

DIA. IN mm		HOUSINGS		SHAFTS				
OVER	UP TO	M6	J6	j5	k5	m6	n6	g6
3	6	−.001 −.009	+.005 −.003	+.003 −.002				−.004 −.012
6	10	−.003 −.012	+.005 −.004	+.004 −.002				−.005 −.014
10	18	−.004 −.015	+.006 −.005	+.005 −.003				−.006 −.017
18	30	−.004 −.017	+.008 −.005	+.005 −.004				−.007 −.020
30	50	−.004 −.020	+.010 −.006	+.006 −.005				−.009 −.025
50	80	−.005 −.024	+.013 −.006		+.015 +.002			−.010 −.029
80	120	−.006 −.028	+.016 −.006		+.018 +.003			−.012 −.034
120	150	−.008 −.033	+.018 −.007		+.021 +.003			−.014 −.039
150	180	−.008 −.035	+.018 −.007			+.040 +.015		−.014 −.039
180	250	−.008 −.037	+.022 −.007			+.046 +.017		−.015 −.044
250	315	−.009 −.041	+.025 −.007				+.066 +.034	−.017 −.049
315	400	−.010 −.046	+.029 −.007				+.073 +.047	−.018 −.054