




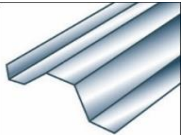
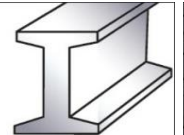




# ECEF TECHNICAL SPECIFICATIONS























## METAL TOOLS


FAMILY CLASSIFICATION	02820
DESCRIPTION	PROFESSIONAL HSS-GROUND FROM THE SOLID CYLINDRICAL DRILLS DIN 338 - SELF-CENTERING SPLIT POINT ANGLE - BLACK FINISH
PRODUCT IMAGE	
KIND OF STEEL	HSS M2 (6542)
COMPOSITION %	C 0,84-0,88 - Si 0,30-0,43 - Mn 0,25-0,35 - P ≤ 0.028 - S ≤ 0,009 Cr 3,90-4,00 - Mo 4,55-4,80 - W 5,55-5,80 - V 1,80-1,90 - Nb 0,04-0,06 C=Carbon - Si=Silicon - Mn=Manganese - P=Phosphorus - S=Sulfur - Cr=Chrome - Mo=Molybdenum W=Tungsten - V=Vanadium
HARDENING TEMPERATURE	1100°
HARDNESS	64-65 HRC
DIN	338
KIND OF DRILL	RN right hand helix
SPIRAL ANGLE	25° - 35°
SHANK	CYLINDRICAL
MANUFACTURING PROCESS	FULLY GROUND FROM THE SOLID, with CAO System, that grants quality control and product homogeneity. The flute is made by grinding lathe (fine sand disc), for a smoother and brighter surface.
SHARPENING	SELF-CENTERING (Split-Point). 135° - Ø ≥ 2,50 MM conical relief with rectification   
TOLERANCE	H8 in mm 1/3=0/+0,014 - 3/6=0/+0,018 - 6/10=0/+0,022 - 10/18=0/+0,027 - 18/25=0/+0,033
SURFACE TREATMENT	Natural steel - Ground from the solid - smooth - bright finish
WORK PIECE MATERIALS	METALS - LIGHT STEEL . STEEL - ALLOY STEEL - CAST IRON METALS WITH RESISTANCE R ≤ 800 N/mm <sup>2</sup>     
REFERENCE TOOL	Power drilling machines after disabling the percussion function; low speed and high pressure. Ideal use with a drill press
RECOMMENDATIONS	USE REFRIGERANT OIL during the cutting, if required
PACKAGE	IN PLASTIC TUBE with HANGER 0,30 - 8,40 mm = 10 pcs. 8,50 - 13 mm = 5 pcs. 13,25 - 25 mm = 1 pc.

# ECEF TECHNICAL SPECIFICATIONS

## METAL TOOLS


TABLE OF CUTTING SPEED and FEED with respect to the material da drill

Work-piece material	Peripheral speed mt/min	Refrigerant	CUTTING FEED RATE mm/rounds						
			Ø mm	Ø mm	Ø mm	Ø mm	Ø mm	Ø mm	Ø mm
			2 Angle 135°	5 Angle 135°	8 Angle 135°	10 Angle 135°	12 Angle 135°	16 Angle 135°	25 Angle 135°
Common steel R<500 N/mm <sup>2</sup> -Iron	20÷25		0,04-0,06	0,08-0,12	0,13	0,16	0,20	0,25	0,32
Low alloy steel R 500-700 N/mm <sup>2</sup>	15÷20		0,04-0,06	0,10	0,12	0,15	0,18	0,20	0,30
Construction steel R 700-900 N/mm <sup>2</sup>	10÷12		0,03	0,07	0,10	0,13	0,16	0,18	0,25
Aluminium and Aluminium alloys	35÷80		0,05	0,10-0,12	0,16	0,20	0,22	0,30	0,40
Aluminium+Silicon (Silium)	30÷50		0,05	0,08	0,14	0,18	0,20	0,25	0,30
Soft Cast Iron	20÷25		0,05	0,10	0,16	0,20	0,25	0,30	0,35
Hard Cast Iron	5÷10		0,03	0,07	0,10	0,14	0,16	0,20	0,25
Soft Bronze	20÷35	 	0,05	0,08	0,14	0,18	0,20	0,25	0,30
Hard Bronze	15÷30	 	0,03-0,05	0,08	0,13	0,16	0,18	0,22	0,27
Zinc and Zinc alloys	30÷40		0,05	0,08	0,13	0,16	0,18	0,22	0,27
electrolytic Copper	20÷35	 	0,05	0,10	0,16	0,20	0,22	0,30	0,40
Brass	50÷60	 	0,06-0,08	0,13	0,22	0,26	0,30	0,35	0,40
Tough Brass	40÷50	 	0,05	0,10	0,16	0,20	0,22	0,27	0,40
Thermoplastic Resins	20÷30		0,05	0,07	0,14	0,16	0,20	0,25	0,30
Hard Resins	10÷20		0,05	0,07	0,10	0,13	0,16	0,20	0,25
Plexiglass	15÷20		0,05	0,08	0,14	0,18	0,20	0,25	0,30
Hard rubber	15÷35		0,06-0,08	0,13	0,20	0,25	0,28	0,32	0,40

