BLUE-MASTER® by celesa

TECHNICAL INFORMATION

SYMBOL INDEX

GENERAL ICONS

DIN -	DIN Norm	TOL -	Tolerance	Plus	High Performance Tool	★★	Standard Quality
★★	Professional Quality	★★	Extra Professiona Quality	★★	Supreme Quality	Premium Quality	Premium Quality

MATERIALS

HSS	High Speed Steel M2 Quality	HSS-G	High Speed Steel M2 Quality Special heat treatment	HSS V3	M3:2 Quality 3% Vanadium	HSS PM	Powder Steel High performance
HSS M3	High Speed Steel M3:1 Quality	HSSCo 5%	5% Cobalt High Speed Steel. M35 Quality	HSSCo 8%	8% Cobalt High Speed Steel. M42 Quality	HCS	Carbon Steel
SOLID CARBIDE	Solid Carbide	CARBIDE TIPPED	Carbide Insert	MG CARBIDE	Carbide Micro Grit		
ASP	Powder Steel High performance	ASP 23	Powder Steel High performance C:1,28 Cr:4,1 Mo:5,0 W:6,4 V:3,1	ASP 60	Powder Steel High performance C:2,30 Cr:4,2 Mo:7,0 Co:10,5 V:6,5 V:3,1	CV	Carbon Steel with Vanadium
X210 Cr12	Teatrise Carbon Steel X210 Cr12	BI	Bimetal	BI/CV	Mix: Bimetal/Carbon Vanadium steel	PCV	Polycrystalline
	CArbide tipped point	TUNGSTEN	Electroplated Tungsten powder		Irwing drill with carbide Insert		Diamond
T15	Super Powder Steel C:1,60 Cr:4,0 V:4,9 W:12,0 Co:5,0	K-10	K10 Carbide Quality	P-20	P10 Carbide Quality	Cu-Be	Copper Beryllium

TOOL COATINGS

OX	Steamed (Black Oxide)	BRIGHT	Bright finish	GOLD	Gold finish	TiAlN	Titan-Aluminium-Nitride coating for drilling and milling
TiN	Titanium Nitride coating	BLUE	Titanium Carbonitride coating	HARD LUBE	High performance friction-reducing coating for tapping	TINALOX	Supernitride high performance coating for hardened steel tapping 120 kg/mm²
CrN	Chrome Nitride coating	TiCN	Special Blue coating fro hardened steel milling	DiATiN	Diamond and Titanium coating for enhanced performance	TiAlSiN	High performance coating for stainless steel and nickel alloys machining
HARDTOP	High hardness coating and resistance to wear and abrasion						

POINTS AND HELIX OF DRILLS

-	Conventional Point Angle118°	-	Split Point	-	Carbide insert	135°	X Turbo self-centering sharp
	Conventional Sharpening		Split Point		S Sharpening		Carbide Insert for Concrete
	Split Point with Internal Cooling		Triple-Facet sharpening for Stainless Steel		Special All-Road Cut		Chip-Breaker for Stainless Steel Cutting
	Special Point Angle for Hardened Steels 70HRc		Slim Point		Slim Point with Internal Cooling		4 Edges Sharpening
	Square sharpening						

SYMBOL INDEX

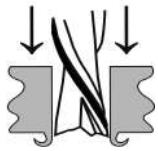
HELIX ANGLES

- Helix Angles for Twist Drills
- Helix angle for Reamersaj
- Straight Flute Reamer
- Helix angle for Reamers
- Helix angle for 3 Flutes End Mills
- Helix angle Multi-Flutes End Mills
- Helix angle for 2 Flutes Cutting Centre End Mills
- Helix angle for 2 Flutes Ball Nose End Mills
- Helix angle for 2 Flutes End Mills
- 35° 38° Variable helix improve performance by reducing vibrations
- Helix angle for taps
- S TYPE Helix angle for drill, for wood and metal

A

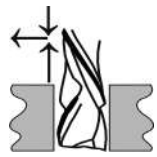
Chip flow
Right hand cut, right hand spiral

B



Chip flow
Right hand cut, left hand spiral

C



Chip flow
Right hand cut, double cut left-right hand spiral

SHANK TYPES

- SDS Plus — SDS PLUS shank
- SDS Max — SDS-MAX shank
- SDS Quick — For UNEO type drilling
- STRAIGHT — Straight shank
- WELDON — WELDON Flat Shank
- WELDON — DIN1835B WELDON Shank
- TAPER — Taper Shank
- Ø ≥ 3 — Anti-slip triple flat shank
- Reduced shank for chuck use
- 1/4" — Hexagonal shank (1/4¨= 6,35 mm)
- Hexagonal shank
- GAMMON — GAMMON shank
- Reduced shank for chuck use

TOOL APPLICATIONS

- INOX — Stainless steel: AISI 304, AISI 316, AISI 316L
- INOX Plus — High performance tool for stainless steel: AISI 304, AISI316, AISI316L
- Al — Aluminium & its alloys
- BRASS — Brass
- CAST IRON — Nodular, maleable and grey cast iron
- Metal in general: Iron, Construction steel
- - Kg/mm² — Metal up to - Kg/mm2
- - HRc — Tempered steel up to..
- PRODUCTION — Tool for the production of big series
- HIGH PERFORMANCE — Tool for intensive production and big series
- Cu — Copper & its alloys
- FORMING — Forming tap
- INC — INCONEL: Refractory alloy with high nickel content
- Ni — Nickel alloy in general
- Ex — Suitable for machining in explosive atmospheres
- Ti — Titane & its alloys
- Wood in general
- Drill fro Squared Holes in the wood
- Hard Wood
- Plywood
- Nailed wood: palets...
- Chipboard
- Agglomerated (Pressed))
- Sandwich construction
- Laminated particle board
- Plexiglas
- Steel pipes
- Cast iron pipes
- Laminated sheet
- Special saws for tree pruning
- Sheet
- PVC — PVC Plastic in general
- Saw blade for curve cutting in wood
- Saw blade for curve cutting in metal
- Fiberglass
- Crystal & glass

SYMBOL INDEX

TOOL APPLICATIONS


Profiles for windows in Alumium & PVC


Marble, Granite

Excellent wear resistance and very high mechanical resistance Stainless steel


Uralit

Non ferreous steel: Copper, Nickel, Brass


Tile


Food


Plastic pipe o flexible rubber insulating materials


Carton, rubber, leather


Leather


Metal profile


Polystyrene


Brick

High production & performance

Tool for a CNC use


Pallets


Cell Concrete


Plaster board

High hardness and wear and abrasion resistance Steel


Natural wood and other materials


Grooving use exclusively


Plaster


Carbon fiber and composite materials


Hydraulic Hoses Cutting


Hard ceramics


Stoneware


Stone


Reinforced concrete


Tile


White marble


Black marble


Concrete celular


Concrete


Asphalt, pavement.


