Powders for making cemented carbide products

Zhuzhou Cemented Carbide Group Corp. Ltd.

www.zccamerica.com

World's Tools, Sharp Tools for Wealth.

Enterprise Spirit

Pursuing a Perfect Mastery. Aiming at Unlimited Progress.

Key Philosophy

Good Faith Creates Values.


QUALITY MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 00111Q26218R5L/4300

We hereby certify that

Zhuzhou Cemented Carbide Group Co.,Ltd.

Diamond Road, Hetang District, Zhuzhou City, Hunan Province, P.R.China; Shizhuyuan Science & Technology Industry Park of Nonferrous Metal, Chenzhou City, Hunan Province, P.R.China

by reason of its

Quality Management System

has been awarded this certificate for compliance with the standard

ISO9001: 2008

GB/T 19001-2008

The Quality Management System Applies in the following area:

Design, Development & Production of "Diamond Brand"Cemented Carbide, Exported Materials and Tools; Tungsten, Molybdenum, Tantalum and Niobium Series of Product and Related Materials, Hard Alloy and Fine Machining Products; Ferrous Smelting, Fine Machining Products and Relative Subsidiary Products

Certified since: Nov. 01, 1996 Valid from: Sep. 19, 2011 Valid until: Sep. 18, 2014

After a surveillance cycle, the certificate is valid only when used together with an Acceptance Notice of Surveillance Audit issued by CQC. Please access www.cqc.com.cn for checking validity of the certificate.

Signed by: Wang Kejiao

CHINA QUALITY CERTIFICATION CENTRE

Q 0076935


ENVIRONMENTAL MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 00113E22005R3L/4300

We hereby certify that

Zhuzhou Cemented Carbide Group Co.,Ltd.

Diamond Road, Hetang District, Zhuzhou City, Hunan Province, P.R.China Nonferrous Metal Technology Industrial Park, Shizhuyuan, Chenzhou City, Hunan Province, P.R.China

by reason of its

Environmental Management System

has been awarded this certificate for compliance with the standard

ISO14001:2004

GB/T 24001-2004

The Environmental Management System Applies in the following area:

Design and Development, Production, Sales, Service of "Diamond Brand"Cemented Carbides, Tungsten and Molybdenum, Tantalum and Niobium Series of Product and Related Management Activities

Certified since: Jun. 18, 2004 Valid from: Sep. 17, 2011 Valid until: Sep. 11, 2014

After a surveillance cycle, the certificate is valid only when used together with an Acceptance Notice of Surveillance Audit issued by CQC. Please access www.cqc.com.cn for checking validity of the certificate.

Signed by: Wang Kejiao

CHINA QUALITY CERTIFICATION CENTRE

E 0022531


OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM CERTIFICATE

Certificate No.: 00113S21155R3L/4300

We hereby certify that

Zhuzhou Cemented Carbide Group Co.,Ltd.

Diamond Road, Hetang District, Zhuzhou City, Hunan Province, P.R.China Nonferrous Metal Technology Industrial Park, Shizhuyuan, Chenzhou City, Hunan Province, P.R.China

has been awarded this certificate for compliance with the standard

OHSAS 18001: 2007

GB/T 28001-2011

This certificate is valid concerning occupational health and safety management system related to

Design and Development, Production, Sales, Service of "Diamond Brand" Cemented Carbides, Tungsten and Molybdenum, Tantalum and Niobium Series of Product and Related Management Activities

Certified since: June 16, 2004 Valid from: September 13, 2013 Valid until: September 11, 2016

After a surveillance cycle, the certificate is valid only when used together with an Acceptance Notice of Surveillance Audit issued by CQC. Please access www.cqc.com.cn for checking validity of the certificate.

Signed by: Wang Kejiao

CHINA QUALITY CERTIFICATION CENTRE

S 0016181

Introduction of ZCC

Zhuzhou Cemented Carbide Group Corp. Ltd. (ZCC) has been a leading manufacturer of cemented carbide products in China since built in 1954. It produces about 5,000 tons of cemented carbides, more than 10,000 tons of APT, tungsten powder, tungsten carbide powder, ready to press powder, and 800tons of Cobalt powder annually. Meanwhile, ZCC also owns separate plants to produce Molybdenum, Tantalum and Niobium products.

ZCC has different business sectors which are for Hard Material, Cutting inserts and tools, Tungsten & Molybdenum, Cobalt, Tantalum &Niobium products.

The hard material sector is the biggest one in ZCC. Its annual production capability is around 600tons of carbide rolls and anvils, 1000tons of carbide rods, 600tons of mining and road milling buttons, 500tons of carbide molds and dies, a few hundred tons for special products and wear parts.

The “Diamond Brand” trademark was named as “China’s Renowned Trademark” in 1999, and “Diamond Brand” cemented carbide was awarded as “China’s Famous Brand” in 2004.

