

# High Density

## Technical Datasheet

Short Name	–	Chemical Composition (Reference in weight %)					
Material-No. (old)	–	W	Ni	Cu	Fe	Mo	
Code	HD 17	90.0	6.5	–	3.5		magnetic
	HD 17 U	90.0	6.0	4.0	–		non-magnetic
	HD 17 Mo	90.0	5.4	3.6		1.0	non-magnetic
	HD 17.5	93.0	5.0	–	2.0		magnetic
	HD 17.5 U	93.0	5.0	2.0	–		non-magnetic
	HD 18	95.0	3.6	–	1.4		magnetic
	HD 18 U	95.0	3.5	1.5	–		non-magnetic
	HD 18.5	97.0	2	–	1	–	magnetic
	HD 18.5 U	97.0	2	1	–	–	non-magnetic

Material Properties	Powdermet produced Tungsten-Base-material with high density and relative good machinability
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Applications	<ul style="list-style-type: none"> <li>– No chat drilling tools</li> <li>– Small counterweights, mass storage parts a.s.o.</li> <li>– Upsetting tools for resistance heating</li> <li>– Materials for X and g ray shields</li> <li>– Contact electrodes in the car valve production.</li> <li>– Inserts with high length to dia ratio in aluminium die cast tools</li> </ul>
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Mechanical Properties (Reference values)		HD 17 HD 17 U	HD 17 Mo	HD 17.5 HD 17.5 U	HD 18 HD 18 U	HD 18.5 HD 18.5 U
	Hardness	HV 10	295	300	305	315
Modulus of elasticity	kN/mm <sup>2</sup>	330	340	350	370	380

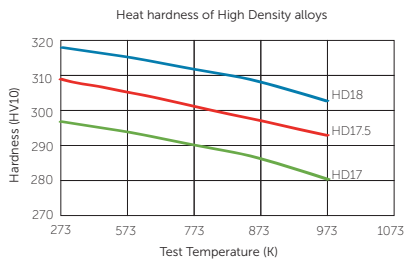
Physical Properties	Electrical conductivity 20 °C (293 K)	$\frac{m}{\Omega \cdot mm^2}$	6.0–7.5	6.5–7.5	6.5–8.0	7.0–8.5	–
	Coefficient of thermal expansion 20–800 °C (293–1,073 K)	$\frac{1}{K}$	6.2	6.2	5.8	5.4	–
	Thermal conductivity	$\frac{W}{m \cdot K}$	100	105	110	120	–
	Density (20 °C/293 K)	g/cm <sup>3</sup>	17.0	17.2	17.5	18.0	18.5

Products	Round and flat bars, finished parts
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Note	Mechanical properties are depending on the size and cross section
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### Machining Instructions (Reference values)

HD 17-/HD 18 alloys are good machinable compared with pure tungsten. But it will be more difficult with higher tungsten content and the tool wear increases as well.

#### Drilling HSS steel 1.3202

Cutting speed (m/min)	12
Point angle	118–120°
Lubrication	Emulsion

#### Turning Carbides ISO K 05

Cutting speed (m/min.)	80–120
Rake angle	6–10°
Clearance angle	7–10°
Lubrication	Emulsion

#### Milling Carbides ISO K 10

Milling head with positive cutting inserts	
Cutting speed (m/min.)	80–120
Rake angle	6°
Clearance angle front face	6°
Clearance angle lateral	6°
Lubrication	none

#### Grinding Siliconcarbide wheels

Hardness	H, I, J, K
Grain size	40–120
Structure	medium
Matrix	ceramic
Cutting speed (m/sec.)	30
Machining	Water soluble emulsion

All statements as to the properties or utilization of the materials and products mentioned in this data sheet are only for the purpose of description. Guarantees in respect of the existence of certain properties or utilization at the material mentioned are only valid if agreed upon in writing.

Wieland Duro GmbH | Albert-Einstein-Straße 1 | 70806 Kornwestheim | Germany  
 info@wieland-duro.com | wieland-duro.com

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