Calcareous stones


Paving stone, floor tile.


Vault and concrete blocks


Soils


PVC Tubes


Wood strip, profile, skirting, handrail

Explosive atmospheres

Aircraft industry

Scratching and preparation of surfaces

Prepare of a surface for later paint.

Prepare and polish of a surface for later wallpaper or paint

Tile removal

Carpet and adhesive removal

CUTTING ANGLES

CENTER DRILLS

DIN333A Norm

DIN333B Norm

DIN333R Norm

COUNTERSINKS

60º Countersink

75º Countersink

90º Countersink

120º Countersink

60º Multicutting Countersink

90º Multicutting Countersink

120º Multicutting Countersink

90º External chamfering countersink

60º external chamfering countersink

60º deburring countersink

90º deburring,countersink

CUTTING ANGLES: END MILLS

45º isosceles angular milling cutter

60º isosceles angular milling cutter

90º isosceles angular milling cutter

Single angle Mill

CUTTING ANGLES: BAND SAW BLADES

0º Teeth angle

Reinforced teeth

10º Teeth angle

12º Ground tooth angle

SYMBOL INDEX

CUTTING ANGLES

END MILLS ROUGHING AND GRIT TYPES OF BAND SAWS

Fine roughing
NF Type

Medium roughing
NM Type

Coarse roughing
NR Type

Tungsten carbide electro-deposited
Fine

Tungsten carbide electro-deposited
Medium

Tungsten carbide electro-deposited
Coarse

CUTTING No.

GENERAL

Teeths Nº

Multi cut


2 Flutes end mills with center cutting


3 Flutes end mills with center cutting

END MILLS


4 Flutes end mills with center cutting


Multi-fluted end mills with center cutting


4 Flutes end mills without center cutting


Solid carbide heat 3 edges

REAMERS


3 Fluted Drill Reamer without cutting centre


Multi-Fluted Drill Reamer without cutting centre

ICONS DEFINITION BY FAMILY

TWIST DRILLS FOR METAL


Left hand drills

DRILL CHUCK

Auto-lock

Light weight

TAPS


Taps with pilot for a good alignment of the first tap


Forming machine taps with oil grooves


Forming machine taps without oil grooves

Hand taps for aluminium & its alloys


Taps alternating teeth for through holes in the aluminium


Two flutes machine tap for blind holes in aluminium


Left-hand cutting

LATHE TOOLS


Square lathe tool


Cylindrical lathe tool


Rectangular lathe tool


Trapezoid lathe tool


Irregular trapezoidal lathe tool

THREAD GAUGES

Thread Profile

Threading conicity NPT (1/16)

Certificate

JIG SAW BLADES


Ground tooth profile


Carbide tipped tooth

Reverse cut: Good finishing in the backside


Teeth type

SCREWDRIVER BITS


Phillips


Pozidriv

Slot

Torx

Torx round

Robertson

Torx Tamper

Hexagonal

Tri Wing

Xzn

SAW BLADES & DRILLS FOR CONSTRUCTION

Water cooling

Dry work

Percussion mode

Rotation mode without percussion

CHART OF REVOLUTIONS PER MINUTE (R.P.M.) ACCORDING TO THE DIAMETER OF THE DRILL AND THE CUTTING SPEED

CUTTING SPEED	DRILL Ø AND REVOLUTIONS PER MINUTE																
Cs (m/min)	2	2,5	3	4	5	6,5	8	10	13	16	20	25	30	40	50	63	80
3	477	382	318	238	190	147	119	95	73	60	48	38	32	24	19	15	12
5	796	636	530	398	318	245	198	159	122	99	80	64	53	40	32	25	20
8	1.273	1.018	848	636	509	392	318	254	195	159	127	102	85	64	50	40	32
10	1.592	1.273	1.061	795	636	490	398	318	245	199	159	127	106	80	64	50	40
12	1.910	1.528	1.273	955	764	588	477	382	294	238	190	152	127	95	76	60	48
15	2.387	1.910	1.592	1.194	955	735	596	477	367	298	138	190	159	119	95	75	60
20	3.183	2.546	2.122	1.592	1.273	979	795	636	490	398	318	255	212	159	127	101	80
25	3.979	3.183	2.652	1.989	1.592	1.224	995	795	612	497	398	318	165	198	159	126	99
30	4.775	3.820	3.183	2.387	1.910	1.469	1.194	995	735	596	477	382	318	238	190	151	119
35	5.570	4.456	3.714	2.785	2.228	1.714	1.393	1.114	857	696	557	445	371	278	222	176	139
40	6.366	5.092	4.245	3.183	2.456	1.958	1.592	1.273	979	795	636	509	424	318	255	202	159
45	7.162	5.730	4.775	3.581	2.865	2.204	1.790	1.432	1.102	895	716	572	477	358	286	227	179
50	7.958	6.366	5.305	3.978	3.183	2.448	1.990	1.592	1.224	995	795	636	530	398	318	252	198
55	8.754	7.002	5.836	4.376	3.501	2.693	2.188	1.750	1.346	1.094	875	700	584	438	350	277	218
60	9.550	7.639	6.366	4.775	3.820	2.938	2.388	1.910	1.469	1.194	955	764	636	477	382	303	238
70	11.142	8.912	7.428	5.570	4.456	3.428	2.785	2.228	1.714	1.392	1.114	891	742	557	445	354	278
75	11.937	9.549	7.958	5.968	4.775	3.672	2.981	2.387	1.836	1.492	1.194	955	795	594	477	378	298
80	12.732	10.185	8.488	6.366	5.092	3.918	3.183	2.546	1.958	1.592	1.273	1.018	848	636	509	404	318
90	14.324	11.459	9.550	7.162	5.730	4.407	1.581	2.865	2.204	1.790	1.432	1.145	955	716	572	455	358
100	15.915	12.732	10.611	7.958	6.366	4.897	3.978	3.183	2.448	1.989	1.592	1.273	1.061	795	636	505	398

