## TAP TECHNICAL DATA

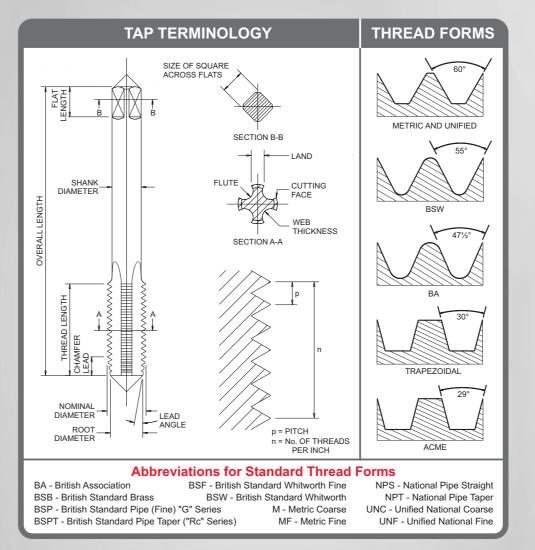


	CBA T		RECOMMENDED X SUITABLE								
		HARDNESS	TENSILE	NORMAL	SPEED N	I/MIN		TA	P TYPE		
	MATERIAL TYPES	HB HB	STRENGTH (N/mm²)	CHIP FORM	UNCOATED	COATED	RED BAND	BLUE BAND	YELLOW BAND	WHITE BAND	GREEN BAND
	Free Cutting steels	≤120	≤400	extra long	12	18 - 27	X				
	Structural steel. Case carburizing steel	≤200	≤700	middle/long	12	18 - 27	X				
l	Plain Carbon steel	≤250	≤850	long	10	18 - 24	X				
STEEL	Alloy steel	>250	≤850	long	10	18 - 24					
	Alloy steel. Hardened and tempered steel	>250 ≤350	>850 ≤1200	long	8	9 - 15					
	Alloy steel. Hardened and tempered steel	>350	>1200	long	5	9 -15					
	Free machining Stainless steel	≤250	≤850	middle	9	18 - 24					X
STAINLESS STEEL	Austenitic	≤250	≤850	long	6	9 - 15					
	Ferritic + Austenitic, Ferritic, Martensitic	≤300	≤1000	long	5	8 - 15					
	Lamellar graphite	≤150	≤500	extra short	11	18 - 27					X
CAST IRON	Lamellar graphite	>150 ≤300	>500 ≤1000	extra short	8	9 - 18					X
CASTINON	Nodular graphite, Malleable Cast Iron	≤200	≤700	middle/short	11	18 - 27	X				X
	Nodular graphite, Malleable Cast Iron	>200 ≤300	>700 ≤100	middle/short	8	9 - 18					
	Titanium, unalloyed	≤ 200	≤700	extra long	8	9 - 15					
TITANIUM	Titanium, alloyed	≤270	≤900	middle/short	9	12 - 18	X				
	Titanium, alloyed	>270 ≤350	>900 ≤1200	middle/short	6	6 - 12	X				
	Nickel, unalloyed	≤150	≤500	extra long	9	12 - 18					X
NICKEL	Nickel, alloyed	≤270	≤900	long	5	6 - 12			X		X
	Nickel, alloyed	>270 ≤350	>900 ≤1200	long	4	5 - 11			X		
	Copper	≤100	≤350	extra long	11	15 - 24					X
COPPER	Beta Brass, Bronze	≤200	≤700	middle/short	30	43 - 55				X	X
COPPER	Alpha Brass	≤200	≤700	long	18	40 - 49					X
	High strength Bronze	≤470	≤1500	short	5	6 - 12					