 Emulsion (oil+water)

 Cutting oil

 Water

 Dry cutting

CUTTING SPEED CONVERSION TABLE - ROUND/MINUTE - TWIST DRILL DIAMETER

diameter ∅		Cutting speed = Mt/min																	
		3	4	5	6	8	10	12	15	18	20	25	30	35	40	45	50	55	60
mm	inches																		
2	5/64	480	640	800	960	1270	1590	1910	2390	2870	3180	3980	4780	5570	6370	7200	8000	8800	9600
3	1/8	320	420	530	640	850	1080	1270	1590	1910	2130	2650	3180	3720	4250	4800	5300	5900	6400
4	5/32	240	320	400	480	640	800	960	1190	1430	1590	1990	2390	2790	3180	3600	4000	4400	4800
5	13/64	190	250	320	380	510	640	760	960	1150	1270	1590	1910	2230	2550	2900	3200	3500	3900
6	15/64	160	210	270	320	420	630	640	800	960	1060	1330	1590	1860	2120	2400	2600	2900	3200
8	5/16	120	160	200	240	320	400	480	600	720	800	1000	1190	1390	1590	1800	2000	2200	2400
10	25/64	95	130	160	190	260	320	380	480	570	640	800	860	1110	1270	1440	1600	1760	1920
12	15/32	80	110	130	160	210	270	320	400	480	530	660	800	930	1060	1200	1330	1500	1600
14	35/64	70	90	110	140	180	230	270	340	410	450	570	680	800	910	1050	1140	1250	1400
16	5/8	60	80	100	120	160	200	240	300	360	400	500	600	700	800	900	1000	1100	1200
18	23/32	55	70	90	110	140	180	210	270	320	350	440	530	620	710	800	890	980	1060
20	25/32	50	65	80	100	130	160	190	240	290	320	400	480	560	640	720	800	880	960
22	7/8	45	60	70	85	120	140	170	220	260	290	360	430	510	580	660	730	800	870
24	15/16	40	55	65	80	110	130	160	200	240	270	330	400	480	530	600	670	730	800
27	1"1/16	35	45	60	70	95	120	140	180	210	240	290	350	410	470	530	590	650	710
30	1"1/8	30	40	55	65	85	110	130	160	190	210	270	320	370	420	480	530	585	640
32	1"1/4	30	40	50	60	80	100	120	150	180	200	250	300	350	400	450	500	550	600
34	1"3/8	30	35	45	55	75	95	110	140	170	190	230	280	330	370	430	470	520	570
36	1"7/16	25	35	45	55	70	90	110	130	160	180	220	270	310	350	400	450	490	530
38	1"1/2	25	35	40	50	65	85	100	130	150	170	210	250	290	340	380	420	460	500
40	1"9/16	25	30	40	50	65	80	100	120	140	160	200	240	280	320	360	400	440	480
42	1"5/6	25	30	40	45	60	75	90	110	140	150	190	230	270	300	350	380	420	460
44	1"3/4	20	30	35	45	60	70	85	110	130	140	180	220	250	290	330	360	400	440
46	1"13/16	20	30	35	40	55	70	85	10	120	140	170	210	240	280	320	350	380	420
48	1"7/8	20	25	35	40	55	65	80	100	120	130	170	200	230	270	300	330	370	400
50	2"	20	25	30	40	50	65	75	100	110	130	160	190	220	250	287	320	350	380
55	2"11/16	18	24	26	35	46	58	70	86	105	115	140	175	202	230	255	280	315	350
60	2"3/8	16	22	24	32	42	53	63	80	96	106	132	160	186	212	238	264	292	320
65	2"9/16	15	20	22	30	40	50	58	72	89	100	120	145	172	200	220	240	265	290
70	2"3/4	14	19	21	28	36	45	54	66	82	90	110	130	155	180	200	220	240	260
75	2"61/64	13	17	20	26	33	42	50	63	77	85	105	125	147	170	190	210	230	250
80	3"5/32	12	16	17	24	32	40	47	60	72	80	100	120	140	160	180	200	220	240
90	3"9/16	11	15	16	22	27	35	42	52	64	70	87	105	122	140	157	175	192	210
100	3"15/16	10	13	14	20	25	31	38	47	58	63	80	95	111	127	143	160	175	190

