Formula for Drilling

1. Cutting Time T_c [sec]

$$T_c = \frac{60 \times H \times \pi \times DC \times i}{f \times vc \times 1{,}000} = \frac{60 \times H \times i}{vf}$$

2. Power Requirements P_c [kW]

$$P_c = \frac{HB \times DC^{0.68} \times vc^{1.27} \times f^{0.59}}{36{,}000}$$

3. Cutting Speed vc [m/min]

$$vc = \frac{\pi \times DC \times n}{1{,}000}$$

4. Spindle Speed n [min^{-1}]

$$n = \frac{vc \times 1{,}000}{\pi \times DC}$$

5. Feed Rate per Revolution f [mm/rev]

$$f = \frac{vf \times \pi \times DC}{vc \times 1{,}000} = \frac{vf}{n}$$

6. Table Feed vf [mm/min]

$$vf = \frac{f \times vc \times 1{,}000}{\pi \times DC} = n \times f$$

7. Thrust F [N]

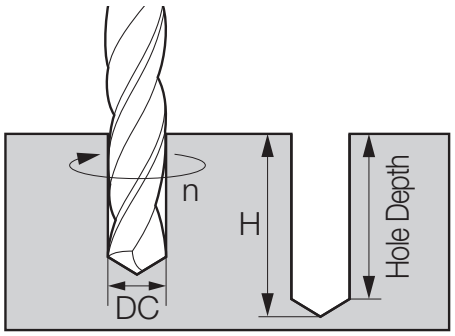
$$F = 0.24 \times HB \times DC^{0.95} \times f^{0.61} \times 9.8$$

8. Torque Mc [N·m]

$$Mc = \frac{Pc \times 30 \times DC}{vc} = \frac{Pc \times 30 \times 10^3}{\pi \times n}$$

9. Material Removal Rate Q [cm^3/min]

$$Q = \frac{\pi \times DC^2 \times f \times n}{4 \times 1000} = \frac{DC \times f \times vc}{4}$$



Brinell Hardness

P	Un alloyed	150 HB
	Low alloyed	200 HB
	High alloyed	300 HB
M	Ferritic	150 HB
	Austenitic	200 HB
K	Malleable	180 HB
	Grey	220 HB
	Ductile	300 HB
N	Al based alloys	100 HB
	Cu based alloys	250 HB
S	Fe based alloys	200 HB
	Ni based alloys	220 HB
	Co based alloys	300 HB
	Ti based alloys	350 HB
H	Hardened steel 50-55	500 HB
	Hardened steel 60-63	700 HB

T_c	:	Cutting Time	[sec]
P_c	:	Power Requirements	[kW]
vc	:	Cutting Speed	[m/min]
n	:	Spindle Speed	[min^{-1}]
f	:	Feed Rate per Revolution	[mm/rev]
vf	:	Table Feed	[mm/min]
F	:	Thrust	[N]
Mc	:	Torque	[N·m]
Q	:	Material Removal Rate	[cm^3/min]
DC	:	Diameter	[mm]
H	:	Depth of Hole	[mm]
i	:	No.of holes	[pcs]
HB	:	Brinell Hardness	[HB]

※ $\pi \fallingdotseq 3.14$

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