FEED CHART

Ø mm	A	B	C	D	E	F
2,0	0,020	0,025	0,032	0,040	0,050	0,063
2,5	0,025	0,032	0,040	0,050	0,063	0,080
3,0	0,030	0,040	0,050	0,060	0,080	0,100
4,0	0,040	0,050	0,063	0,080	0,100	0,125
5,0	0,040	0,050	0,063	0,080	0,100	0,125
6,5	0,050	0,063	0,080	0,100	0,125	0,160
8,0	0,063	0,080	0,100	0,125	0,160	0,200
10,0	0,080	0,100	0,125	0,160	0,200	0,250
13,0	0,090	0,110	0,130	0,180	0,220	0,270
16,0	0,100	0,125	0,160	0,200	0,250	0,315
20,0	0,125	0,160	0,200	0,250	0,315	0,400
25,0	0,160	0,200	0,250	0,315	0,100	0,500
30,0	0,160	0,200	0,250	0,315	0,100	0,500
40,0	0,200	0,250	0,315	0,400	0,500	0,630
50,0	0,250	0,315	0,400	0,500	0,630	0,800
63,0	0,315	0,400	0,500	0,630	0,800	1,000
80,0	0,400	0,500	0,630	0,800	1,000	1,250

NOTICE: These values are guidance, valid under the following conditions of use

- Constant drilling advance
- Use of drills of dimensions according to DIN 338 or DIN 345
- HSS or HSSCo qualities
- Maximum drilling length equal to three times the drill diameter
- Good stability and rigidity in the power tool and in the clamping of the piece.
- Without pilot pins.
- Good refrigeration (coolant, flow, pressure)
- Vertical drilling and incoming and outgoing of the drill perpendicular to the surface

In the case the above-mentioned conditions are not fulfilled the cutting speed and / or the feed values must be modified, reducing or increasing them.

CUTTING SPEED CONDITIONS FOR COUNTERSINKS

MATERIAL	Steel <700 N/mm²	Steel >700 N/mm²	Steel 1000 N/mm²	Cast Iron <250 N/mm²	Cast Iron >250 N/mm²	Stainless Steel <1000 N/mm²	Soft Brass	Hard Brass	Aluminium < 11 %	Soft Plastic	Hard Plastic
COOLANTS	X	X	X	X	X	X	X	X	X	Water	Air
Cs (m/min)	15	10	6	12	8	6	20	15	25	20	15
Diam. mm	U/min R.P.M.	U/min R.P.M.	U/min R.P.M.	U/min R.P.M.	U/min R.P.M.	U/min R.P.M.	U/min R.P.M.	U/min R.P.M.	U/min R.P.M.	U/min R.P.M.	U/min R.P.M.
4,3	1100	740	440	890	590	444	1480	1110	1850	1480	1110
5,0	950	640	380	760	510	382	1270	950	1590	1270	950
5,3	900	600	360	720	480	360	1200	900	1500	1200	900
5,8	820	550	330	660	440	329	1100	820	1370	1100	820
6,0	800	530	320	640	420	318	1060	800	1330	1060	800
6,3	760	510	300	610	400	303	1010	760	1260	1010	760
7,0	680	450	270	550	360	273	910	680	1140	910	680
7,3	650	440	260	520	350	262	870	650	1090	870	650
8,0	600	400	240	480	320	239	800	600	990	800	600
8,3	580	380	230	460	310	230	770	580	960	770	580
9,4	510	340	200	410	270	203	680	510	850	680	510
10,0	480	320	190	380	250	191	640	480	800	640	480
10,4	460	310	180	370	240	184	610	460	770	610	460
11,5	420	280	170	330	220	166	550	420	690	550	420
12,4	390	260	150	310	210	154	510	390	640	510	390
13,4	360	240	140	290	190	143	480	360	590	480	360
14,4	340	220	130	270	170	133	450	320	550	450	320
15,0	320	210	130	250	170	127	420	320	530	420	320
16,5	290	190	120	230	150	116	390	290	480	390	290
19,0	250	170	100	200	130	101	340	250	420	340	250
20,5	230	160	90	190	120	93	310	230	360	310	230
23,0	210	140	80	170	110	83	280	210	350	280	210
25,0	190	130	80	150	100	76	250	190	320	250	190
26,0	180	120	70	150	100	73	240	180	310	240	180
28,0	170	110	70	140	90	68	230	170	280	230	170
30,0	160	110	60	130	80	64	210	160	270	210	160
31,0	150	100	60	120	80	62	210	150	260	210	150
32,0	150	100	60	120	80	60	210	150	260	210	150
34,0	140	90	60	110	70	56	190	140	230	190	140
37,0	130	90	50	100	70	52	170	130	220	170	130
40,0	120	80	50	100	60	48	160	150	200	160	120
50,0	100	60	40	80	50	38	130	100	160	130	100
63,0	80	50	30	60	40	30	100	80	130	100	80
80,0	60	40	20	50	30	24	80	60	100	80	60

CONVERSION FORMULA

$$R.P.M = \frac{Cs \times 1.000}{Ø \times TT}$$

$$Cs = \frac{R.P.M \times Ø \times TT}{1.000}$$

R.P.M. = REVOLUTION PER MINUTE
Cs. = CUTTING SPEED IN METER/MIN
Ø = DRILL DIAMETER
÷ = 3,1416

EXAMPLE:

-Material : ALUMINIUM
-ALU < 11%
-Drill Ø: 10 mm
-Cs: 25 m / min (Chart)

$$R.P.M : \frac{Cs \times 1.000}{Ø \times \pi} : \frac{25 \times 1.000}{10 \times \pi} = 800$$

