



**RSALLOYS**

HOLDING GROUP

AZIENDA CERTIFICATA  
ISO 9001

ACCIAI PM

TOOLING ALLOYS

**Z-23**  
**PM**speed

DATA SHEET

**RSACCIAI RSENGINEERING KENOTHERM**

# Z-23 PM<sup>speed</sup>

DATA SHEET



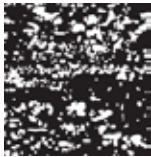
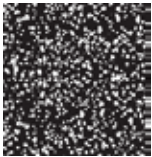
## Key Features of Zapp's Powder Metallurgical High Speed Steel Z-23 PM<sup>speed</sup>

- PM 6-5-3
- Produced using powder metallurgical processes
- Standard powder high-speed steel
- Case hardness up to 66 HRC possible

## Typical Areas of Application

- Cutting, punching, and fine blanking tools
- Pressing and forming tools
- Machining tools

## POWDER METALLURGICAL VS. CONVENTIONAL MICROSTRUCTURE



The homogeneous microstructure which is obtained by using powder metallurgical processes vs. the coarse carbide structure of conventionally produced steel

## PHYSICAL PROPERTIES

Modulus of elasticity E [GPa]	230
Density [kg/dm <sup>3</sup> ]	7.97
Thermal expansion coefficient [mm/(mm/K)] in a temperature range up to 400 °C	11.5 x 10 <sup>-6</sup>
600 °C	12.4 x 10 <sup>-6</sup>
13.0 x 10 <sup>-6</sup>	
Thermal conductivity [W/(m*K)]	24.0

## DELIVERY CONDITION

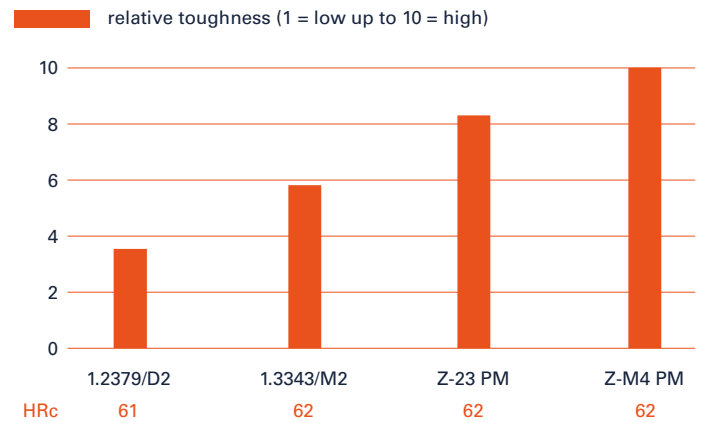
As-delivered condition	Soft-annealed, approx. 300 HB
Product form	Round bars, flat bars, sheets
Surface finish	Mechanically machined

## Typical chemical composition (weight %)

C	Cr	Mo	W	V
1.3	4.2	5.0	6.4	3.0

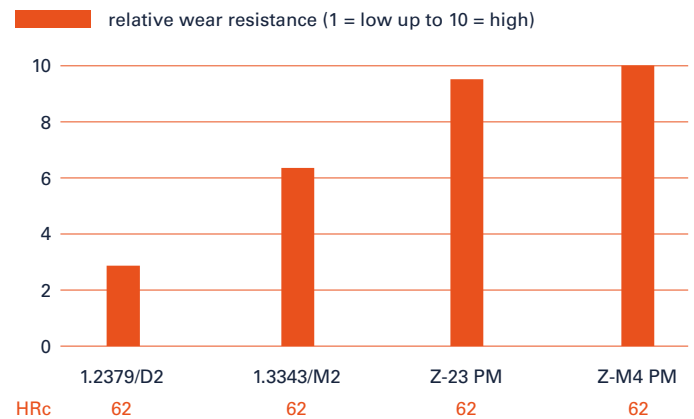
## Qualitative comparison of the most important properties

### TOUGHNESS



Standard size of the Charpy-test-piece with a 12.7 mm notch radius.

### WEAR RESISTANCE



# HEAT TREATMENT DATA

## SOFT ANNEALING

- In neutral atmosphere at ~ 870 °C and ~ 4 h exposure time (after through-heating)
- Followed by furnace cooling (optimum cooling rate max. 10 °C/h up to 540 °C)
- Soft annealing hardness ~ 300 HB

## STRESS RELIEF ANNEALING

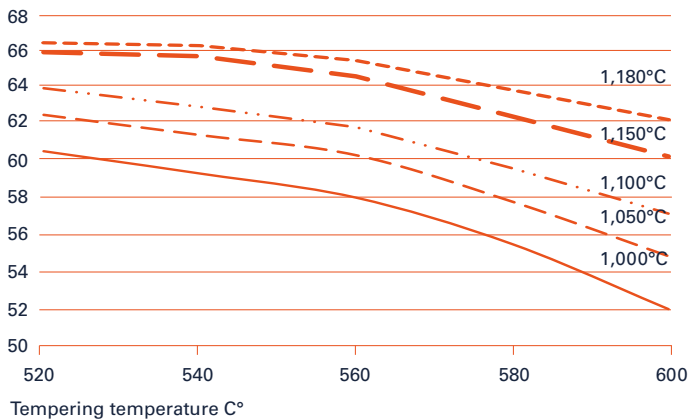
~ 650 °C/~ 2 h exposure time (after through-heating) followed by furnace cooling

## SURFACE TREATMENTS

Tempering temperatures of  $\geq 560$  °C provide the prerequisite for subsequent nitriding or PVD coating.

## TEMPERING DIAGRAM

Hardness, HRc



## VACUUM HEAT TREATMENT INSTRUCTIONS

Pre-heating	professional heating, 3 pre-heating stages recommended
Vacuum heating	from 1,000 to 1,180 °C see table
Exposure time	from 10 to 30 minutes after through-heating, see table
Cooling	in vacuum, a quenching pressure of at least 6 bar is required
Tempering	at least 3 times for 2 hours each according to table, fourth tempering recommended, allow to equilibrate to room temperature in between

Desired hardness HRc $\pm$ 1	Hardening temperature °C	Exposure time at hardening temperature minutes	Tempering °C
58	1,000	30	560
60	1,050	25	560
62	1,100	15	560
64	1,150	15	560
66	1,180	10	560

The maximum specified hardening temperature of 1,180 °C should not be exceeded. Hardening with further heat treatment processes is possible, but should be discussed in advance!