VC 800^{cold}, Special Tool Steel
Data Sheet – Tooling Alloys

Zapp is certified to ISO 9001

Key features of Zapp's tool steel VC 800^{cold}

- Conventionally manufactured
- High toughness and compressive strength
- Easy heat treatment
- Case hardness up to 58 HRC possible

Typical areas of application

- Cutting and punching tools for thick sheet applications
- Pressing and forming tools
- Shearing and industrial knives
- Plastic injection molds

Physical properties

Modulus of elasticity E [GPa]	190
Density [kg/dm³]	7.7
Thermal expansion coefficient [mm/(mm/K)] In a temperature range up to 20 °C – 200 °C	11.6 x 10^{-6}
Thermal conductivity [W/(m*K)]	26.1

Delivery condition

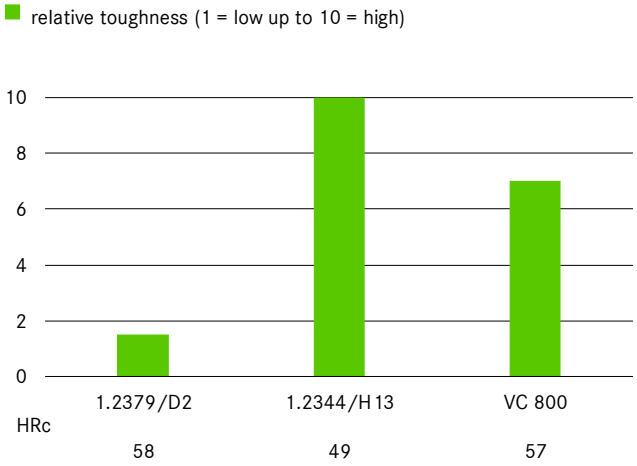
As-delivered condition	Soft-annealed, approx. 240 HB
Product form	Rounds bars, flat bars
Surface finish	Mechanically machined

Typical chemical composition (weight %)

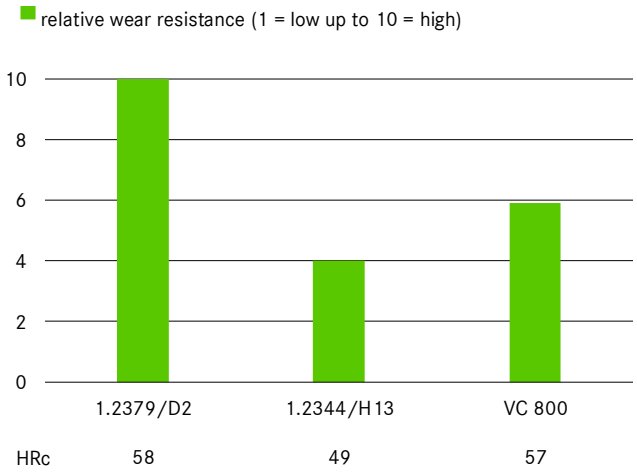
C	Cr	Mo	W	V
0.5	8.0	1.5	-	0.5

Qualitative comparison of the most important properties

Toughness



Wear resistance



Heat treatment

Soft annealing

- In neutral atmosphere at ~ 880 °C and ~ 4 h exposure time (after through-heating)
- Followed by furnace cooling (optimum cooling rate max. 15 °C/h up to 540 °C)
- Soft annealing hardness ~ 240 HB

Stress-relief annealing

~ 650 °C/ ~ 2 h exposure time (after through-heating), followed by furnace cooling

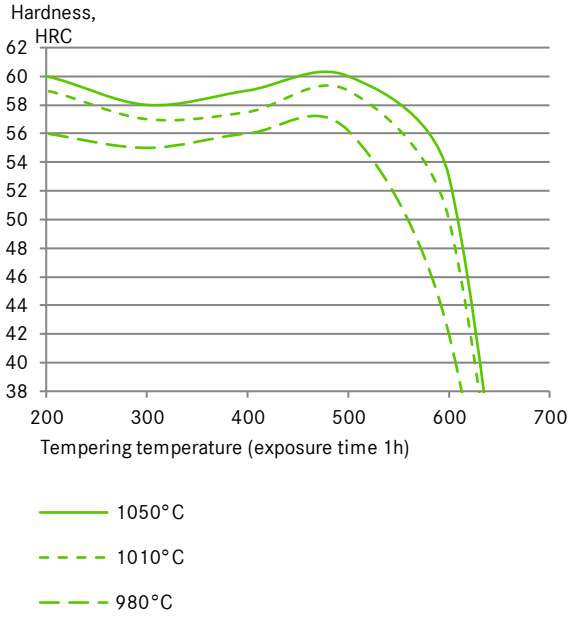
Surface treatments

Tempering temperatures of ≥ 520 °C provide the prerequisite for subsequent nitriding or PVD coating.

You can find more materials at:
www.zapp.com/en-uk/materials/powder-metallurgical-tool-steel

Zapp Precision Metals GmbH ensures professional execution of all heat treatment steps as well as their preparation and post-processing (e.g., charging, hardness testing, straightening processes, etc.) – always with the aim of obtaining the optimum component properties!
We are happy to assist you with constructive advice!

Tempering diagram



Vacuum heat treatment instructions

Pre-heating	professional heating, 2 to 3 pre-heating stages recommended
Vacuum heating	from 980 to 1,050 °C, see table
Exposure time	from 30 to 45 min after through-heating
Cooling	in vacuum, a quenching pressure of at least 6 bar is required
Tempering temperature	at least 520 °C
Tempering	at least 3 times for 2 hours each according to table, fourth tempering recommended, allow to equilibrate to room temperature in between

The maximum specified hardening temperature of 1,050 °C should not be exceeded.
Hardening with further heat treatment processes is possible, but should be discussed in advance!

TOOLING ALLOYS

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