

Material-N°. Short name	none	Composition (Reference in weight %)				
		W	Ni	Cu	Fe	Mo
HD 17		90,0	6,5	-	3,5	
HD 17 Mo		90,0	5,4	3,6		1,0
HD 17,5		93,0	5,0	-	2,0	
HD 17,5 U		93,0	5,0	2,0	-	
HD 18		95,0	3,6	-	1,4	

Properties Powdermet produced Tungsten-Base-material with high density and relative good machinability.

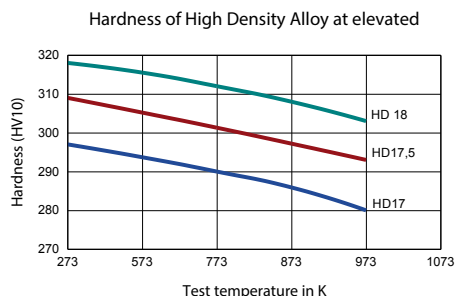
- Applications:**
- No chat drilling tools
 - Small counterweights, mass storage parts a.s.o.
 - Upsetting tools for resistance heating
 - Materials for X and G ray shields
 - Contact electrodes in the car valve production.
 - Inserts with high length to dia ratio in aluminium die cast tools

Mechanical Properties (Typical)			HD 17	HD 17 Mo	HD 17,5	HD 18
			HD 17 U		HD 17,5 U	HD 18 U
Hardness	HV10		295	300	305	315
Mod. of elasticity	kN/mm ²		330	340	350	370

Physical properties			HD 17	HD 17 Mo	HD 17,5	HD 18			
			HD 17 U		HD 17,5 U	HD 18 U			
			Electrical conductivity 293 K (20 °C)	$\frac{m}{\Omega \cdot mm^2}$		6,0 – 7,5	6,5 – 7,5	6,5 – 8,0	7,0 – 8,5
			Coefficient of thermal expansion 293–1.073 K (20–800 °C)	$\frac{1}{K}$		6,2	6,2	5,8	5,4
Thermal conductivity	$\frac{W}{m \cdot K}$		100	105	110	120			
Density	$\frac{g}{cm^3}$		17,0	17,2	17,5	18,5			

Products Round and flat bars, finished parts

Mechanical properties are depending on the size and cross section.



Machining (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* 1.3202

Cutting speed m/min.

12

Nose 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 positiv cutting inserts

Cutting speed (m/min)

80 – 120

Rake angle

6°

Clearance angle

6°

Inclination angle

6°

Lubricaton

none

Grinding

Siliconcarbide wheels

Hardness

H, I, J, K

Grain size

40 - 120

Struktur

medium

Bonding

ceramic

Cutting speed (m/sec)

30

Lubrication

Water soluble emulsion

All statements as to the properties or utilization of the materials and products mentioned in this datasheet 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.

*(HSS) High Speed Steel