ZCC has established a global sales network since 2001. With branches in America, Europe, HongKong, and a liaison office in India, ZCC has been providing better local services for our customers around the world:

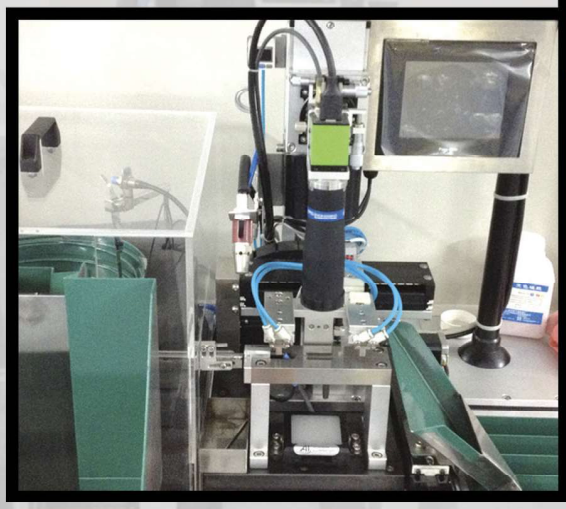
Zhuzhou Cemented Carbide Works USA Inc.
4651 Platt Lane, Ann Arbor, MI 48108 USA
Tel: +1-734-302-0125 Fax: +1-734-302-0126
E-mail: salesdepartment@zccamerica.com

For more information, please login
ZCC website: www.zccamerica.com

R & D Center

Testing Center

Accepted by China National Accreditation Board for Laboratories. (Equivalent to ISO/IEC17025)



Production Plants

Content

P5 Ammonium paratungstate

P6 Ammonium metatungstate

P7 Tungsten trioxide

P8 Blue tungsten oxide

P9 Tungsten powder

P10 Tungsten carbide powder

P11 Carbide solid solution powder

P12 Cobalt powder

P13-P15 Spray dried grade powders

P16 Chart of comparison between Rockwell hardness and Vickers hardness

P17 Tantalum carbide powder

P18 Niobium carbide powder

P19 Solid solution powders of tantalum-niobium carbide

P20 Vanadium carbide

P20 Chromium carbide

P21 Titanium carbide

Ammonium paratungstate

Grade: APT-0
Appearance: Pure white crystals
Main composition content: $WO_3 \geq 88.5\%$.
(Calculated by the subtractive method)

X300

X100

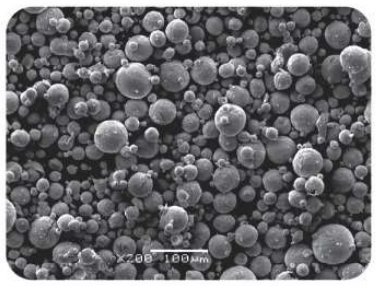
Impurity content, % MAX

Grade	APT-0
Al	0.0005
As	0.0010
Bi	0.0001
Ca	0.0005
Co	0.0005
Cr	0.0005
Cu	0.0001
Fe	0.0009
K	0.0009
Mn	0.0005
Mg	0.0005
Mo	0.0018
Na	0.0010
Ni	0.0005
P	0.0007
Pb	0.0001
S	0.0007
Sb	0.0002
Si	0.0009
Sn	0.0001
Ti	0.0005
V	0.0005

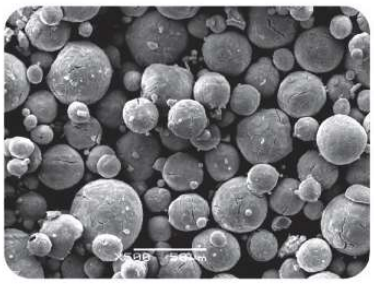
Packing: Inner double plastic bags, outer steel drum, 200kg net weight each drum.

Ammonium metatungstate

Grade: AMT-1
Appearance: White powder
Main composition content: $WO_3 \geq 89\%$
(Calculated by the subtractive method)
Water insoluble: $\leq 0.05\%$
PH value: ≤ 4



X200



X500

Impurity content, %MAX

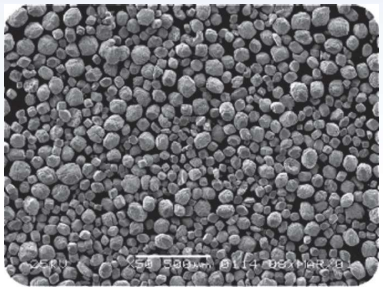
Grade	AMT-1
Al	0.0010
As	0.0010
Bi	0.0001
Ca	0.0010
Cu	0.0005
Cr	0.0010
Co	0.0010
Fe	0.0030
K	0.0010
Mg	0.0005
Mn	0.0010
Mo	0.0030
Ni	0.0005
Na	0.0020
Pb	0.0001
S	0.0030
Sb	0.0005
Sn	0.0010
Si	0.0010
Ti	0.0010
V	0.0010

Packing: Inner double plastic bags, outer steel drum, 200kg net weight each drum.