CUTTING CONDITIONS FOR HSS / HSS-CO / ASP END MILLS

	Hardness (N/mm^2)	Ø Mill (mm)	Cutting speed (m./min.)	Feed Teeth Fz (mm)
BUILDING STEELS	< 400	4 - 8 8 - 12 12 - 20 20 - 32 32 - 50	--38 - 42 65 - 75	0.01 - 0.03 0.03 - 0.05 0.05 - 0.07 0.07 - 0.10 0.10 - 0.12
ALLOYED STEEL	< 700	--4 - 8 8 - 12 12 - 20 20 - 32 32 - 50	32-36 55-65	0.01 - 0.04 0.04 - 0.05 0.05 - 0.07 0.07 - 0.10 0.10 - 0.12
ALLOYED STEEL	< 950	4 - 8 8 - 12 12 - 20 20 - 32 32 - 50	30 - 34 50 - 60	0.02 - 0.04 0.04 - 0.05 0.05 - 0.07 0.07 - 0.09 0.09 - 0.11
ALLOYED STEEL	< 1400	4 - 8 8 - 12 12 - 20 20 - 32 32 - 50	16 - 20 30 - 40	0.01 - 0.03 0.03 - 0.04 0.04 - 0.06 0.06 - 0.07 0.07 - 0.09
STAINLESS STEELS	< 700	4 - 8 8 - 12 12 - 20 20 - 32 32 - 50	14 - 18 22 - 26	0.01 - 0.03 0.03 - 0.05 0.05 - 0.07 0.07 - 0.10 0.10 - 0.13
CAST IRON	100 - 800	4 - 8 8 - 12 12 - 20 20 - 32 32 - 50	20 - 24 38 - 42	0.02 - 0.04 0.04 - 0.06 0.06 - 0.08 0.08 - 0.11 0.11 - 0.13
ALUMINIUM ALLOY (SI<10%)	140 - 610	4 - 8 8 - 12 12 - 20 20 - 32 32 - 50	100 - 150 150 - 200	0.03 - 0.06 0.06 - 0.07 0.07 - 0.10 0.10 - 0.14 0.14 - 0.17
ALUMINIUM ALLOY (SI>10%)	160 - 420	4 - 8 8 - 12 12 - 20 20 - 32 32 - 50	60 - 100 80 - 120	0.03 - 0.06 0.06 - 0.08 0.08 - 0.11 0.11 - 0.15 0.15 - 0.19
LONG CHIP BRASS-BRONZE	< 500	4 - 8 8 - 12 12 - 20 20 - 32 32 - 50	50 - 70 80 - 120	0.01 - 0.03 0.03 - 0.05 0.05 - 0.08 0.08 - 0.09 0.09 - 0.11
TITANIUM ALLOY	< 1100	4 - 8 8 - 12 12 - 20 20 - 32 32 - 50	12 - 16 22 - 26	0.01 - 0.03 0.03 - 0.05 0.05 - 0.07 0.07 - 0.09 0.09 - 0.10
REFRACTORY ALLOYS CO, NI	< 1100	4 - 8 8 - 12 12 - 20 20 - 32 32 - 50	6 - 14 12 - 24	0.01 - 0.03 0.03 - 0.05 0.05 - 0.07 0.07 - 0.09 0.09 - 0.10

Coated end mills

CONVERSION FORMULA

$$R.P.M = \frac{Cs \times 1.000}{TT \times Ø}$$

FEED SPEED = R.P.M. x Z x Fz (mm/min.)

R.P.M. = REVOLUTIONS PER MINUTE
Cs. = CUTTING SPEED (m./min.)
Ø = END MILL DIAMETER
TT = 3,1416
Z = TEETH Nº
Fz = FEED x TEETH

CUTTING CONDITIONS FOR CARBIDE END MILLS

Coated end mills

	Hardness (N/mm^2)	Ø Mill (mm)	Cutting speed (m./min.)	Feed Teeth Fz (mm)
BUILDING STEELS	< 400	2 - 4 4 - 8 8 - 12 12 - 16 16 - 25	80 - 120 96 - 144	0.01 - 0.02 0.02 - 0.05 0.05 - 0.06 0.06 - 0.08 0.08 - 0.10
ALLOYED STEEL	< 700	2 - 4 4 - 8 8 - 12 12 - 16 16 - 25	60 - 100 72 - 120	0.01 - 0.02 0.02 - 0.04 0.04 - 0.05 0.05 - 0.06 0.0 6- 0.08
ALLOYED STEEL	< 950	2 - 4 4 - 8 8 - 12 12 - 16 16 - 25	60 - 80 72 - 96	0.01 - 0.02 0.02 - 0.04 0.04 - 0.05 0.05 - 0.06 0.06 - 0.08
ALLOYED STEEL	< 1400	2 - 4 4 - 8 8 - 12 12 - 16 16 - 25	20 - 60 24 - 72	0.005 - 0.015 0.015 - 0.02 0.02 - 0.03 0.03 - 0.05 0.05 - 0.08
STAINLESS STEELS	< 700	2 - 4 4 - 8 8 - 12 12 - 16 16 - 25	40 - 80 48 - 96	0.005 - 0.015 0.015 - 0.02 0.02 - 0.03 0.03 - 0.05 0.05 - 0.08
CAST IRON	100 - 800	2 - 4 4 - 8 8 - 12 12 - 16 16 - 25	50 - 100 60 - 120	0.01 - 0.03 0.03 - 0.05 0.05 - 0.06 0.06 - 0.08 0.08 - 0.12
ALUMINIUM ALLOY (SI<10%)	140 - 610	2 - 4 4 - 8 8 - 12 12 - 16 16 - 25	240 - 400 290 - 480	0.02 - 0.05 0.05 - 0.08 0.08 - 0.12 0.12 - 0.15 0.15 - 0.20
ALUMINIUM ALLOY (SI>10%)	160 - 420	2 - 4 4 - 8 8 - 12 12 - 16 16 - 25	125 - 300 150 - 360	0.02 - 0.05 0.05 - 0.08 0.08 - 0.12 0.12 - 0.15 0.15 - 0.20
LONG CHIP BRASS-BRONZE	< 500	2 - 4 4 - 8 8 - 12 12 - 16 16 - 25	100 - 200 120 - 240	0.15 - 0.03 0.03 - 0.04 0.04 - 0.06 0.06 - 0.08 0.08 - 0.10
TITANIUM ALLOY	< 1100	2 - 4 4 - 8 8 - 12 12 - 16 16 - 25	20 - 40 24 - 48	0.005 - 0.015 0.015 - 0.02 0.02 - 0.03 0.03 - 0.05 0.05 - 0.08
REFRACTORY ALLOYS CO, NI	< 1100	2 - 4 4 - 8 8 - 12 12 - 16 16 - 25	20 - 50 24 - 60	0.005 - 0.015 0.015 - 0.02 0.02 - 0.03 0.03 - 0.05 0.05 - 0.08

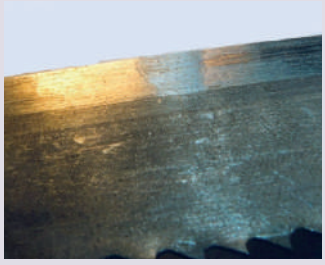
CONVERSION FORMULA

$$R.P.M = \frac{Cs \times 1.000}{TT \times Ø}$$

FEED SPEED = R.P.M. x Z x Fz (mm/min.)

R.P.M. = REVOLUTIONS PER MINUTE
Cs. = CUTTING SPEED (m./min.)
Ø = END MILL DIAMETER
TT = 3,1416
Z = TEETH Nº
Fz = FEED x TEETH

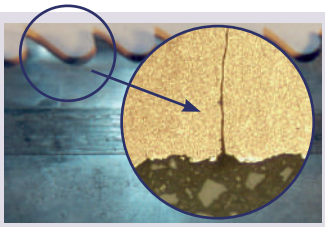
BAND SAW BLADES TROUBLESHOOTER AND CLAIM ACCEPTANCE



CRACKS ORIGINATING FROM THE BACK EDGE

Causes:
- Guides are faulty (crushing the back).
- The back edge of the blade is touching the rolling guides.
- Blade to tightly fitted in the machine's arm guide when mounted.

