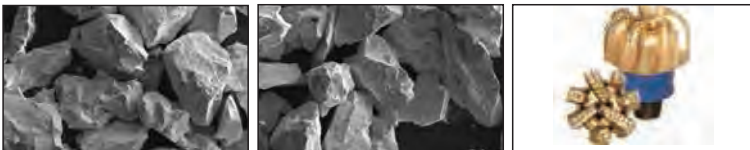


ZTC HARD-FACING MATERIAL

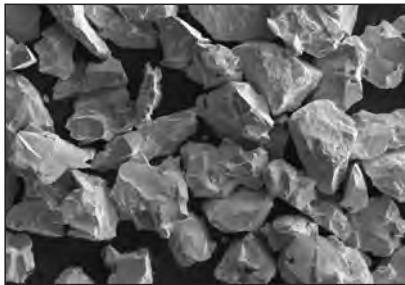
Matrix Powders for PDC Bits



Matrix powders 7201 for Diamond Bits

Description

- ◎ The main component of matrix powder 7201 is Marocrystalline tungsten carbide. This powders have excellent erosion resistance and abrasion resistance, which rank only second to 7203 powders and are used in majority of drill pipe manufacturing plant.
- ◎ 7201 matrix powders are mainly used to surface mosaic of workpiece and bit products that require erosion, abrasion, impact resistance .



The typical SEM topography of matrix powder 7201



Grade and Chemical Composition

Grade	Chemical Composition						
	Fe(%)	T.C(%)	F.C(%)	Mo(%)	Ti(%)	Ta(%)	Nb(%)
ZTC7201	≤3.2	5.2-5.6	≤0.04	≤1.0	≤0.08	≤0.03	≤0.03

Particle Size Distribution and Physical Properties

US mesh	wt%
+80	0-3
80/120	10-18
120/170	15-22
170/230	16-25
230/325	10-18
-325	28-36

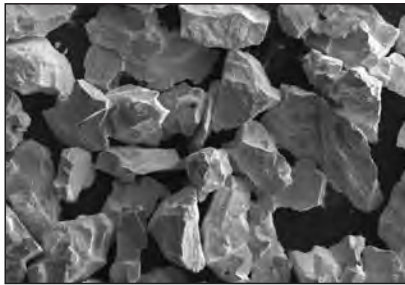
Apparent Density	7.60-8.50g/cc
Tap Density	9.58-9.95g/cc
Specific Gravity	15.3-15.7g/cc
Melt Infiltration Absorption*	18-24% (mass ratio)
Melt Infiltration Absorption*	28-36% (volume ratio)
Transverse Rupture Strength*	85-125ksi
Hardness*	34-42HRC
Specific Gravity*	12.6-13.7g/cc
Shrinkage*	0.076-0.152mm per25.4mm

Attention: After screening and controlling precisely, matrix powder 7201 apply to infiltration process. The matrix powder should avoid segregation, exposing to air and humid environment. All products have been done the melt infiltration test before leaving the factory. The factors of infiltration test including infiltrated alloy, temperature, time and knock tightness of 7201 in the mold(Copper / Nickel / Zinc, Macrofil65 used at 1150 °C). All the asterisk (*) data of 7201 matrix powder come from melt infiltration test.

Matrix powder 7202 for Diamond Bits

Description

- ⊙ Matrix powder 7202 consists most of marocrystalline tungsten carbide, which designed for providing erosion and wear resistance. Matrix powder 7202 infiltrated in workpiece surface, it can get excellent hardness and abrasion resistance.
- ⊙ Products are targeted for surface mosaic of drilling oil or mining tools, which the diameter is under 20 cm.



The typical SEM topography of matrix powder 7202



Grade and Chemical Composition

Grade	Chemical Composition						
	Fe(%)	T.C(%)	F.C(%)	Mo(%)	Ti(%)	Ta(%)	Nb(%)
ZTC7202	2.5-3.0	5.7-6.0	≤0.03	≤0.05	≤0.03	≤0.03	≤0.03

Particle Size Distribution and Physical Properties

US mesh	wt%
+80	1(max)
80/120	11-15
120/170	15-19
170/230	19-23
230/325	12-16
-325	33-37

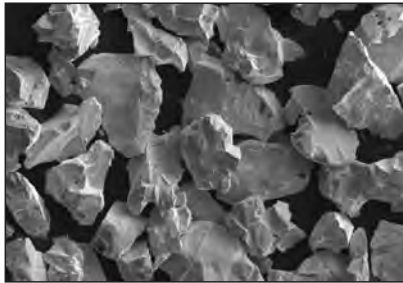
Apparent Density	7.6 – 8.2g/cc
Tap Density	10.5 – 10.9g/cc
Specific Gravity	15.3 – 15.7g/cc
Melt Infiltration Absorption*	15-17% (mass ratio)
Melt Infiltration Absorption*	23-26% (volume ratio)
Transverse Rupture Strength*	95-145ksi
Hardness*	38-42HRC
Specific Gravity*	13.5-13.7g/cc
Shrinkage*	0.004mm per inch

Attention: The factors of infiltration test including infiltrated alloy, temperature, time and knock tightness of 7202 in the mold (Copper / Nickel / Zinc, Macrofil65 used at 1150 °C). All the asterisk (*) data of 7202 matrix powder come from melt infiltration test.

MATRIX POWDER 7203 FOR DIAMOND BITS

Description

- ◎ Matrix powder 7203 consist mainly of marocrystalline tungsten carbide. Matrix powder 7203 have better erosion–corrosion and abrasion resistance than matrix powder 7201. The particles size of matrix powder 7203 are coarser than 7201, so drill pipes that are made from 7203 powder have better strength and toughness.
- ◎ Products are mainly used for drill product, sand core drill pipe, PDC drill pipe body and other products by melt infiltration method, which require excellent erosion resistant, wear resistance, impact resistance.



The typical SEM topography of 7203 matrix powders

Grade and Chemical Composition

Grade	Chemical Composition							
	Fe(%)	T.C(%)	F.C(%)	Mo(%)	Ti(%)	Ta(%)	Nb(%)	Ni(%)
ZTC7203	≤1.0	5.4–5.9	≤0.04	≤0.1	≤0.08	≤0.03	≤0.03	1.5–2.5

Particle Size Distribution and Physical Properties

US mesh	wt%
+60	Trace
60–80	4–8
80/120	13–17
120/170	13–17
170/230	13–17
230/325	13–17
–325	28–36

Apparent Density	7.6 – 8.5g/cc
Tap Density	9.1 – 9.8g/cc
Specific Gravity	15.3 – 15.7g/cc
Melt Infiltration Absorption*	20–26% (mass ratio)
Transverse Rupture Strength*	90–135ksi
Hardness*	32–40HRC
Specific Gravity*	12.6–13.4g/cc(theoretical value)
Shrinkage*	0.10–0.18mm/25.4mm

Attention: After screening and controlling precisely, 7203 matrix powders apply to infiltration process. The matrix powders should avoid segregation, exposing to air and humid environment. All the products have been done melt infiltration test before leaving the factory. The factors of infiltration test including infiltrated alloy, temperature, time and knock tightness of 7203 in the mold(Copper / Nickel / Zinc, Macrofil65 used at 1150 °C). All the asterisk (*) data of 7203 matrix powder come from melt infiltration test.