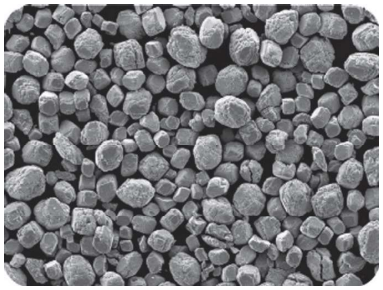
Tungsten trioxide

Grade: WO_3-0

Appearance: Light yellow crystallized powder



X50



X300

Impurity content, % MAX

Grade	WO_3-0
Al	0.0005
As	0.0010
Bi	0.0001
Ca	0.0010
Co	0.0010
Cr	0.0010
Cu	0.0003
Fe	0.0010
K	0.0010
Mg	0.0007
Mn	0.0005
Mo	0.0020
Na	0.0010
Ni	0.0007
P	0.0007
Pb	0.0001
S	0.0007
Sb	0.0005
Si	0.0010
Sn	0.0002
Ti	0.0010
V	0.0010
Loss of WO_3 at calcination	0.5

Packing: Inner double plastic bags, outer steel drum, 200kg net weight each drum.

Blue tungsten oxide

Grade: WO_3-x-0
Appearance: Dark blue crystals

X100

X300

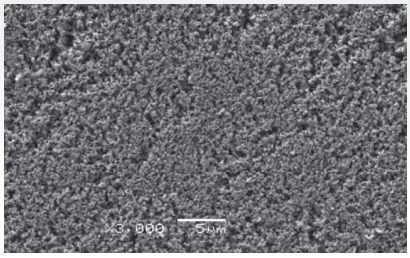
Impurity content, % MAX

Grade	WO_3-x-0
Al	0.0005
As	0.0010
Bi	0.0001
Ca	0.0010
Cr	0.0010
Cu	0.0003
Co	0.0010
Fe	0.0010
K	0.0010
Mg	0.0007
Mn	0.0005
Mo	0.0020
Ni	0.0005
Na	0.0010
P	0.0007
Pb	0.0001
Sn	0.0001
Si	0.0010
Sb	0.0003
S	0.0007
Ti	0.0010
V	0.0010
NH	0.15

Packing: Inner double plastic bags, outer steel drum, 200kg net weight each drum.

Tungsten powder

Grade: FW-1
Appearance: Light grey or dark grey powder
Main composition content: W ≥99.95%.
(Calculated by the subtractive method)



Impurity content, %

Elements	Impurity content
Fe	≤0.0050
Al	≤0.0010
Si	≤0.0020
Mg	≤0.0010
Mn	≤0.0010
Ni	≤0.0030
As	≤0.0015
Pb	≤0.0001
Bi	≤0.0001
Sn	≤0.0003
Sb	≤0.0010
Ca	≤0.0020
Mo	≤0.0050
K+Na	≤0.0030
P	≤0.0010
C	≤0.0050

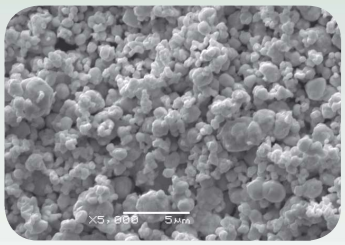
Type, range of average particle size and oxygen content

Type	Range of average size (μm)	O%	Type	Range of average size (μm)	O%
04	BET: ≤0.10	≤0.60	40	4.01~5.00	≤0.10
06	BET: ≤0.15	≤0.50	50	5.01~7.00	≤0.10
08	0.80~1.00	≤0.40	70	7.01~10.00	≤0.10
10	1.01~1.50	≤0.25	100	10.01~15.00	≤0.10
15	1.51~2.00	≤0.20	150	15.01~20.00	≤0.10
20	2.01~2.50	≤0.15	200	20.01~30.00	≤0.10
25	2.51~3.00	≤0.15	300	>30.00	≤0.10
30	3.01~4.00	≤0.15			

Packing: Inner double plastic bags, outer steel drum, 25kg or 50kg net weight each drum.

Tungsten carbide powder

Grade: FWC
Appearance: Light grey powder



Type, range of average particle size and oxygen content

Type	Range of average size (μm)	O%	Type	Range of average size (μm)	O%
06	BET: 0.271~0.360	≤0.20	40	4.01~5.00	≤0.08
08	0.80~1.00	≤0.18	50	5.01~6.00	≤0.08
10	1.01~1.50	≤0.15	60	6.01~9.00	≤0.08
15	1.51~2.00	≤0.12	90	9.01~13.00	≤0.05
20	2.01~2.50	≤0.10	130	13.01~20.00	≤0.05
25	2.51~3.00	≤0.08	200	20.01~30.00	≤0.05
30	3.01~4.00	≤0.08	300	>30.00	≤0.05