NON-ACCEPTABLE CLAIM



CRACKS ORIGINATING FROM THE TOOTH

Causes:
- Tooth pitch is too short: chips get stuffed.
- Tooth pitch is too large: excessive vibrations.
- Feeding is too high in comparison with cutting speed.

NON-ACCEPTABLE CLAIM

STREACK ON THE BACK

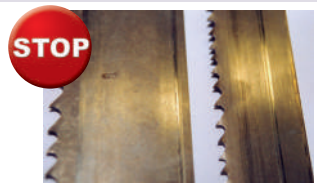
Causes:
- Back rolling guide is faulty.
- The back edge of the blade is touching the rolling guides.

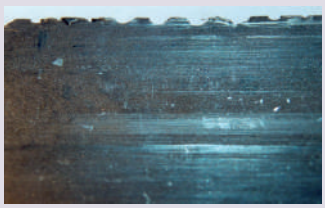
NON-ACCEPTABLE CLAIM

DEEP SCRATCH ON THE SIDES OF THE BLADE

Causes:
- Lateral guides are faulty.
- Tooth pitch is too large: excessive vibrations.
- Cutting speed is not adapted to the material (too high).
- The work piece isn't sufficiently fastened during the cutting operation.

NON-ACCEPTABLE CLAIM





BROCKEN OR CRUSHED TOOTH

Causes:
- Tooth pitch is too short: chips get stuffed.
- Tooth pitch is too large: excessive vibrations.
- Cutting speed is not adapted to the material (too high).
- The work piece isn't sufficiently fastened during the cutting operation.

NON-ACCEPTABLE CLAIM

CLEAR BREACH AT WELDING POINT

Causes:
- Manufacturing default: faulty welding.

ACCEPTABLE CLAIM

BROKEN BLADE, TOOTH IN OPPOSITE DIRECTION

Causes:
- Lateral guides too tights.
- Saw guide arms too far apart from piece.
- Wheels and groups of guides are not aligned.

NON-ACCEPTABLE CLAIM

UNSTRAIGHT CUT

Causes:
- Normal tooth wear.
- Cutting speed and feed are not adapted to the material.
- The tooth pattern is rubbing against the guide side.

NON-ACCEPTABLE CLAIM

IDENTIFICATION OF THE TYPES OF CIRCULAR SAW BLADES

AX **60** **S** **BF** **T41**

TYPE OF ABRASIVE

- **A:** Aluminium Oxide
- **AX:** High Resistance Aluminium Oxide
- **AC:** Aluminium Oxide and Silicium Carbide
- **C:** Silicium Carbide
- **Z:** Zirconium

SHAPE OF THE CIRCULAR SAW BLADE

- **T41** Flat fo futting
- **T42** Centre low-profiled for cutting
- **T27** Centre low-profiled flap for polishing

GRAIN

- **30-36:** Medium
- **40-60:** Fine
- **80-120:** Extra fine

HARDNESS

- **Q:** Soft
- **R:** Medium
- **S:** Hard

TYPE OF CIRCULAR SAW BLADE (BINDER)

- **BF:** Fibre-reinforced resin bond

90° Circular Saw Blades for **Cutting**

15° Circular Saw Blades for **Polishing and Roughing**

Fe S Cl **Iron, Sulphur** and **Chloride** free

A: Aluminium Oxide.

The aluminium oxide is resistant and durable, for cutting and roughing of high-resistance materials as carbon steel, stainless steel and all type of metals.

AX: High-Resistance Aluminium Oxide:

The high-resistance aluminium oxide is a top class abrasive, its grain microstructure allows its breaking when cutting and roughing and generating multiple cutting edges. It is typically used in high production and hardness. Recommended for stainless steel, carbon steel and forged steel.

AC: Aluminium Oxide + Silicon Carbide:

C: Silicon Carbide:

The Silicon Carbide is the hardest and sharpest mineral. It is ideal for cutting, sanding and polishing all kind of materials, non-ferrous metals: aluminium, brass, bronze, rubber, glass, plastics, fibrous wood, enamel...The silicon carbide is superior to any other abrasive concerning its penetration and cutting capacity, faster and with less effort.

Z: Zirconium:

The zirconium self-sharpening quality allows a long working life in high performance works and materials disposal. It is ideal for high performance roughing and polishing in stainless steel, steel carbon and all kind of materials.

HOW TO DIFFERENTIATE THE ABRASIVE CIRCULAR SAW BLADES

The abrasive circular saw blades cut, polish and rough with different force due to the abrasive grains that compound them, and joint together because of the binder. According to this material and the binder they have different variations of hardness, speed, cut depth and wear resistance.

Based on these parameters the components must be selected with the specific characteristics for cut, polish our rough according to the application and the material of the piece. Whether it be due to the type of tool to be used (angle grinder, grooving machine, slitting machine or fixed machine), by the material to cut (metal, stainless steel, steel, stone) or by the operation (cut or rough) the characteristics of the circular saw blade will be different for an optimum performance.

AB05:

Abrasive Circular Saw blade for general use in metal cutting. Diameters of 115mm and 125mm. Flat Centre geometry (T41), composed of Aluminium Oxide. Metallic set of 10 units for a perfect conservation.

AB11:

High performance Abrasive Circular Saw blade for stainless steel, steel and metal cutting. Diameters of 115mm, 125mm and 230mm. Available in two disc geometries; Flat Centre geometry (T41) and Depressed Centre (T42). High hardness, made in high resistance Aluminium Oxide fiber resin. OSA certificate guaranteed.

AB17:

STONE. High performance Abrasive Circular Saw blade for construction materials cutting. . Diameters of 115mm, 125mm and 230mm. Depressed Centre (T42) disc geometry. Medium hardness. Manufactued in Silicon Carbide fiber resin. OSA certificate guaranteed.

AB18:

MULTIFUNCTION. High performance Abrasive Circular Saw blade for all kind of materials. . Diameters of 115mm, 125mm and 230mm. Flat Centre geometry (T41). Soft hardness. Manufactured in Aluminium Oxide + Silicon Carbide fiber resin. OSA certificate guaranteed.

AB15:

High performance Flap Abrasive Circular Saw blade for stainless steel, steel and metal polishing. Diameters of 115mm and 125mm. Depressed Centre geometry with flaps for polishing (T27). Four grain qualities. Manufactured in zirconium joined to flaps of reinforced fiber-glass for a maximum productivity and security. Front working of the disc at a maximum angle of 15º.

