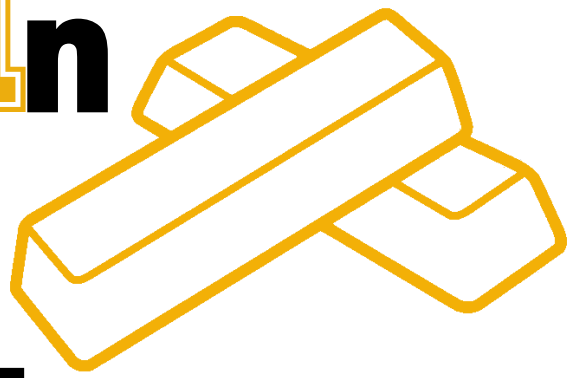
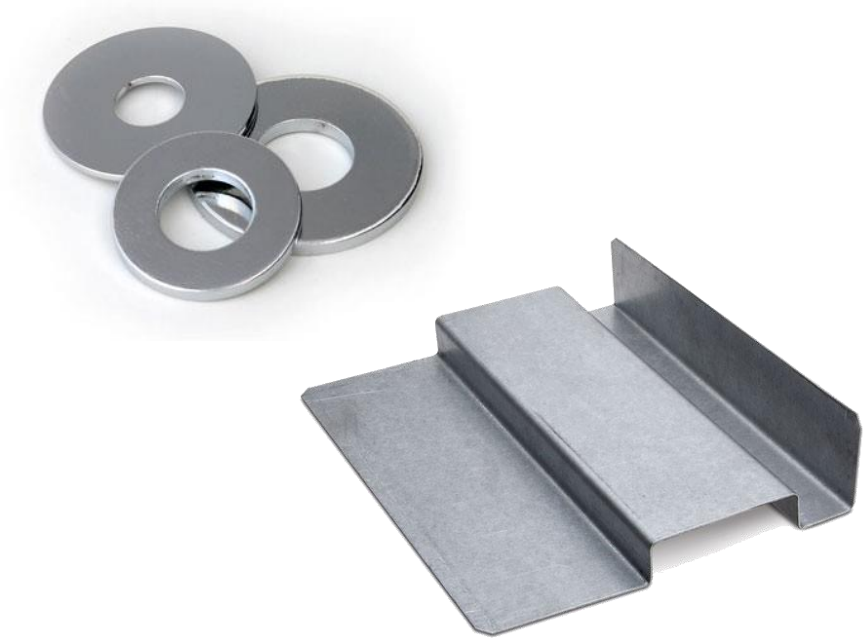
Mechanics In Design and Manufacturing