Chemical composition

Grade		FWC	Special requirements
Carbon content	Total carbon(%)	6.13±0.05	Type 06 Total carbon: (6.15~6.25) Free carbon: ≤0.15, Combined carbon: ≥6.08
	Combined carbon(%)	≥6.07	
	Free carbon(%)	≤0.06	
Impurity content	Mo	≤0.005	
	Al	≤0.002	
	Ca	≤0.002	
	Si	≤0.003	
	Co	≤0.010	
	S	≤0.002	
	P	≤0.005	
	As	≤0.005	
	K+Na	≤0.003	
	Cr	≤0.030	Type 90~Type 300 Cr ≤0.04
	Fe	≤0.020	Type 25~Type 60 Fe ≤0.03 Type 90~Type 300 Fe ≤0.05
	Mg	≤0.002	
	Mn	≤0.001	
	Ni	≤0.008	

Packing: Inner double plastic bags, outer steel drum, 25kg or 50kg net weight each drum.

Carbide solid solution powder

Grade: 4K32, 4K40, 4K24, 4K64

Appearance: Dark grey powder

Grade		4K32			4K40			4K24	4K64
Class		Special class	Excellent class	Industrial class	Special class	Excellent class	First class		
Chemical composition	Ti	32.0±0.5	32.0±1.0	32.0±1.5	40.0±0.5	40.0±0.5	39.5±1.5	24.0±0.5	63.5±1.5
	W	56.0±1.0	56.0±1.0	56.0±1.5	47.0±0.5	47.0±0.5	47.0±1.5	65.0±1.5	19.5±1.5
	Total carbon	11.2±0.2	11.2±0.2	11.2±0.3	12.9±0.2	12.5±0.3	12.4±0.3	10.2±0.5	16.5±0.5
	Free carbon	≤0.20	≤0.20	≤0.25	≤0.40	≤0.50	≤0.50	≤0.40	≤0.60
Impurities content									
Impurities content not more than	Fe	0.100	0.150	0.500	0.060	0.060	0.100	0.100	0.100
	Mo	0.100	0.100	0.150	0.100	0.100	0.100	0.100	0.100
	Si	0.005	0.005	0.150	0.005	0.005	0.005	0.005	0.005
	Co	0.050	0.050	--	0.050	0.050	0.050	--	0.050
	Na	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
	K	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
	Ca	0.007	0.007	0.100	0.007	0.007	0.007	0.007	0.007
	S	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
	O	0.250	0.250	0.300	0.400	0.300	0.300	0.250	0.500
	N	0.800	0.800	0.800	0.500	0.500	0.800	0.800	0.800
Fsss,μm Average size		2.0~ 4.0	2.0~ 4.0	1.5~ 4.0	≤2.0	2.0~ 3.0	3.0~ 4.0	2.0~ 4.0	2.0~ 4.0

Packing: Inner double plastic bags, outer steel drum, 25kg or 50kg net weight each drum.

Cobalt powder

Grade: FCo06, FCo10, FCo15, FCo20

Appearance: Grey powder

Elements / Grade	FCo06	FCo10	FCo15	FCo20
FSSS, μm	0.60~1.00	1.01~1.50	1.51~2.00	2.01~3.00
Bulk density (g/cm^3)	0.6~1.0	0.6~1.4	0.6~1.4	0.6~1.4
Tap density (g/cm^3)	1.2~2.5	1.4~3.0	1.4~3.0	1.4~3.0
Impurity content % Max	The content of cobalt is calculated by the subtractive method not including the gas impurities			
Co(%)	≥99.800			
Ni	≤0.030			
Fe	≤0.008			
Ca	≤0.008			
Cu	≤0.008			
Zn	≤0.008			
Mn	≤0.008			
Mg	≤0.008			
Al	≤0.008			
Na	≤0.008			
Pb	≤0.002			
Si	≤0.008			
C	≤0.030			
S	≤0.005			
O	≤0.75	≤0.5		
Packing	Inner vacuum-packed plastic bag, outer drum			
	Each bag 2.5 kg Each drum 30.0 kg	Each bag 5.0 kg Each drum 50.0 kg	Each bag 5.0 kg Each drum 50.0 kg	Each bag 2.5 kg Each drum 30.0 kg