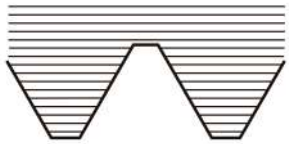
AB20:

High performance Flap Abrasive Circular Saw blade for roughing and polishing of stainless steel, steel and metal. Diameters of 115mm and 125mm. Depressed Centre geometry with flaps for polishing (T27). Four grain qualities available. Manufactured in Aliminium Oxide. Light, flexible and noiseless due to its multi-layer body. Front working of the disc at a maximum angle of 15º.

FORMING TAPPING

One of the method to make threads is the forming thread tapping
This method can be used in materials having a minimum ductility of 10%

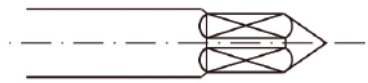
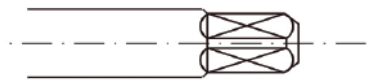
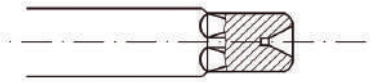
ADVANTAGES	USING CONDITIONS
- No chip generation during the tapping process - Better surface finish on the flanks - Homogeneous thread perfectly calibrated - Stronger thread able to support higher torque - Higher tool lifetime - Higher speed - Higher productivity	- Accurate prior hole diameter - Plenty of lubrication - RPM's High Enough



Thread obtained with a metal cutting tap

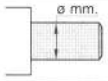
Thread obtained with a forming tap

GEOMETRY OF THE MACHINE TAPS ACCORDING TO THE NORM

RANGE		POINT	SQUARE
M3-M6	DIN 371	ENTIRE POINT	EXTERNAL ENTIRE POINT
M3-M6	DIN 376		
M3-M6	DIN 374		
M3-M6	DIN 352		
M3-M6	DIN 2181		
M3-M6	DIN 357		
M3-M10	DIN 2174		
M8; M10	DIN 371	REDUCED POINT	CHAMFER
M7; M12	DIN 376		
M7; M9	DIN 371	INTERNAL CENTRE POINT	INTERNAL CENTRE POINT
≥ M14	DIN 376		
≥ M7	DIN 374		
≥ M7	DIN 352		
≥ M7	DIN 2181		
≥ M7	DIN 357		
≥ M12	DIN 2174		

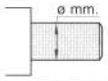
DIE THREADING RECOMMENDED EXTERNAL DIAMETER

M



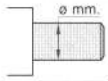
Ø d_1	p	ø mm.
M 1	0,25	0,97
M 1,1	0,25	1,07
M 1,2	0,25	1,17
M 1,4	0,3	1,36
M 1,6	0,35	1,54
M (1,7)	0,35	1,64
M 1,8	0,35	1,74
M 2	0,4	1,93
M 2,2	0,45	2,13
M (2,3)	0,4	2,23
M 2,5	0,45	2,43
M (2,6)	0,45	2,53
M 3	0,5	2,92
M 3,5	0,6	3,41
M 4	0,7	3,91
M 4,5	0,75	4,41
M 5	0,8	4,90
M 6	1	5,88
M 7	1	6,88
M 8	1,25	7,87
M 9	1,25	8,87
M 10	1,5	9,85
M 11	1,5	10,85
M 12	1,75	11,83
M 14	2	13,82
M 16	2	15,82
M 18	2,5	17,79
M 20	2,5	19,79
M 22	2,5	21,79
M 24	3	23,77
M 27	3	26,77
M 30	3,5	29,73
M 33	3,5	32,73
M 36	4	35,70
M 39	4	38,70
M 42	4,5	41,69
M 45	4,5	44,69
M 48	5	47,66
M 52	5	51,66
M 56	5,5	55,65
M 60	5,5	59,65
M 64	6	63,62
M 68	6	67,62
M 3 x	0,6	2,91
M 3,5 x	0,75	3,41
M 4 x	0,75	3,91
M 5 x	0,9	4,89

MF



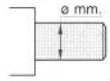
Ø d_1	x	p	ø mm.
M 3	x	0,35	2,94
M 3,5	x	0,35	3,44
M 4	x	0,35	3,94
M 4	x	0,5	3,93
M 5	x	0,5	4,93
M 6	x	0,5	5,93
M 6	x	0,75	5,90
M 7	x	0,75	6,90
M 8	x	0,5	7,93
M 8	x	0,75	7,90
M 8	x	1	7,88
M 9	x	1	8,88
M 10	x	0,5	9,93
M 10	x	0,75	9,90
M 10	x	1	9,88
M 10	x	1,25	9,86
M 11	x	1	10,88
M 12	x	0,75	11,90
M 12	x	1	11,88
M 12	x	1,25	11,86
M 12	x	1,5	11,85
M 13	x	1	12,88
M 13	x	1,5	12,85
M 14	x	1	13,88
M 14	x	1,25	13,86
M 14	x	1,5	13,85
M 15	x	1	14,88
M 15	x	1,5	14,85
M 16	x	1	15,88
M 16	x	1,5	15,85
M 18	x	1	17,88
M 18	x	1,5	17,85
M 18	x	2	17,82
M 20	x	1	19,88
M 20	x	1,5	19,85
M 20	x	2	19,82
M 22	x	1	21,88
M 22	x	1,5	21,85
M 22	x	2	21,82
M 24	x	1	23,88
M 24	x	1,5	23,85
M 24	x	2	23,82

MF



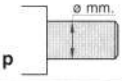
Ø d_1	x	p	ø mm.
M 25	x	1	24,88
M 25	x	1,5	24,85
M 26	x	1	25,88
M 26	x	1,5	25,85
M 27	x	1	26,88
M 27	x	1,5	26,85
M 27	x	2	26,82
M 28	x	1,5	27,85
M 28	x	2	27,82
M 30	x	1	29,88
M 30	x	1,5	29,85
M 30	x	2	29,82
M 32	x	1,5	31,85
M 33	x	1,5	32,85
M 33	x	2	32,82
M 34	x	1,5	33,85
M 35	x	1,5	34,85
M 36	x	1,5	35,85
M 36	x	2	35,82
M 36	x	3	35,76
M 38	x	1,5	37,85
M 39	x	1,5	38,85
M 39	x	2	38,82
M 39	x	3	38,76
M 40	x	1,5	39,85
M 40	x	2	39,82
M 40	x	3	39,76
M 42	x	1,5	41,85
M 42	x	2	41,82
M 42	x	3	41,76
M 45	x	1,5	44,85
M 45	x	2	44,82
M 45	x	3	44,76
M 48	x	1,5	47,85
M 48	x	2	47,82
M 48	x	3	47,76
M 50	x	1,5	49,85
M 50	x	2	49,82
M 50	x	3	49,76
M 52	x	1,5	51,85
M 52	x	2	51,82
M 52	x	3	51,76

