

Press Tonnage Chart

Punching force for round holes in mild steel · Birson Forgings, Ludhiana · since 1985 · ISO 9001:2015

Formula

Tonnage (t) = cut perimeter (mm) × sheet thickness (mm) × shear strength (kg/mm²) ÷ 1000

In SI units: force (kN) = perimeter × thickness × shear strength (MPa) ÷ 1000; tons = kN ÷ 9.81. For a round hole, perimeter = 3.1416 × hole diameter.

Round holes in mild steel (35 kg/mm²), metric tons before safety margin

Sheet thickness across, hole diameter down.

Hole Ø (mm)	1 mm	2 mm	3 mm	4 mm	5 mm	6 mm
10	1.1	2.2	3.3	4.4	5.5	6.6
15	1.6	3.3	4.9	6.6	8.2	9.9
20	2.2	4.4	6.6	8.8	11.0	13.2
25	2.7	5.5	8.2	11.0	13.7	16.5
30	3.3	6.6	9.9	13.2	16.5	19.8
40	4.4	8.8	13.2	17.6	22.0	26.4
50	5.5	11.0	16.5	22.0	27.5	33.0

Using the chart

1. Multiply by the number of holes punched per stroke.
2. Other materials: multiply by (material shear strength ÷ 35). Example: stainless steel 304 at about 50 kg/mm², multiply by 1.43.
3. Add a 30% safety margin (× 1.3), then choose the next standard press size.

Worked example: one 20 mm hole in 5 mm mild steel = 11.0 t; + 30% = 14.3 t, so a 30 t C-frame press.

Typical shear strength (confirm against the mill certificate)

Material	kg/mm ²	MPa (approx.)
Mild steel / HR sheet	32–40	310–390
CRCA	30–35	295–345
Stainless steel 304	45–55	440–540
Aluminium (soft, 1xxx)	7–10	70–100
Brass	25–35	245–345
Copper	15–25	150–245

Online calculator (11 cutting operations, any shape): www.birsonforgings.com/presstonnagecalculator

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Values are estimates for press selection. Actual force depends on die clearance, tool sharpness and material grade/temper.