+ Sheet Metalwork

Sheet Metal Forming



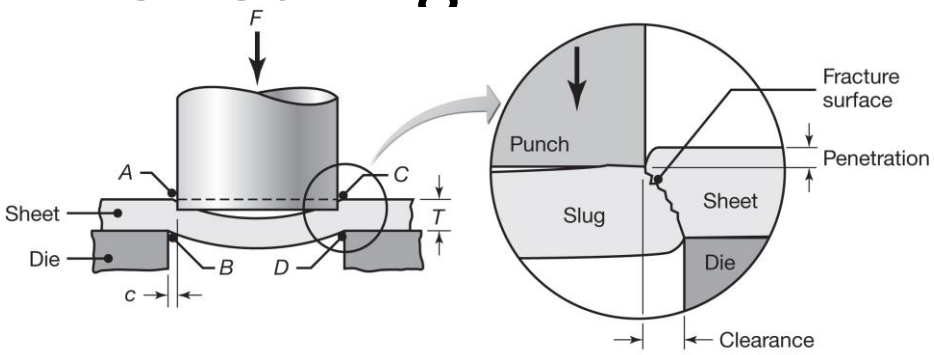
Roll Forming

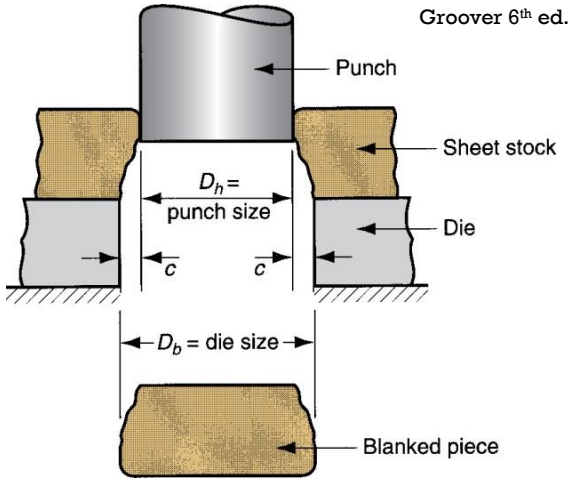
Stretch Forming

Hydroforming

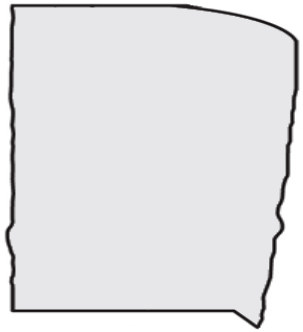
Metal spinning

Shearing





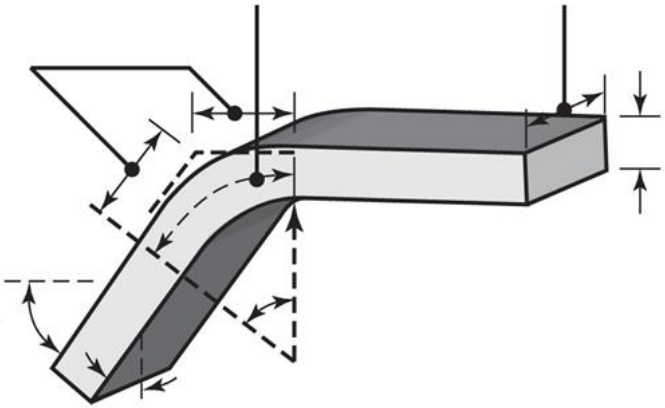
- Clearance



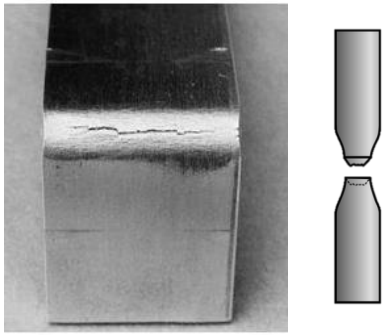
- Force

- Sizing
  - Blanking
  - Punching

Bending

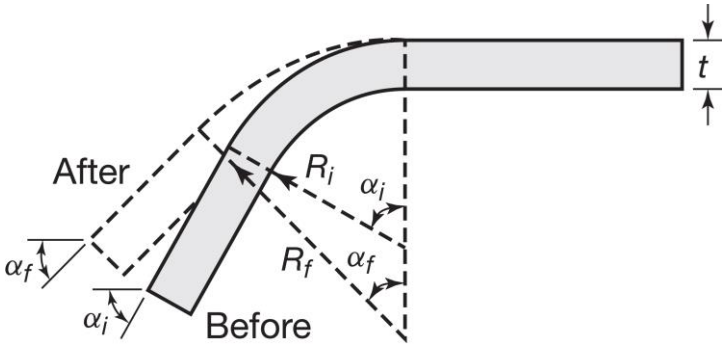


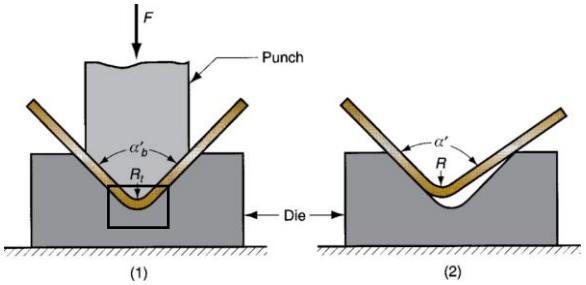
- Bend allowance
- Minimum bend radius



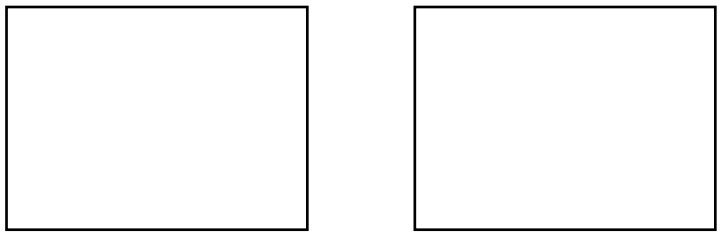
- Bending force

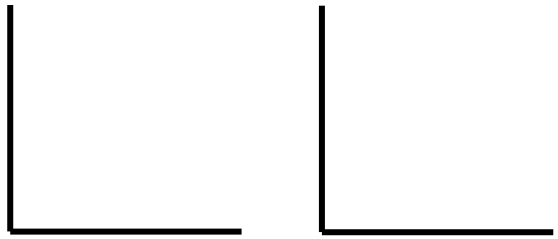
Springback in Bending





Groover 6th ed.