W (BSW)



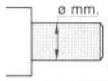
Ø d_1	p	ø mm.
W 3/32	48	2,26
W 1/8	40	3,12
W 5/32	32	3,82
W 3/16	24	4,69
W 7/32	24	5,39
W 1/4	20	6,16
W 5/16	18	7,76
W 3/8	16	9,30
W 7/16	14	10,89
W 1/2	12	12,43
W 9/16	12	13,92
W 5/8	11	15,62
W 3/4	10	18,76
W 7/8	9	21,89
W 1	8	25,08
W 1 1/8	7	28,21
W 1 1/4	7	31,35
W 1 3/8	6	34,48
W 1 1/2	6	37,67
W 1 3/4	5	43,94
W 2	4,5	50,26

BSF



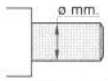
Ø d_1	p	ø mm.
BSF 3/16	32	4,67
BSF 1/4	26	6,25
BSF 5/16	22	7,82
BSF 3/8	20	9,39
BSF 7/16	18	10,97
BSF 1/2	16	12,54
BSF 9/16	16	14,12
BSF 5/8	14	15,71
BSF 3/4	12	18,85
BSF 7/8	11	22,02
BSF 1	10	25,17

UNC



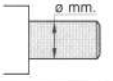
Ø d_1 - p	ø mm.
No. 1 - 64 UNC	1,79
No. 2 - 56 UNC	2,12
No. 3 - 48 UNC	2,44
No. 4 - 40 UNC	2,76
No. 5 - 40 UNC	3,09
No. 6 - 32 UNC	3,41
No. 8 - 32 UNC	4,07
No. 10 - 24 UNC	4,71
No. 12 - 24 UNC	5,37
1/4 - 20 UNC	6,22
5/16 - 18 UNC	7,80
3/8 - 16 UNC	9,37
7/16 - 14 UNC	10,95
1/2 - 13 UNC	12,52
9/16 - 12 UNC	14,10
5/8 - 11 UNC	15,68
3/4 - 10 UNC	18,84
7/8 - 9 UNC	22
1 - 8 UNC	25,16
1 1/8 - 7 UNC	28,31
1 1/4 - 7 UNC	31,49
1 3/8 - 6 UNC	34,63
1 1/2 - 6 UNC	37,81
1 3/4 - 5 UNC	44,12
2 -4,5 UNC	50,45

UNF



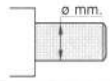
Ø d_1 - p	ø mm.
No. 0 - 80 UNF	1,47
No. 1 - 72 UNF	1,79
No. 2 - 64 UNF	2,12
No. 3 - 56 UNF	2,44
No. 4 - 48 UNF	2,77
No. 5 - 44 UNF	3,10
No. 6 - 40 UNF	3,42
No. 8 - 36 UNF	4,08
No. 10 - 32 UNF	4,73
No. 12 - 28 UNF	5,38
1/4 - 28 UNF	6,24
5/16 - 24 UNF	7,82
3/8 - 24 UNF	9,41
7/16 - 20 UNF	10,98
1/2 - 20 UNF	12,56
9/16 - 18 UNF	14,14
5/8 - 18 UNF	15,73
3/4 - 16 UNF	18,89
7/8 - 14 UNF	22,05
1 - 12 UNF	25,21
1 1/8 - 12 UNF	28,38
1 1/4 - 12 UNF	31,56
1 3/8 - 12 UNF	34,73
1 1/2 - 12 UNF	37,91

G (BSP)



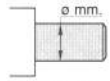
Ø d_1	p	ø mm.
G 1/16	28	7,61
G 1/8	28	9,62
G 1/4	19	13,03
G 3/8	19	16,53
G 1/2	14	20,81
G 5/8	14	22,77
G 3/4	14	26,30
G 7/8	14	30,06
G 1	11	33,07
G 1 1/8	11	37,71
G 1 1/4	11	41,73
G 1 3/8	11	44,14
G 1 1/2	11	47,62
G 1 3/4	11	53,56
G 2	11	59,43

NPSM



Ø d_1	p	ø mm.
1/8 NPSM	27	4,99
1/4 NPSM	18	13,24
3/8 NPSM	18	16,70
1/2 NPSM	14	20,77
3/4 NPSM	14	26,13
1 NPSM	11,5	32,68
1 1/4 NPSM	11,5	41,45
1 1/2 NPSM	11,5	47,52
2 NPSM	11,5	59,56

PG



Ø d_1	p	ø mm.
PG 7	20	12,40
PG 9	18	15,10
PG 11	18	18,50
PG 13,5	18	20,30
PG 16	18	22,40
PG 21	16	28,15
PG 29	16	36,85
PG 36	16	46,85
PG 42	16	53,85
PG 48	16	59,15