	Al, Mg, unalloyed	≤100	≤350	extra long	15	24 - 30					X
ALUMINIUM	Al alloyed Si < 0.5%	≤150	≤500	middle	30	43 - 52			0		X
MAGNESIUM	Al alloyed, Si > 0.5% < 10%	≤120	≤400	middle/short	18	30 - 36	X				X
	Al alloyed, Si > 10%, Al-alloys, Mg-alloys	≤120	≤400	short	15	24 - 30	X				X
	Thermoplastics	-	-	extra long	27	-			0		X
SYNTHETIC MATERIALS	Thermosetting plastics	-	-	short	11	15 - 21					X
	Reinforced plastic materials	-	-	extra short	8	9 - 15	X				

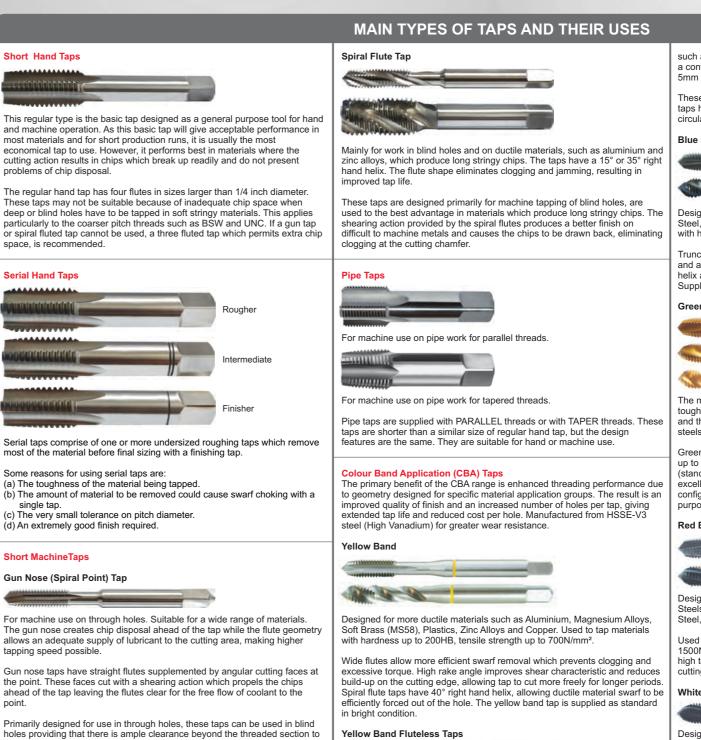
		R		ENDED DRI	LL S				
	OMINAL ETER	Pitch TPI	DRILL SIZE IN mm	SIZE   NOMINAL DIAMETER	Pitch TPI	DRILL SIZE IN mm	SIZE   NOMINAL DIAMETER	Pitch TPI	DRILL SIZE
				METRIC	COA	RSE	* Flutele:	ss Tappi	ing Drill Sizes
	11	0.25	0.75 (0.9*)	M7	1	6	M27	3	24 (25.5*)
	1.2 1.4	0.25	0.95 (1.1*) 1.1 (1.27*)	M8 M9	1.25 1.25	6.8 (7.4*) 7.8	M30 M32	3.5	26.5 (28.2*) 28.5
	1.6	0.35	1.25 (1.45*)	M10	1.5	8.5 (9.3*)	M33	3.5	29.5 (31.2*)
	12 2.5	0.4 0.45	1.6 (1.85*) 2.05 (2.3*)	M11 M12	1.5 1.75	9.5 10.2 (11.2*)	M36 M39	4	32 (33.9*) 35 (36.9*)
	13 3.5	0.5	2.5 (2.8*)	M14 M16	2 2	12 (13*)	M42 M45	4.5 4.5	37.5 (39.6*) 40.5 (42.6*)
	3.5 14	0.6	2.9 (3.2*) 3.3 (3.7*)	M18	2.5	14 (15*) 15.5 (16.8*)	M48	5	43
	4.5 15	0.75	3.7 (4.2*) 4.2 (4.65*)	M20 M22	2.5	17.5 (18.8*) 19.5 (20.8*)	M52 M56	5 5.5	47 50.5
	16	1	5 (5.55*)	M24	3	21 (22.5*)	IVISO	3.3	30.3
				MET	RIC FI	NE	* Flutele:	ss Tappi	ing Drill Sizes
	F2 2.5	0.25 0.35	1.75 2.15	MF12 MF12	1.25 1.5	10.75 (11.45*) 10.5 (11.3*)	MF27 MF30	2 1.5	25 28.5
М	F3	0.35	2.65	MF14	1.25	12.75 (13.4*)	MF30	2	28
	3.5 F4	0.35	3.15 3.5	MF14 MF16	1.5	12.5 (13.3*) 15	MF32 MF33	1.5 1.5	30.5 31.5
MF	4.5	0.5	4	MF16	1.5	14.5 (15.3*)	MF36	1.5	34.5
	F5 F6	0.5 0.5	4.5 5.5	MF18 MF18	1.5 2	16.5 (17.3*) 16	MF36 MF39	2 1.5	34 37.5