Spray dried grade powders

Application code	ZCC grade	Chemical composition % in weight				Physical properties of powder		Physical and mechanical properties and mirco structure as stintered						Application recommended
		Co	Tic+ TacNbc	WC	Other elements	Hall flow	Apparent density	Density	Hardness HV 30	Transverse Rupture strength	Coercivity	Magnetic Saturation	Porosity	
						s/25cm^3	g/cm^3	g/cm^3		N/mm^2	KA/m	%		
P10	YC10	9.5	35.00	55.50		35	2.52	10.30	1525-1675	≥1130	9.2-11.5	8.3-9.5	A02 B00	For machining steel, cast steel
P20	YT14	8.2	14.00	77.80		32	2.83	11.52	1560-1700	≥1400	12.0-15.5	7.5-8.2	A02 B00	For machining long-chip steel, cast steel, forgeable cast iron
P25	YC30	9.5	21.90	68.60		35	2.50	11.42	1400-1550	≥1700	8.0-10.4	8.5-9.5	A02 B00	
P30	YT5	9.3	6.30	84.40		32	3.14	13.02	1370--1560	≥1750	9.5-12.5	8.6-9.2	A02 B00	
	YC30S	10.0	20.00	70.00		33	3.08	12.86	1425-1575	≥1600	13.7-15.5	8.1-9.1	A02 B00	
P35	YC40	11.0	12.00	77.00		35	3.24	13.12	1320-1460	≥1650	107-13.1	9.1-10.1	A02 B00	For machining steel, cast steel parts with different pore including sand hole
P40	YC45	12.0	18.93	69.07		35	2.88	12.75	≥1400	≥2250	15.0-19.0	10.0-11.2	A04 B02	
M10	YW1	6.1	16.30	77.60		35	3.13	13.30	1600-1800	≥1290	16.5-20.5	5.4-6.1	A02 B02	For machining steel, cast steel, manganese steel, grey cast iron
M20	YW2	8.2	16.35	75.45		35	3.01	13.10	1530-1680	≥1460	15.0-19.0	7.3-8.2	A02 B02	For machining steel, cast steel, austenitic steel, manganese steel, grey cast iron
M30	YD20	6.0	2.00	92.00		35	3.45	14.80	1450-1600	≥1320	13.5-15.1	5.3-6.0	A02 B00	For machining steel, cast steel, austenitic steel, grey cast iron, high temperature resistant alloy
K014	YG3X	3.0	0.30	96.70		36	3.50	15.23	≥1450	≥1300	21.0-30.0	2.4-3.1	A04 B02	For machining super-hard grey cast steel, hardening steel, chilled iron, high silicon-aluminum alloy, high wear-resistant plastic, hard paper plate ,ceramic
	YL05	4.0	2.00	94.00		35	3.55	15.02	1760-1940	≥1130	20.3-24.7	3.2-4.0	A02 B02	
K05	YG6X	6.0	0.30	93.70		35	3.45	14.94	1650-1750	≥1560	19.5-24.5	5.1-5.9	A02 B02	
	YG6A	6.0	2.00	92.00		35	2.85	14.95	1350-1500	≥1600	21.5-26.5	4.9-5.9	A02 B02	
K10-K15	YD10.1	6.0	0.40	93.60		35	3.45	14.91	1665-1835	≥1230	19.5-24.5	5.2-6.0	A02 B02	For machining cast iron with hardness higher than 200HB, short-chip forgeable cast iron, silicon-aluminum alloy, copper alloy, plastic, glass, ceramic, stone
K20	YG6S	6.0	0.40	93.60		35	3.25	14.90	1600-1700	≥1670	16.3-19.2	5.2-6.0	A02 B02	For machining grey cast iron with hardness lower than 200HB, non-ferrous metal, copper, brass, aluminum
	YG8N	7.8	1.00	91.20		35	3.35	14.61	≥1400	≥2000	15.0-18.0	6.6-7.8	A02 B02	
K30	YG8	7.8		92.20		35	3.44	14.75	≥1300	≥1900	10.2-15.0	6.5-7.7	A02 B02	For machining low hardness grey cast iron, low strengthen steel, compact wood
	YD20	6.0	2.00	92.00		35	3.45	14.80	1450-1600	≥1320	13.5-15.1	5.3-6.0	A02 B00	

