

# METAL FORMING

## Heading Dies

### Cold Forming

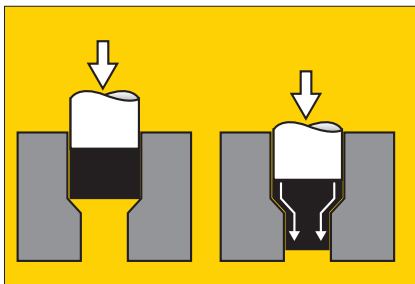
Cold-forming tools are designed to sustain high and repeated stress. Tungsten carbide made possible the use of cold-forming technology for mass production of high-volume parts (screws, bolts, rivets...). Kennametal specialty grades ensure exceptionally long tool life while delivering superior part accuracy.

### Benefits

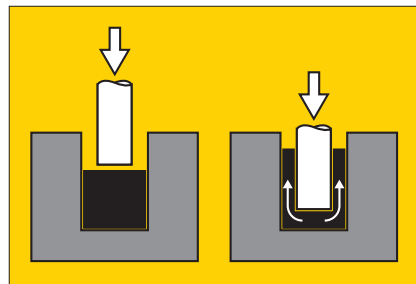
- Outstanding tool life and wear resistance.
- Greatly improved dimensional consistency of parts due to excellent transverse rupture strength and pressure resistance.
- Uniform binder phase and content means substantially higher overall strength.

### Optimal Geometries

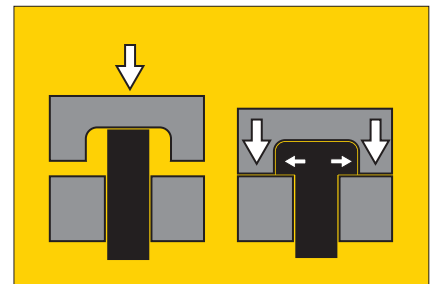
We do all we can to simplify your die assembling and finishing operations. We place the utmost importance on geometric tolerances that will provide you the best-performing tool.



Forward extrusion reduces slug diameter and increases slug length to produce parts such as stepped shafts and cylinders.



In backward extrusion, steel flows back and around the descending punch to form cup-shaped pieces.



Upsetting, or heading, a common technique for making fasteners, gathers steel in the head and other sections along the length of the part.

### ■ Unground Rough Core Die Nib Stock Allowance

Outside Diameter (O.D.)		Inside Diameter (I.D.)		Length (L)	
Size Range	Stock Allowance	Size Range	Stock Allowance	Size Range	Stock Allowance
.250 – .625	+ .010 / .035	.050 – .250	-.010 / .025	.125 – .500	+ .020 / .035
.626 – 1.000	+ .015 / .040	.251 – .500	-.010 / .025	.501 – .750	+ .020 / .045
1.001 – 2.125	+ .020 / .050	.501 – .750	-.010 / .035	.751 – 1.500	+ .025 / .060
2.126 – 4.000	+ .030 / .070	.751 – 1.000	-.010 / .040	1.501 – 3.000	+ .030 / .070
–	–	1.001 – 1.500	-.015 / .050	3.001 – 4.000	+ .030 / .080
–	–	Over 1.500	-.015 / .060	–	–

# Characteristics of WC-Co Grades for Cold-Heading Dies • Punches

## ■ Cemented Tungsten Carbide Grades for Metalforming, Forging, Swaging, and Heading Applications

Kennametal Grade	Grain Size $\mu\text{m}$	Binder Cobalt %	Additives (Ta, Nb) C%	Hardness HRA	Density $\text{g/cm}^3$	TRS (1000 psi)
K3833/H91	Medium	11	—	89.8	14.40	430
K94	Medium	11.5	2.3	89.8	14.30	410
K3109	Coarse	12.1	—	88.0	14.20	430
H81	Medium	13	0.7	88.6	14.15	450
R61	Coarse	15	—	86.0	14.00	390
H71	Coarse	16	—	87.2	13.90	400
R52	Extra Coarse	18	—	84.0	13.70	360
ND20	Coarse	20	5	86.0	13.40	350
H20/K3520/CD60	Coarse	20	—	84.3	13.50	350
H25	Coarse	25	—	83.0	13.05	350
ND25	Coarse	25	5	83.0	13.00	350
ND30	Coarse	30	—	81.0	12.70	325



### Applications:

- Fasteners
- Nails
- Rivets
- Bearings
- Ammunition
- Auto components

Delivery schedule for straight wall nibs		Contact for more information
Unground/Rough Core	2 weeks	Tel: +1 800 221 4273
Ground O.D.	2–3 weeks	Fax: +1 800 221 1895
O.D. and Ends Ground	3 weeks	
Semi-Finished	3–4 weeks	k-mdsn.inside-sales@kennametal.com