M	F6	0.75	5.25	MF20	1.5	18.5 (19.3*)	MF40	1.5	38.5
	F7 F8	0.75 0.75	6.25 7.25	MF20 MF22	1.5	18 20.5 (21.3*)	MF42 MF45	1.5 1.5	40.5 43.5
M	F8	1	7 (7.55*)	MF22	2	<u>2</u> 0	MF48	1.5	46.5
	F9 -10	1 1	8 9 (9.55*)	MF24 MF24	1.5 2	22.5 (23.3*) 22	MF50 MF52	1.5 1.5	48.5 50.5
	-10 -12	1.25 1	8.75 (9.45*) 11 (11.55*)	MF25 MF25	1.5 2	23.5 23			
IVIT	12	ı	11 (11.55 )	= 0	SSW	23			
	32	48	1.9	3/8	16	8	1"	8	22
	/8 32	40 32	2.55 3.2	7/16 1/2	14 12	9.3 10.5	1.1/8 1.1/4	7	25 28
3/	16	24	3.7	9/16	12	12.2	1.1/2	6	34
	32 /4	24 20	4.5 5.1	5/8 3/4	11 10	13.5 16.5	1.3/4 2"	5 4.5	39 45
	16	18	6.5	7/8	9	19.5	_		
					BSF				
	16 32	32 28	4 4.7	7/16 1/2	18 16	9.8 11	7/8 1"	11 10	19.5 22.5
1/4 5/16 3/8		26	5.4	9/16	16	12.7	1.1/8	9	25.5
		22	6.8 8.3	5/8 3/4	14 12	14 16.5	1.1/4 1.1/2	8	29 34.5
					JNC				
	2.51	48	2	5/16	18	6.6	1"	8	22
		40	2.25 2.6	3/8 7/16	16 14	9.4	1.1/8 1.1/4	7	25 28
No.6	3.51	32	2.75	1/2	13	10.8	1.3/8	6	31
		32 24	3.4 3.8	9/16 5/8	12 11	12.2 13.5	1.1/2 1.3/4	6 5	34 39
lo.12	5.49	24	4.4	3/4	10	16.5	2"	4.5	45
1	/4	20	5.1	7/8	9 JNF	19.5			
lo.3	2.51	56	2.1	1/4	28	5.5	7/8	14	20.5
		48 44	2.35 2.65	5/16 3/8	24 24	6.9 8.5	1" 1.1/8	12 12	23.5 26.5
lo.6	3.51	40	2.9	7/16	20	9.8	1.1/4	12	29.5
3/8  No.3 2.51 No.4 2.84 No.5 3.18 No.6 3.51 No.8 4.17 No.10 4.83 No.12 5.49 1/4  No.3 2.51 No.4 2.84 No.5 3.18		36 32	3.5 4.1	1/2 9/16	20 18	11.5 12.8	1.3/8 1.1/2	12 12	32.5 36
o.12	5.49	28	4.6	5/8	18	14.5			
3/	10	32	4	3/4	16 <b>BSP</b>	17.5			
	/8	28	8.8	5/8	14	21	1.1/4	11	40
	/4 /8	19 19	11.8 15.5	3/4 7/8	14 14	24.5 28.5	1.1/2 1.3/4	11	45.5 51.5
	/2	14	19	1"	11	31	2"	11	57
	10	20	0.0		SPT	40.5	4.414	4.4	20
1	/8 /4	28 19	8.6 11.5	1/2 3/4	14 14	18.5 24	1.1/4 1.1/2	11 11	39 45
3	/8	19	15	1"	11	30.25	2"	11	56.5
-	10	07	2.1		NPS	10	4.44	4	20.
