Twist drill calculations

Variables

n = speed of the drill in rpm
vc = cutting speed in m / min
d = drill diameter in mm
z = number of cutting edges (usually always 2)
fs = cutting edge feed in mm / cutting edge
vf = feed rate (mm / min)

Speed

The following formula is used to calculate the drill speed:

n [rpm] = (vc [m/min] * 1000) / (3,14 * d1 [mm])

Example:
Bore with Ø 5 mm (d1) in wrought aluminum alloy
vc = 100 m / min (from the table below)

(100 * 1000) / (3,14 * 5) = **6370 rpm**

Feed

The following formula is used to calculate the feed rate:

vf [mm/min] = n * fs

Example:
Bore with Ø 5 mm (d1) in wrought aluminum alloy
n = 6370 from speed calculation
fs = 0.07 from table

6370 * 0,07 = **446 mm/min**

Guide values for speed and feed

Material	Vc [m/min]	Diameter drill [mm]							
		1	2	3	4	5	6	8	Coolant
		Feed f with 2 cutting edges [mm / revolution]							
Cast aluminum > 12% Si	50 … 70	0,01	0,02	0,03	0,04	0,06	0,08	0,09	Emulsion
Wrought aluminum alloy	100 … 140	0,03	0,04	0,05	0,06	0,07	0,08	0,09	Emulsion
Soft plastic	600	0,05	0,06	0,08	0,1	0,12	0,14	0,16	Dry / MQL
Hard plastic	550	0,04	0,05	0,065	0,08	0,09	0,12	0,14	Dry / MQL
Brass, copper, bronze	60 … 100	0,03	0,04	0,05	0,06	0,07	0,08	0,09	Dry / MQL
Steel	90 … 110	0,01	0,01	0,012	0,025	0,03	0,05	0,06	Emulsion

The values listed serve as a rough guide and may differ from the table depending on the machine and peripherals.

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