FORMULA	LEGENDA
$\text{R.P.M.} = \frac{V_c \times 1000}{\pi \times \varnothing}$	RPM = Rounds per minute Vc = Peripheral speed $\pi$ = 3,1416 $\varnothing$ = Drill diameter

# ECEF TECHNICAL SPECIFICATIONS

## METAL TOOLS

### REPORT OF THE HARDNESS OF THE MATERIAL TO DRILL

HSS-R/HSS-G twist drills						HSS-Co twist drills						tungsten carbide drill bits HM/MD					
Vickers		Brinell		Rockwell		Resistance		Vickers		Brinell		Rockwell		Resistance			
HV 30	HB 30	HRB	HRC	N/mm <sup>2</sup>	KP/mm <sup>2</sup>	HV 30	HB 30	HRB	HRC	N/mm <sup>2</sup>	KP/mm <sup>2</sup>	HV 30	HB 30	HRB	HRC	N/mm <sup>2</sup>	KP/mm <sup>2</sup>
80	80	36,40	-	270	28	295	295	-	29,60	990	101						
85	85	42,40	-	290	30	300	300	-	30,30	1010	103						
90	90	47,40	-	310	32	310	310	-	31,50	1040	106						
85	85	52,00	-	320	33	320	320	-	32,70	1080	110						
100	100	56,40	-	340	35	330	330	-	33,80	1110	113						
105	105	60,00	-	360	37	340	340	-	34,90	1140	117						
110	110	63,40	-	380	39	350	350	-	36,00	1170	120						
115	115	66,40	-	390	40	360	359	-	37,00	1200	123						
120	120	69,40	-	410	42	370	368	-	38,00	1230	126						
125	125	72,00	-	420	43	380	376	-	38,90	1260	129						
130	130	74,40	-	440	45	390	385	-	39,80	1290	132						
135	135	76,40	-	460	47	400	392	-	40,70	1320	135						
140	140	78,40	-	470	48	410	400	-	41,50	1350	138						
145	145	80,40	-	490	50	420	408	-	42,40	1380	144						
150	150	82,20	-	500	51	440	423	-	44,00	1430	146						
155	155	83,80	-	520	53	450	430	-	44,80	1450	149						
160	160	85,40	-	540	55	460	-	-	45,60	-	-						
165	165	86,80	-	550	56	470	-	-	46,30	-	-						
170	170	88,20	-	570	58	480	-	-	47,00	-	-						
175	175	89,60	-	590	60	490	-	-	47,70	-	-						
180	180	90,80	-	600	62	500	-	-	48,30	-	-						
185	185	91,80	-	620	63	510	-	-	49,10	-	-						
190	190	93,00	-	640	65	520	-	-	49,70	-	-						
195	195	94,00	-	660	67	530	-	-	50,40	-	-						
200	200	95,00	-	670	68	540	-	-	51,00	-	-						
205	205	95,80	-	680	70	550	-	-	51,60	-	-						
210	210	96,60	-	710	72	560	-	-	52,20	-	-						
215	215	97,60	-	720	73	570	-	-	52,80	-	-						
220	220	98,20	-	730	75	580	-	-	53,30	-	-						
225	225	99,00	-	750	77	590	-	-	53,90	-	-						
230	230	-	19,20	760	78	600	-	-	54,40	-	-						
235	235	-	20,20	780	80	610	-	-	55,00	-	-						
240	240	-	21,20	800	82	620	-	-	55,50	-	-						
245	245	-	22,10	820	84	630	-	-	56,00	-	-						
250	250	-	23,00	830	85	640	-	-	56,50	-	-						
255	255	-	23,80	850	87	650	-	-	57,00	-	-						
260	260	-	24,60	870	89	660	-	-	57,50	-	-						
265	265	-	25,40	880	90	670	-	-	58,00	-	-						
270	270	-	26,20	900	92	680	-	-	58,50	-	-						
275	275	-	26,90	920	94	690	-	-	59,00	-	-						
280	280	-	27,60	940	96	700	-	-	59,50	-	-						
285	285	-	28,30	950	97	720	-	-	60,40	-	-						
290	290	-	29,00	970	99	740	-	-	61,20	-	-						