1	/8 /4	27 18	9.1 12	1/2 3/4	14 14	19 24.5	1.1/4 1.1/2	11.5 11.5	39.4 45.5
	/8	18	15.5	1"	11.5	30.5	2"	11.5	57.5
1	/8	27	8.4	1/2	<b>NPT</b>	17.5	1.1/4	11.5	37.5
1	/4 /8	18 18	11 14.25	3/4 1"	14 14 11.5	23	1.1/2	11.5	43.5 55.5
3	10	10	14.20	Γ'	11.5 <b>BA</b>	29		11.0	
12	1.3	90.1	1.05	7 2.5	52.9	2.05	3 4.1	34.8	3.4
10 9	1.7 1.9	72.6 65.1	1.4 1.55	6 2.8 5 3.2	47.9 43.1	2.3 2.65	<b>2</b> 4.7 <b>1</b> 5.3	31.3 28.2	3.9 4.5
9					38.3				

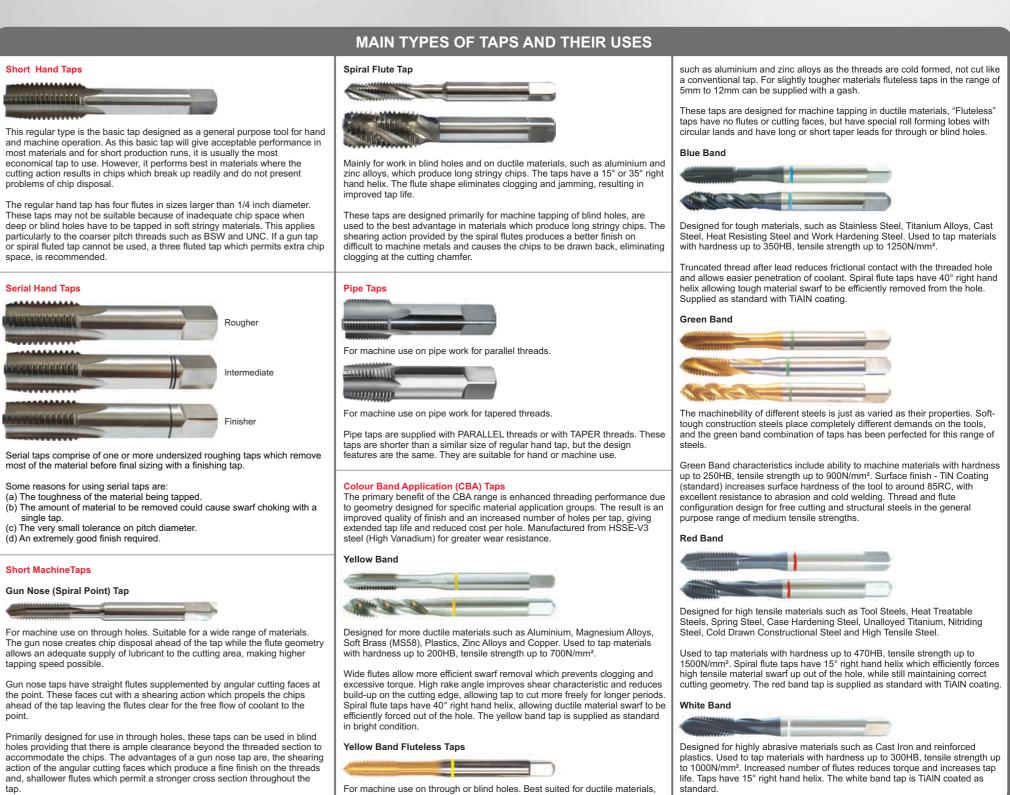
TAP	PING PROBLEMS: CA	AUS	SES AND SOLUTIONS
Damaged tap threa (a) Possible Caus Mis-alignment of Solution			Possible Cause The drilled hole is too small. Solution Use the recommended drill size.
Care must be ta before starting t (b) <b>Possible Caus</b> The tap is too d <b>Solution</b>	e	(a)	er-Heating of tap Possible Cause Lack of/or the wrong type of lubricant. Solution
(c) Possible Caus Work hardened Solution	skin in the drilled hole.	(b)	Apply an adequate supply and the correct type of lubricant to the cutting area.  Possible Cause The tap is too dull.