THREAD TYPE IDENTIFICATION AND EQUIVALENCIES

		AMERICAN THREADS						ENGLISH THREAD					
ROSCA Ø	Ø mm	UNC (NC)	UNF (NF)	UNEF (NEF)	UN	UNS	NPS NPT API	BSW	BSF	BRASS	BS 6n	WHIT	BSP BSPT
1/16	1,588	--	--	--	--	--	27	60	--	--	--	--	--
3/32	2,381	--	--	--	--	--	--	48	--	--	--	--	--
1/8	3,175	--	--	--	--	--	27	40	--	--	--	--	28
5/32	3,969	--	--	--	--	--	--	32	--	--	--	--	--
3/16	4,763	--	--	--	--	--	--	24	32	--	--	--	--
7/32	5,556	--	--	--	--	--	--	24	28	--	--	--	--
No 0		--	80	--	--	--	--	--	--	--	--	--	--
No 1	1,854	64	72	--	--	--	--	--	--	--	--	--	--
No 2	2,184	56	64	--	--	--	--	--	--	--	--	--	--
No 3	2,515	48	56	--	--	--	--	--	--	--	--	--	--
No 4	2,845	40	48	--	--	--	--	--	--	--	--	--	--
No 5	3,175	40	44	--	--	--	--	--	--	--	--	--	--
No 6	3,505	32	40	--	--	--	--	--	--	--	--	--	--
No 8	4,166	32	36	--	--	--	--	--	--	--	--	--	--
No 10	4,826	24	32	--	--	28-36-40-48-56	--	--	--	--	--	--	--
No 12	5,486	24	28	32	--	36-40-48-56	--	--	--	--	--	--	--
1/4	6,350	20	28	32	--	24-27-36-40-48-56	18	20	26	26	--	32	19
9/32	7,14	--	--	--	--	--	--	20	26	--	--	--	--
5/16	7,938	18	24	32	20-28	27-36-40-48	--	18	22	26	--	32	--
3/8	9,525	16	24	32	20-28	18-27-36-40	18	16	20	26	--	32	19
7/16	11,11	14	20	28	16-32	18-24-27	--	14	18	26	--	--	--
1/2	12,7	13	20	28	16-32	12-14-18-24-27	14	12	16	26	18	20	14
9/16	14,29	12	18	24	16-20-28-32	14-27	--	12	16	26	--	20	--
5/8	15,87	11	18	24	12-16-20-28-32	14-27	--	11	14	26	18	20	14
11/16	17,46	--	--	24	12-16-20-28-32	--	--	11	14	26	--	16-20	--
3/4	19,05	10	16	20	12-28-32	14-18-24-27	14	10	12	26	16	16-20	14
13/16	20,64	--	--	20	12-16-28-32	--	--	10	12	--	--	16-20-26	--
7/8	22,22	9	14	20	12-16-28-32	10-18-24-27	--	9	11	26	--	20	14
15/16	23,81	--	--	20	12-16-28-32	--	--	--	--	--	--	12-20	--
1"	25,40	8	12	20	16-28-32	10-14-18-24-27	11/2	8	10	26	16	12-20	11
1" 1/16	26,98	--	--	18	8-12-16-20-28	--	--	--	--	--	--	12-20	--
1" 1/8	28,57	7	12	18	8-16-20-28	10-14-24	--	7	9	26	--	12-20	11
1" 3/16	30,16	--	--	18	8-12-16-20-28	--	--	--	--	--	--	12-20	--
1" 1/4	31,75	7	12	18	8-16-20-28	10-14-24	111/2	7	9	26	16	12-20	11
1" 5/16	33,34	--	--	18	8-12-16-20-28	--	--	--	--	--	--	12-20	--
1" 3/8	34,92	6	12	18	8-16-20-28	10-14-24	--	6	8	--	--	12-20	11
1" 7/16	36,51	--	--	18	6-8-12-16-20-28	--	--	--	--	--	--	12-20	--
1" 1/2	38,10	6	12	18	8-16-20-28	10-14-24	111/2	6	8	26	14	12-20	11
1" 9/16	39,69	--	--	18	6-8-12-16-20-28	--	--	--	--	--	--	--	--
1" 5/8	41,27	--	--	18	6-8-12-16-20	--	--	5	8	26	--	12-16-20	11
1" 11/16	42,86	--	--	18	6-8-12-16-20	--	--	--	--	--	--	--	--
1" 3/4	44,45	5	--	--	6-8-12-16-20	10-14-18	--	5	7	26	--	12-16-20	11
1" 13/16	46,04	--	--	--	6-8-12-16-20	--	--	--	--	--	--	--	--
1" 7/8	47,62	--	--	--	6-8-12-16-20	10-14-18	--	4 1/2	--	26	--	12-16-20	--
1" 15/16	49,21	--	--	--	6-8-12-16-20	--	--	--	--	--	--	--	--
2"	50,80	4 1/2	--	--	6-8-12-16-20	10-14-18	11 1/2	4 1/2	7	26	14	12-16-20	11

EQUIVALENCES BETWEEN PITCHES IN INCHES AND METRIC

N	mm	N	mm	N	mm	N	mm
80	0,317	28	0,907	13	1,953	4 1/2	5,644
72	0,352	27	0,940	12	2,116	4	6,349
64	0,396	26	0,976	11 1/2	2,208	3 1/2	7,257
60	0,423	24	1,058	11	2,309	3 1/4	7,815
56	0,453	22	1,154	10	2,540	3	8,466
48	0,529	20	1,270	9	2,822	2 7/8	8,834
44	0,577	19	1,336	8	3,174	2 3/4	9,236
40	0,635	18	1,411	7	3,628	2 5/8	9,676
36	0,705	16	1,587	6	4,233	2 1/2	10,160
32	0,793	14	1,814	5	5,080	---	---

GENERAL SALES CONDITIONS

INTRODUCTION

Present commercial terms will apply from the 3rd of February of 2025. That means that previously applied terms will not be in effect any more,unless permanence of any specific agreement is strictly allowed.

PAYMENT TERMS

- According to permission of Account Department.
- Breach of payment terms means cutting off following shipments dispatch.

INSURANCE

In case customer requires any insurance, correspondent premium must be paid by him.

CLAIMS

Customers must check receiving goods once they get them in order to ensure that shipment has been correctly completed. Any claim placed from customers within 8 days will be analyzed, evaluated and explained and CELESA will not accept any returning goods without previous communication.

RETURNING GOODS

CELESA will accept returning goods just in case they are considered defective or in cases that mistaken shipment are on fault by CELESA. Goods must be always returned under freight cost paid by sender, with original invoice or packing list.

CELESA must be immediately informed about any returning good, directly or through our sales network. Quality Department will check goods and shortly, a technical or quality report will be completed. If no mistake would be found, CELESA will deduct 15% from the correspondent credit note in concept of handle cost. If customer would be right, goods will be immediately replaced or a credit note would be immediately submitted.

GUARANTEE

CELESA guarantees that all goods available in the range fulfil all technical requirements regarding Geometrical parameters and Material Treatment without any responsibility in bad using cases. In any case, our responsibility will be limited up to repair or replacement of goods, without any further compensation or punishment. CELESA reserves the right to modify any good without any previous warning in case of Technical Department considers it an improvement in cutting tool life.

CELESA will never proceed with replacement of any tools without favourable report from Quality Department.

CELESA will never admit any punishment from customers for delays in any shipment.

MINIMUM ORDER TOTAL AMOUNT

Minimum order total amount is 60 € Net.

PRICE LIST IN FORCE

CELESA will apply current price list without any responsibility for customers misunderstanding beyond our content of BLUEMASTER catalogue.

CONDITIONAL TERMS

Acceptance of goods shipped by CELESA without immediate rejection from customer, means approval of above mentioned Commercial terms and any modification will be allowed just in case of written authorization from CELESA.

TAXES

Orders are not subject to VAT.

RETENTION OF TITLE

CELESA sales are subject to retention of title according to Art. 1506 of CC, until any invoice pending payment is completed.

COMPETENT JURISDICTION

In case of any misunderstanding in interpretation of these Commercial terms or non-fulfilment from any side may be appealed to the Bilbao Court.

IDENTIFICATION

BACKGROUND COLOUR DISCOUNT DISCOUNTS ARE RELATED TO BACKGROUND COLOURS OF EACH PRICE

GREY DISCOUNT	Best selling twist drills
PINK DISCOUNT	Special applications
GREEN DISCOUNT	Hand taps & dies sets
YELLOW DISCOUNT	Band saw blades