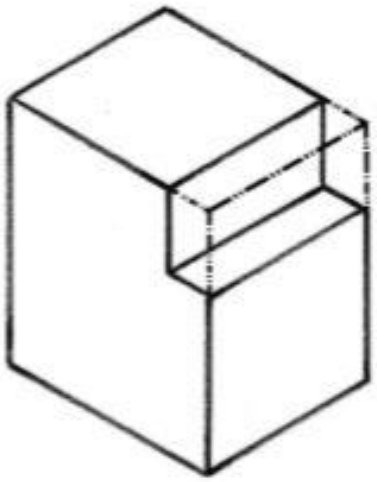
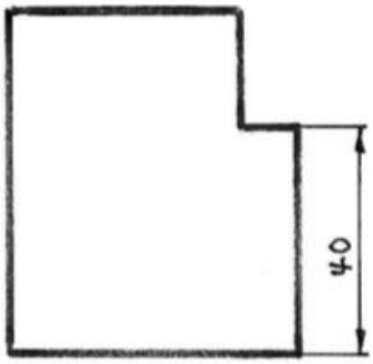
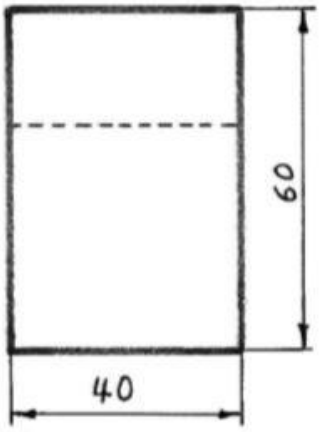
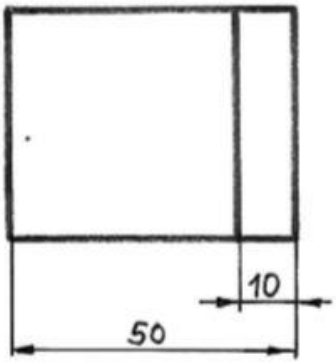
ICATT APPRENTICESHIP PROGRAM TRAIN.RETAIN.GROW.	Information
Date:	Calculation rotational speed- milling

The here shown workpiece is made of E 335, a steel for the machine construction with a tensile strength of 570…710 N/mm². It needs to be roughed on a manual milling machine with a four-dashing uncoated HSS end mill with a diameter of 20mm.
Calculate the rotational speed









ICATT APPRENTICESHIP PROGRAM TRAIN.RETAIN.GROW.	Information
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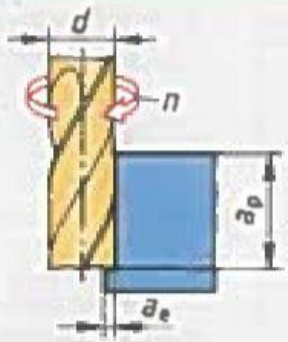
- E335, Machine construction, tensile strenght570…710 N/mm²
- Roughing on manual milling machine
- four-dashing uncoated HSS end mill with d = 20mm

ISO: Rotational Speed n min^{-1}

TB index check “cutting data milling” => Pg 329…
Formula n = Vc / (π*d)

Check on 332 for Vc
Vc in TB is 65 mm/min for coated HSS end mill
(Check footnote 1) => *0.35 !!!

Standard values for the face contouring with HSS-end mill (coated)[1)]



v_c	cutting velocity
d	cutter diameter
n	rotational speed
v_f	feed rate
f_t	feed rate per cutting edge
N	number of teeth
a_p	cutting depth
a_e	engagement (milling width)

Rotatio … n …

Feed ra … v_f =

Workpiece material		Roughing				Finishing	
Material group	average Tensile strength R_m in N/mm² or hardness HB	Cutting velocity v_c[2)] in mm/min	Cutter diameter d in mm 4.0	12.0	20.0	Cutting velocity v_c[2)] in mm/min	Cutte… d 4.0
			Feed rate f_t[3)] in mm				Feed r…
Structural steel	$R_m \le 500$	70 – **75** – 80	0.009	0.037	0.060	80 – **85** – 90	0.005
	$R_m > 500$	60 – **65** – 70	0.007	0.032	0.053	65 – **70** – 75	0.004
Free-cutting steel	$R_m \le 570$	65 – **70** – 75	0.007	0.032	0.053	70 – **75** – 80	0.004
	$R_m > 570$	60 – **65** – 70	0.007	0.032	0.053	65 – **70** – 75	0.004

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Vc = Vc coated * 0.35= 65 mmin * 0.35 = 22.75 m/min

n = Vc / (d*π) = (22.75m/min) / (20mm * π)

= (22750mm/min) / 20mm * π) = ~352 min^{-1}