		(c)	Solution Use a tap which is in good condition. Possible Cause Using the incorrect tap. Solution
Solution Use the recomm	nended tap for the material.	(d)	Use the recommended tap.  Possible Cause  Excessive tapping speed is applied.
Poor finish of the t (a) Possible Caus Using the incom	e		Solution Use the recommended tapping speed.  er-size tapped hole
Use the recomm (b) Possible Caus The drilled hole Solution	e	(a)	Possible Cause Using the incorrect tap. Solution Use the recommended tap.
Use the recomm (c) Possible Caus The tap is too d Solution			Possible Cause Mis-alignment of the tap with the hole. Solution Care must be taken to align the tap with the hole
(d) Possible Caus Insufficient num Solution	ber of threads on the lead.	(c)	before starting to tap.  Possible Cause Lack of/or the wrong type of lubricant.  Solution
(e) Possible Caus Mis-alignment of Solution	of the tap with the hole.	(d)	Apply an adequate supply and the correct type of lubricant to the cutting area.  Possible Cause Incorrect rake angle.
Care must be to before starting to (f) Possible Caus Incorrect rake a Solution	e	Тар	Solution Use the recommended tap for the material.  binding in the hole Possible Cause
			Using the incorrect tap.  Solution Use the recommended tap.  Possible Cause
The flutes are c	logged by chips. nt or a spiral flute tap.	(*)	The drilled hole is too small.  Solution Use the recommended drill size.  Possible Cause
	walls in a thin walled workpiece.	(*)	Lack of/or the wrong type of lubricant.  Solution  Apply an adequate supply and the correct type of lubricant to the cutting area.
The threads on <b>Solution</b>	the tap are broken.  is in good condition.	(d)	Possible Cause The flutes are clogged with chips. Solution
Lack of/or the w Solution	arong type of lubricant. ate supply and the correct type of	(e)	Use a spiral point or a spiral flute tap.  Possible Cause Incorrect rake angle.  Solution Use the recommended tap for the material.
(e) Possible Caus		Flut	tes clogged with chips Possible Cause Using the incorrect tap.
(f) Possible Caus	nended tap for the material.  e  cottom of the hole.	(b)	Solution Use a spiral point or spiral flute tap. Possible Cause Lack of/or the wrong type of lubricant.
Allow sufficient hole.  (g) Possible Caus Incorrect rake a			Solution Apply an adequate supply and the correct type of lubricant to the cutting area.
Solution	nended tap for the material.	(a)	Breakage Possible Cause Using the incorrect tap.
(a) Possible Caus Mis-alignment of Solution		(b)	Solution Use the recommended tap. Possible Cause The tap is too dull.
before starting t (b) Possible Caus Lack of/or the w		(c)	Solution Use a tap which is in good condition. Possible Cause The drilled hole is too small.
lubricant to the (c) Possible Caus	e	(d)	Solution Use the recommended drill size. Possible Cause The drilled hole is too shallow.
The material is Solution (i) Use the corre (ii) Use a surface (d) Ressible Cause	ect type of tap.	(e)	Solution Allow clearance at the bottom of the hole when drilling. Possible Cause Mis alignment of the top with the hole
(d) Possible Caus Using the incorr Solution (i) Use a tap wit (ii) Use a surface	rect tap. th the correct lead.		Mis-alignment of the tap with the hole.  Solution  Care must be taken to align the tap with the hole before starting to tap.  Possible Cause
(e) Possible Caus Incorrect rake a Solution	e .		The flutes are clogged with chips.  Solution Use a spiral point or spiral flute tap.  Possible Cause
Bell-Mouthed Tapp	ed Hole		Excessive tapping speed is applied.  Solution
Solution Care must be ta	of the tap with the hole.  Aken to align the tap with the hole	(h)	Use the recommended tapping speed.  Possible Cause The tap holding device is not suitable.  Solution
Solution	e is not rigidly held.	(i)	Use the appropriate tapping attachment.  Possible Cause The work material is work hardened.  Solution
Solution	e sure is applied when starting to tap.	(j)	Use serial taps.  Possible Cause Lack of/or the wrong type of lubricant.  Solution
should be applie (d) <b>Possible Caus</b> Insufficient num		(k)	Apply an adequate supply and the correct type of lubricant to the chamfer lead of the tap.  Possible Cause Incorrect rake angle.
