Blanking and Piercing Force and Press Tonnage

Force to blank or pierce sheet from the cut perimeter, thickness and shear strength, with stripping force and press tonnage with a margin.

Method: F = L t τ_s (Kalpakjian; ASM Handbook vol. 14B)

Input parameters

Unit system: SI

Parameter	Value	Unit
Cut perimeter (all punches)	0.40000	m
Sheet thickness	2.0000	mm
Shear strength of the sheet About 0.7–0.8 of the tensile strength for steel; your data.	320.00	MPa
Stripping force share	10.000	%
Press capacity margin	20.000	%

Calculated results

Parameter	Value	Unit
Blanking force L t τ	256.00	kN
Stripping force	25.600	kN
Press capacity needed	31.326	tf

Notes for this case

- Shear on the punch (angled shear) cuts the peak force; die clearance per your tooling standard.
- The stripping force acts on the return stroke and is not added to the press capacity; check the stripper springs or press return force for it.

Formula and method

$$F = L\,t\,\tau_s$$

Variables

L	Cut perimeter (all punches)	m
t	Sheet thickness	m
τ_s	Shear strength of the sheet	Pa
k_s	Stripping force share	-
k_m	Press capacity margin	-
F	Blanking force L t τ	N
F_s	Stripping force	N
P	Press capacity needed, F(1 + k_m)	N

Method and standards

Shear.

Assumptions and limits

- Flat punch.
- The stripping force acts on the return stroke and is not added to the press capacity, which is F(1 + k_m).
- Press capacity is shown in tonne-force (kip in FPS).

References

- F = L t τ_s (Kalpakjian; ASM Handbook vol. 14B)

Report details

Report reference	FCC-2JFM-CE3K (the same inputs always give the same reference)
Generated	17 November 2026, 19:44 UTC
Calculator	Blanking and Piercing Force and Press Tonnage
Method last reviewed	12 November 2026
Software release	FireCAD Calc, release of 17 November 2026
Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/mechanical/manufacturing/blanking-force

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.