Spray dried grade powders

Application code	ZCC grade	Chemical composition % in weight				Physical properties of powder		Physical and mechanical properties and mirco structure as stintered						Application recommended
		Co	Tic+ TacNbc	WC	Other elements	Hall flow	Apparent density	Density	Hardness HV 30	Transverse Rupture strength	Coercivity	Magnetic Saturation	Porosity	
						s/25cm^3	g/cm^3	g/cm^3		N/mm^2	KA/m	%		
G05	YK05	6.0		94.0		35	3.45	14.90	1370-1490	≥2300	11.3-12.6	5.5-5.9	A02 B00	For drilling soft or medium hard rock formation with single axis compression strength less than 60MPa
	YK10.5	7.5		92.5		35	3.40	14.78	1300-1500	≥2600	9.4-12.5	6.6-7.5	A02 B00	
G10	YG8C	8.3		91.7		36	3.55	14.65	≥1500	≥2000	7.6-9.6	7.1-8.2	A02 B02	For drilling soft or medium hard rock formation with single axis compression strength of 60~120MPa
	YK20.1	9.5		90.5		36	3.55	14.52	1155-1275	≥2400	6.6-7.4	8.6-9.5	A02 B00	
G20	YK25	10.0	0.5	89.5		35	3.39	14.51	≥1100	≥2550	6.0-8.0	8.8-9.8	A02 B02	For drilling soft or medium hard rock formation with single axis compression strength of 120~200 Mpa
	YG11C	11.5		88.5		36	3.40	14.30	≥1050	≥2400	6.0-8.0	9.5-11.4	A02 B00	
G30	YG13C	13.0		87.0		35	3.35	14.22	≥980	≥2500	5.5-7.0	11.7-13.0	A02 B02	For drilling soft or medium hard rock formation with single axis compression strength of 120~200 Mpa
	YK30	11.0		89.0		36	3.45	14.39	1060-1170	≥2110	5.3-6.1	9.9-11.0	A02 B02	
G40	YG15C	15.0		85.0		37	3.15	14.00	950-1100	≥2160	4.8-6.3	13.5-15.0	A02 B02	For drilling medium hard or hard rock formation with single axis strength of 120~200 Mpa
	YG16C	16.5		83.5		37	3.13	13.90	≥880	≥2640	4.8-6.4	14.1-16.4	A02 B02	
G50	YG20C	20.0		80.0		37	3.13	13.50	≥760	≥2480	3.5-4.5	17.0-19.8	A02 B02	For drilling hard or super hard rock formation with single axis compression strength higher than 200 Mpa
G60	YG25C	25.0		75.0		39	3.15	13.12	830-870	≥2650	4.0-4.6	20.0-25.0	A04 B02	
LS10	YG3X	3.0	0.3	96.7		36	3.50	15.23	≥1600	≥1300	21.0-30.0	2.4-3.1	A04 B02	For making dies used for drawing metal wire with diameter less than 6mm and seal ring
	YG3	3.0		97.0		35	3.60	15.25	1560--1680	≥1300	14.5-19.5	2.4-3.0	A04 B02	
	YL05	4.0	2.0	94.0		35	3.55	15.02	1760--1940	≥1130	20.3-24.7	3.2-4.0	A02 B00	
LS20	YG6X	6.0	0.5	93.5		35	3.45	14.94	≥1550	≥1700	21.5-26.5	4.9-5.9	A02 B02	For making dies used for making metal wire of diameter less than 20mm,tube of diameter less than 10mm and seal ring
	YG6	6.0		94.0		35	3.55	14.95	1400--1560	≥1670	12.5-16.0	5.0-6.0	A04 B02	
	YL10.1	6.0		94.0		35	3.55	14.95	1530--1630	≥1530	15.3-17.7	5.0-5.8	A02 B00	
LS25	YG8	7.8		92.2		35	3.44	14.75	≥1300	≥1900	10.2-15.0	6.5-7.7	A02 B02	
LS30	YL10.2	9.5		90.0	0.5	35	3.01	14.45	1550--1650	≥1610	18.9-22.0	8.0-9.5	A02 B02	For making sealing ring, dies used for making metal wire of diameter less than 50mm,tube of diameter less than 35mm
	YG10	10.0		90.0		37	3.28	14.55	≥1200	≥2300	9.0-12.0	9.0-10.0	A02 B02	
	YG11	11.0		89.0		38	3.26	14.44	≥1100	≥2000	8.0-13.0	9.5-11.0	A02 B02	
	YG12	12.0		88.0		38	3.25	14.30	≥1200	≥2500	7.0-11.0	11.0-12.0	A02 B02	

Spray dried grade powders

Application code	ZCC grade	Chemical composition % in weight				Physical properties of powder		Physical and mechanical properties and mirco structure as stintered						Application recommended
		Co	Tic+ TacNbc	WC	Other elements	Hall flow	Apparent density	Density	Hardness HV 30	Transverse Rupture strength	Coercivity	Magnetic Saturation	Porosity	
						s/25cm^3	g/cm^3	g/cm^3		N/mm^2	KA/m	%		
LS40	YG15	15.0		85.0		39	2.96	14.04	≥1050	≥2220	7.5-10.5	13.0-14.6	A02 B02	For making drawing dies under the conditions of big stress and compression
LS50	YG20	20.0		80.0		39	2.71	13.55	≥850	≥2480	7.0-8.6	18.0-19.8	A02 B02	
LS60	YG25	25.0		75.0		43	2.56	13.13	≥850	≥2800	4.2-5.8	22-25	A02 B02	
LV10	YG15C	15.0		85.0		37	3.15	14.00	950-1100	≥2160	4.8-6.3	13.5-15.0	A02 B02	For making rollers used in the high quality finishing rolling stands of high speed mills of wires
	YG16C	16.5		83.5		37	3.13	13.90	≥880	≥2640	4.8-6.4	14.1-16.4	A02 B02	
LV20	YG20C	20.0		80.0		37	3.13	13.50	≥760	≥2480	3.5-4.5	17.0-19.8	A02 B02	For making rollers used in the high quality finishing rolling stands of high speed mills of wires
LV30	YG25C	25.0		75.0		39	3.15	13.12	830-870	≥2650	4.0-4.6	20.0-25.0	A04 B02	For making rollers used in the normal finishing rolling stands of high speed mills of wires
Non-magnetic	YN16	Ni6	0.35	93.65		36	3.25	14.90	≥1650	≥2800			A04 B02	For making non-magnetic alloy used for making moulds, parts on precision instrument and corrosion resistant parts

Packing: Inner double plastic bags, outer steel drum, 25kg or 50kg net weight each drum.