Solution Use a tap with t	he correct lead.		Solution Use the recommended tap for the material.

			T	AP TECHN	ICAL DATA					
		TYPICAL I	PHYSICAL PRO	PERTIES	RECOM		ALTERN TAP 1		* TAP	
TYPE	GRADE	HARDNESS BRINELL	TONS PER SQ INCH	N/mm²	THROUGH	BLIND HOLE	THROUGH HOLE	BLIND HOLE	PERIPHERAL SPEED m/min	LUBRICANTS
	FREE CUTTING	150	33	500	Gun	Spiral Flute			10-15	
CARBON	0.3 to 0.4% Carbon 0.3 to 0.4% Carbon	170 248	38 54	570 800			Straight	Straight	8-12	Sulphur
STEEL	0.4 to 0.7% Carbon	206	44	650	Nose		Flute	Flute	8-10	based oil
	0.4 to 0.7% Carbon	286	63	95						
ALLOY STEEL	Tough Hard	248 330 380	54 74 82	810 1100 1250	Gun Nose	Spiral Flute	Straight Flute	Straight Flute	8-12	Sulphur based oil
STAINLESS	Martensitic Free Cutting Martensitic Std. Grade	248	54	810	Gun	Spiral	Straight	Straight		Heavy duty
STEEL	Austenitic Free Cutting Austenitic Std. Grade		As Supplied		Nose	Flute	Straight Flute	Straight Flute	2-6	Sulphur based oil
NIMONIC	Wrought	300	67	1000		See CBA Tag	section		2-4	Chlorinated
ALLOYS	Cast	350	78	1170		See CBA Tap	Section		2-4	oil
	Titanium Comm: Pure	170	38	570						
TITANIUM	Titanium Comm: Pure Titanium Comm: Pure	200 275	43 65	650 975		See CBA Tap	o section		2-4	Chlorinated
IIIANION	Titanium Alloyed	340	76	1140	-	000 02/114	3 00011011			oil
	Titanium Alloyed	380	85	1275						
TOOL STEEL	HSS Standard / Cobalt Grades	225	48	720	Gun Nose	Spiral Flute	Straight Flute	Straight Flute	8-10	Sulphur based oil
	Hot / Cold Working Steel	225		810	Gun	Straight	Straight		45.00	Sulphur
MAN	GANESE STEEL		As Supplied		Nose	Flute	Flute		15-20	based oil
CAST	Grey Ductile	240	52	780	Straight	Straight Flute	Gun	-	5-10	Dry soluble oil or
IRONS	Maleable Hardened & Tempered	330	74	1110	Flute		Nose		4-8	paraffin
ALUMINIUM ALLOYS	Long Chip Short Chip		As Supplied		Fluteless	Fluteless	Gun Nose	Spiral Flute	20-25 10-15	Soluble oil or light material oil
MANG	GANESE ALLOYS	des 225 48 720 Gun Nose Flute Straight Flute Flute Flute Flute Straight Flute Straight Flute Flute Flute Flute Flute Straight Flute Flute Flute Flute Sulphur based oil  As Supplied Straight Flute Straight Flute Gun Nose Flute Straight Flute Straight Flute Straight Flute Straight Flute Straight Flute Gun Nose Flute Straight Soluble Soluble								
z	INC ALLOYS		As Supplied		Fluteless	Fluteless	Straight Flute	Straight Flute	15-20	Soluble oil
	Brass Free Cutting Brass Low Lead Bronze Silicon				Fluteless	Fluteless	Straight Flute	Straight Flute	15-20 25-30 10-12	Soluble oil or light
	Bronze Manganese				Gun Nose	Straight Flute	Straight Flute	Straight Flute	3-5	mineral oil
COPPER ALLOYS	Copper Free Machining Copper Electrolytic		As Supplied		Fluteless	Fluteless	Gun Nose	Gun Nose	15-20 8-12	Chlorinated