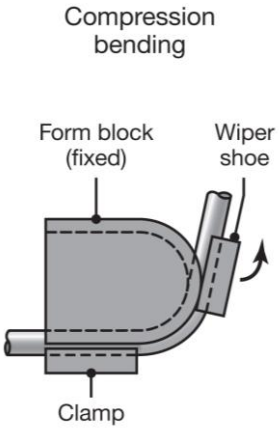


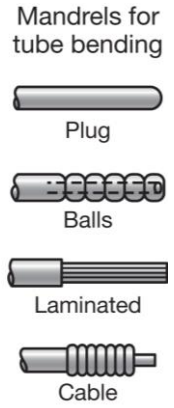


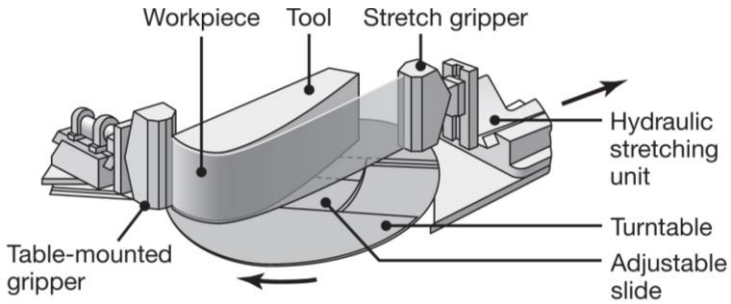
Compensating for springback

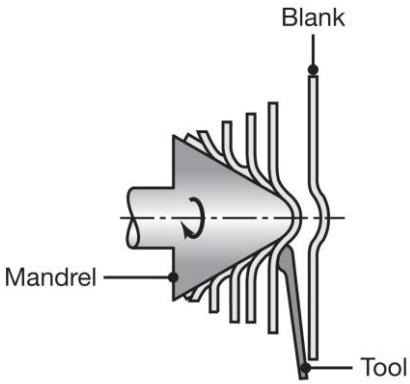
Other Sheetmetal Forming Operations

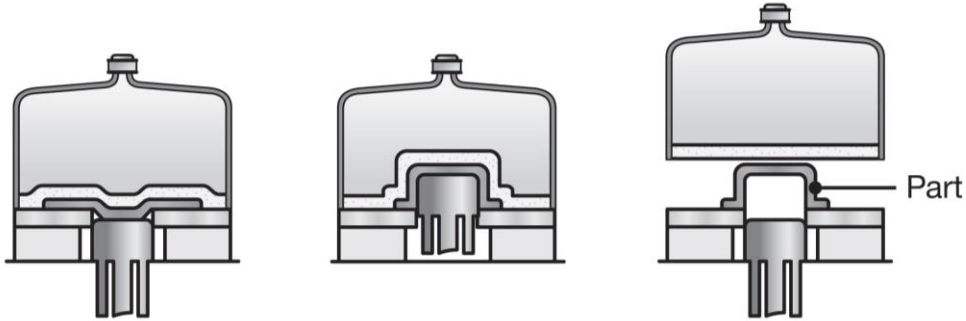
Groover 6th ed.