Note:

1. General grade

1) All above data are typical.

2) P, M, K indicate cemented carbide used for long-chip machining, long-chip or short-chip machining and short-chip machining respectively.

3) G indicates cemented carbide used for geology prospect and mining.

4) LS, LT, LQ, LV indicate cemented carbide used for drawing dies, punching dies.

2. The relationship of flowability between different units(s/25m^3 and s/50g) of carbide grade powder:

Given that:

X hall flow meansured by s/25cm^3.

Y hall flow meansured by s/50g.

Z apparent density of that lot of powder.

then: $Y=(50 \times X) / (25 \times Z)$

Comparison between Rockwell-hardness and Vickers-hardness

Hardness comparison and reference table											
Rcokwell		Vickers HV	Rcokwell		Vickers HV	Rcokwell		Vickers HV	Rcokwell		Vickers HV
HRA	HRC		HRA	HRC		HRA	HRC		HRA	HRC	
93.5		1900	89.0		1330	83.3	64.0	825	79.5	57.0	642
93.1		1850	88.9	73.8	1300	83.1	63.5	810	79.3	56.5	631
93.0	82.0	1800	88.5	73.0	1250	82.8	63.0	795	79.0	56.0	620
92.5	80.5	1750	88.1	72.2	1200	82.5	62.5	780	78.7	55.5	609
92.3	79.8	1700	87.6	71.3	1150	82.2	62.0	766	78.5	55.0	599
92.0		1680	87.0	70.4	1100	82.0	61.5	752	78.2	54.5	589
91.7	79.2	1650	86.4	69.4	1050	81.7	61.0	739	77.9	54.0	579
91.5	78.4	1600	85.7	67.8	1000	81.4	60.5	726	77.7	53.5	570
91.0	77.7	1560	85.5		980	81.2	60.0	713	77.4	53.0	561
90.5	77.0	1500	85.0	66.6	950	80.9	59.5	700	77.1	52.5	551
90.1	76.2	1450	84.3		900	80.6	59.0	688	76.9	52.0	543
90.0		1430	84.0		870	80.3	58.5	676	76.6	51.5	534
89.9	75.4	1400	83.9	65.0	856	80.1	58.0	664	76.3	51.0	525
89.5		1370	83.6	64.5	840	79.8	57.5	653	76.1	50.5	517
89.3	74.6	1350									

Tantalum carbide powder

Grade: FTaC-1, FTaC-2, FTaC2-1

Appearance: Yellowish-brown powder

Grade			FTaC-1	FTaC-2	FTaC2-1
Chemical composition	Ta(Nb)C		≥99.5	≥99.0	≥99.0
	T.C		≥6.20	≥6.20	6.25±0.25
	F.C		≤0.100	≤0.15	≤0.15
Impurity content,%,max	Nb		0.3000	1.000	1.000
	Fe		0.0500	0.100	0.100
	Si		0.0080	0.010	0.015
	Al		0.0050	0.005	0.010
	Ti		0.0085	0.015	0.050
	O	1 Level	0.3500	0.350	0.350
		2 Level	0.3000	0.300	0.300
		3 Level	0.2000	0.200	0.200
		4 Level	0.1500	0.150	0.150
	N		0.0250	0.050	0.050
	Na		0.0050	0.008	0.020
	Ca		0.0050	0.008	0.020
	Mn		—	—	0.070
Fsss (μm)	1 Level		0.8~1.0		
	2 Level		1.0~1.2		
	3 Level		1.2~1.5		
	4 Level		1.5~3.0		

Packing: Inner double plastic bags, outer steel drum, 25kg or 50kg net weight each drum.

Niobium carbide powder

Grade: FNbC-1, FNbC-2
Appearance: Dark grey powder

Grade			FNbC-1	FNbC-2
Chemical composition	T.C		10.8-11.4	11.0-11.6
	F.C		≤0.15	≤0.30
Impurity content,%,max	N		0.150	0.250
	Ta		0.250	0.250
	W		0.150	0.200
	Mo		0.100	0.100
	Ti		0.020	0.050
	Si		0.010	0.020
	Mn		0.050	0.050
	Na		0.008	0.008
	Fe		0.100	0.150
	Co		0.100	0.150
	Cr		0.100	0.150
	O	1 Level	0.400	0.400
		2 Level	0.300	0.300
	Sn		0.010	0.050
	K		0.008	0.008
	Ca		0.010	0.020
Fsss (μm)	1 Level		1.0~1.5	
	2 Level		1.5~4.0	

Packing: Inner double plastic bags, outer steel drum, 25kg or 50kg net weight each drum.

