

Cutting Force per Kienzle

Sample document with complete example values. It shows the report the purchased export produces for YOUR input - it is not itself a report for any part.

Project: Sample project

Part/Position: no real part

Prepared by: Sample, not released

Cutting force and cutting power per the Kienzle equation

Material and chip geometry

Material	16MnCr5
kc1.1	2,020 N/mm ²
Slope value mc	0.17
Depth of cut ap	3 mm
Feed f	0.2 mm
Lead angle κ	90 °
Cutting speed vc	200 m/min
Efficiency η	0.8

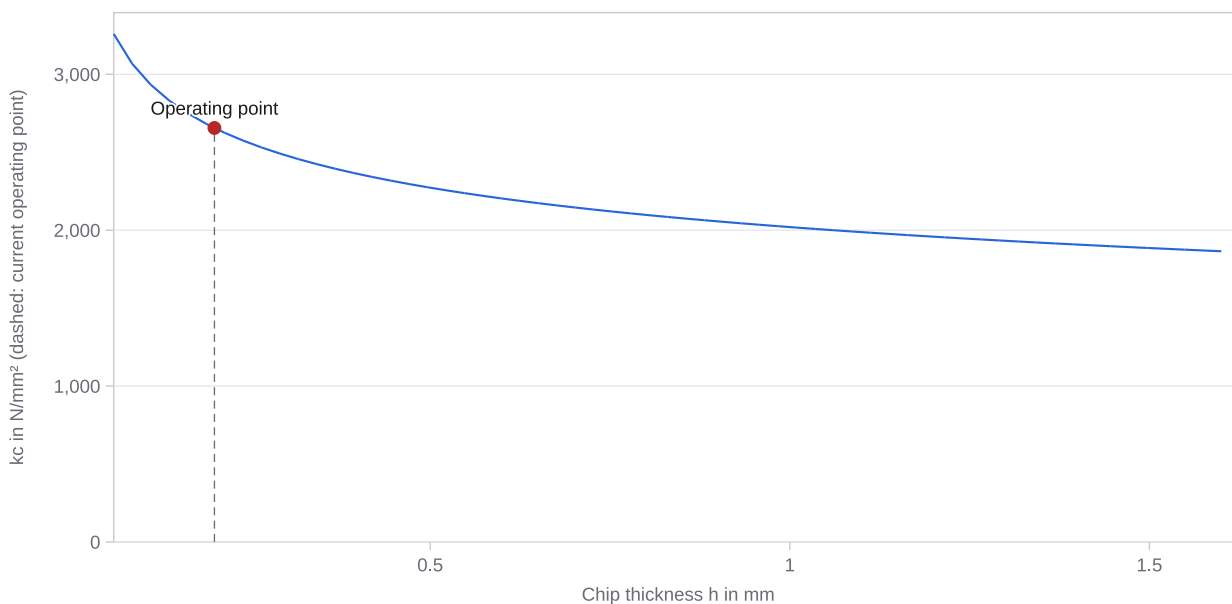
Cutting force and power

Chip thickness h	0.2 mm
Chip width b	3 mm
Chip cross-section A = b·h	0.6 mm ²
Specific cutting force kc = kc1.1·h ^(-mc)	2,656 N/mm ²
Cutting force Fc = b·h·kc	1,593 N
Cutting power Pc = Fc·vc	5.31 kW
Drive power P_M = Pc/η	6.64 kW
Total feed path L = l + la + lu	124 mm
Machining time t_h	1.24 min (74.4 s)

Checks

Criterion	Value	Limit	Status
Chip thickness h within the Kienzle validity range	0.2 mm	0.06 ... 1.6 mm	● OK

Specific cutting force kc over chip thickness h



Calculation basis and note

Cutting force per Kienzle (Fertigungstechnik, Springer; Dubbel, appendix S4): $k_c = k_{c1.1} \cdot h^{(-mc)}$ and $F_c = b \cdot h \cdot k_c = k_{c1.1} \cdot b \cdot h^{(1-mc)}$. The cutting power is $P_c = F_c \cdot v_c$, and the machining time for longitudinal turning is $t_h = (l + \text{approach} + \text{overrun}) \cdot i / (n \cdot f)$.

This is a design approximation for the straight main cutting edge without correction factors (rake angle, wear, chip compression). Real forces are typically 20 to 50 % higher due to wear; $k_{c1.1}$ and mc vary by source and batch (± 10 to 20 %). Use the cutting-data calculator for kinematics, material removal rate and reference values per method.

About this sample

All values on these pages come from a freely chosen example calculation and belong to no real part. The purchased export contains the same sections with your input, your header data (project, part, prepared by) and as searchable text. Pricing and scope: maschinenbaurechner.de/en/pricing

Note: The results are design and orientation aids. They do not replace independent verification, calculation and approval by a qualified person. The terms of use at maschinenbaurechner.de apply.