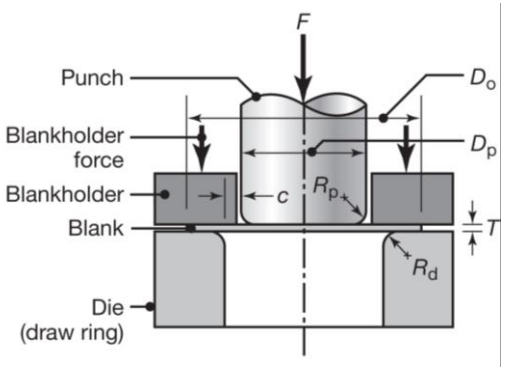


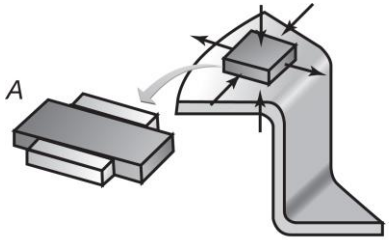


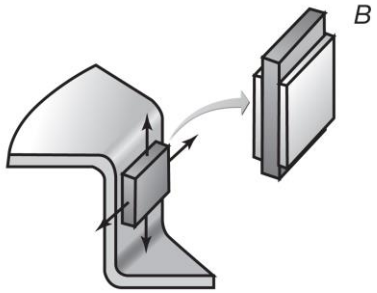
Mechanics In Design and Manufacturing

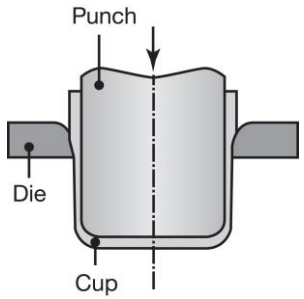
+ Deep Drawing

Drawing Mechanics

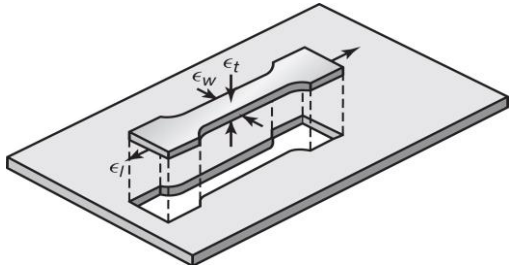


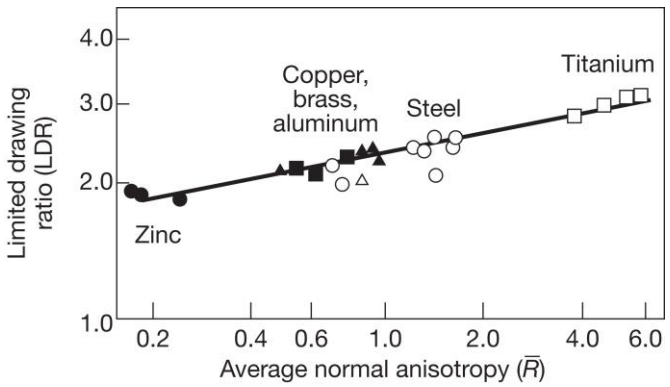






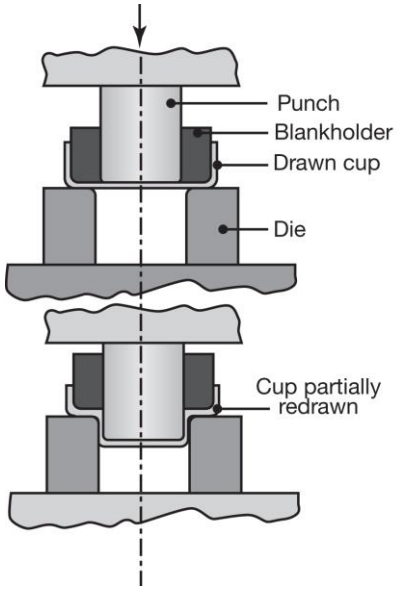
Drawability/LDR

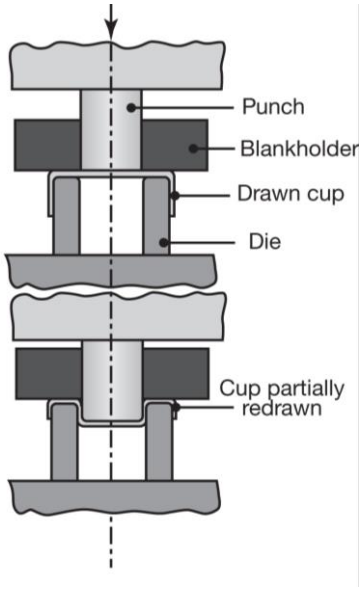


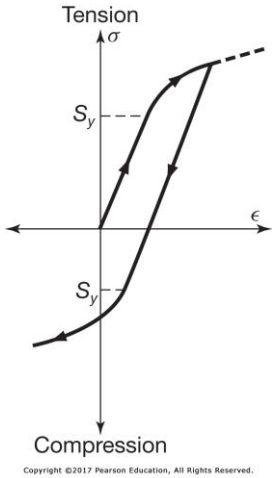


Material	$\bar{R}$
Zinc alloys	0.4–0.6
Hot-rolled steel	0.8–1.0
Cold-rolled rimmed steel	1.0–1.4
Cold-rolled aluminum-killed steel	1.4–1.8
Aluminum alloys	0.6–0.8
Copper and brass	0.6–0.9
Titanium alloys (α)	3.0–5.0
Stainless steels	0.9–1.2
High-strength low-alloy steels	0.9–1.2

Redrawing







Design Considerations