Solid solution powders of tantalum-niobium carbide

Grade: 90:10, 80:20, 70:30, 60:40, 50:50

Appearance: Dark grey powder

Grade			90:10	80:20	70:30	60:40	50:50
Chemical composition	Ta		84.4±1.5	71.5±1.5	65.6±1.5	56.0±1.3	46.9±1.3
	Nb		8.85±1.0	21±1.0	26.6±1.2	35.0±1.3	44.3±1.5
Impurity content,%,max	T.C		6.75±0.3	7.3±0.3	7.8±0.3	8.2±0.3	8.8±0.3
	F.C		≤0.15	≤0.15	≤0.15	≤0.15	≤0.15
	Co		0.100	0.100	0.100	0.100	0.100
	Mo		0.100	0.100	0.100	0.100	0.100
	Si		0.020	0.020	0.020	0.020	0.020
	Fe		0.150	0.150	0.150	0.150	0.150
	Ni		0.040	0.040	0.040	0.040	0.040
	K		0.008	0.008	0.008	0.008	0.008
	Na		0.008	0.008	0.008	0.008	0.008
	Mn		0.050	0.050	0.050	0.050	0.050
	Sn		0.010	0.010	0.010	0.010	0.010
	Ca		0.010	0.010	0.010	0.010	0.010
	Al		0.015	0.015	0.015	0.015	0.015
	N		0.250	0.200	0.250	0.250	0.250
	O	1 Level	0.350	0.350	0.350	0.350	0.350
		2 Level	0.250	0.250	0.250	0.250	0.250
		3 Level	0.200	0.200	0.20	0.200	0.200
	Ti		0.200	0.300	0.30	0.300	0.300
	W		0.200	0.350	0.35	0.350	0.350
	Cr		0.100	0.100	0.100	0.100	0.100
Fsss (μm)	1 Level		1.0~1.2				
	2 Level		1.2~1.5				
	3 Level		1.5~3.5				

Packing: Inner double plastic bags, outer steel drum, 25kg or 50kg net weight each drum.

Vanadium carbide

Grade: FXVC-01, FVC-1, FVC-2
Appearance: Grey powder

Grade		FXVC-01	FVC-1	FVC-2
Main content ,%		≥99.4	--	--
Chemical composition %	T.C	17.5~18.0	17.7~18.5	16.0~16.9
	F.C	≤1.50	≤1.25	≤0.50
	Fe	≤0.10	≤0.15	≤0.10
	Ca	≤0.05	≤0.05	≤0.05
	Al	≤0.02	≤0.02	≤0.02
	Si	≤0.15	≤0.20	≤0.20
	Na	≤0.01	≤0.01	≤0.01
	O	≤1.00	≤0.40	≤0.35
	N	≤0.30	≤0.30	≤0.35
Fsss (μm)		≤1.5	1.5~4.0	

Packing: Inner double plastic bags, outer steel drum, 25kg or 50kg net weight each drum.

Chromium carbide

Grade: FXCr_3C_2-01, FCr_3C_2-1
Appearance: Grey powder

Grade		FXCr_3C_2-01	FCr_3C_2-1
Chemical composition %	T.C	12.8~13.4	12.8~13.4
	F.C	--	≤0.4
	O	≤1.00	≤0.35
	N	≤0.10	≤0.15
	Fe	≤0.15	≤0.10
	Ca	≤0.02	≤0.10
	Si	≤0.05	≤0.08
	Mo	≤0.01	≤0.15
	Na	≤0.01	--
	Al	≤0.02	--
Fsss (μm)		≤2.0	2.0~5.0

Packing: Inner double plastic bags, outer steel drum, 25kg or 50kg net weight each drum.

Titanium carbide

Grade: FTiC-1, FTiC-2
Appearance: Dark grey powder

Grade		FTiC-1	FTiC-2
Impurity content,%,max	T.C	19.0~19.9	19.0~19.9
	F.C	≤0.300	≤0.500
	O	≤0.350	≤1.000
	N	≤0.350	≤0.400
	Fe	≤0.100	≤0.100
	Al	≤0.015	≤0.020
	Si	≤0.080	≤0.080
	K	<0.005	<0.005
	Na	<0.005	<0.005
Fsss (μm)		2~5	1.0~6.0

Packing: Inner double plastic bags, outer steel drum, 25kg or 50kg net weight each drum.

How to find us

Zhuzhou Cemented Carbide Works, USA Inc.

4651 Platt Lane, Ann Arbor, MI. 48108

Tel: 734 302 0125

Fax: 734 302 0126

Web Site: http://www.zccamerica.com

E-mail: salesdepartment@zccamerica.com