	Bronze Aluminium Bronze Commercial				Gun	Straight	Straight	Straight	10-12 3-5	oil or soluble oil
	Bronze Phosphor				Nose	Flute	Flute	Flute	3-5	Soluble oil or light mineral oil
	Soft								4-7	ngna minorai on
PLASTICS	Hard Reinforced		As Supplied		Straight Flute	Straight Flute	Gun Nose	-	12-15	Dry
	* Тар	pping speeds fo	or fluteless tap	s are 2-3 time	s higher then	the recomme	ended speeds	given		



Metres/Min		4	6	8	9	10	12	15	18	21	25	27	30	3
Тар	Size					DE/	/OLUTI	ONS DE	ER MIN	IITE				
mm	inch					NEV	OLUTI	ONS FL	-IX IVIIIA	U1L				
1.6	1/16	800	1194	1592	1791	1988	2386	2983	3579	4176	4971	5369	5965	7
1.8		708 637	1065 955	1415 1274	1598 1433	1768 1591	2121 1909	2652 2386	3182 2863	3712 3341	4419 3977	4773 4295	5303 4773	5
2.2	3/32	579	869	1158	1303	1446	1736	2169	2603	3037	3616	3905	4339	52
2.5	0/02	510	764	1019	1147	1274	1527	1909	2291	2673	3182	3436	3818	45
3	1/8	425	637	849	955	1061	1273	1591	1909	2227	2651	2864	3182	38
3.5		364	546	728	819	909	1091	1364	1636	1909	2273	2455	2727	32
4	5/32	318	478	637	718	796	955	1193	1432	1671	1989	2148	2387	28
4.5		283	425	566	637	707	849	1061	1273	1485	1768	1909	2122	25
5	3/16	255	382	510	573	637	764	955	1146	1337	1591	1719	1909	22
6	1/4	212	319	425	477	530	636	795	954	1113	1326	1432	1592	19
7	9/32	182	273	364	409	455	546	682	818	955	1136	1227	1364	16
8 9	5/16	159	239	319	358	398	477	597	716	835	994	1074	1193	14
10	3/8	142 127	212 191	283 255	318 286	354 318	425 382	531 477	637 573	742 668	885 795	955 859	1061 955	12
11	3/0	116	174	232	260	289	347	434	521	608	723	781	868	1(
12	1/2	106	159	212	238	265	318	398	477	557	663	716	796	9
13	.,_	98	147	196	220	245	294	367	441	514	612	661	734	8
14	9/16	91	136	182	205	277	273	341	409	477	568	614	682	8
16	5/8	80	119	159	179	199	239	298	358	418	497	537	597	7
18		71	106	141	159	177	212	265	318	371	442	477	530	6
20	3/4	64	96	127	143	159	191	239	286	334	398	430	477	5
22	7/8	58	87	116	130	145	174	217	260	304	362	391	434	5
24	1"	53	80	106	119	133	159	199	239	275	331	353	398	4
27		47	71	94	106	118	141	177	212	245	295	318	354	4
30	1.1/8	43	64	85	95	106	127	159	191	223	265	286	318	3
33 36	1.1/4	39 35	58 53	77 71	87 80	96 88	116 106	145 133	174 159	203 186	241 221	360 239	289 265	3
39	1.1/2	33	49	65	73	82	98	122	147	171	204	239	245	2
42	1.1/2	30	46	61	68	76	91	114	186	159	189	205	227	2
45	1.3/4	28	42	57	64	71	85	106	127	149	177	191	212	2
48		27	40	53	60	66	80	99	119	139	166	179	199	2
52		24	37	49	55	61	73	92	110	129	153	165	184	2
56	2"	23	34	46	51	57	68	85	102	119	142	153	170	2
				FOR	RMULA	FOR	CALC	ULAT	ING rp	om	_			







cerlikon SABS balzers







Manufacturers & Suppliers of Drills, Reamers, End Mills, Bore Cutters, Taps & Dies, Toolbits, Solid Carbide Tooling, Carbide Insert Tooling, Custom Tools & Surface Coatings



shaping your dreams



