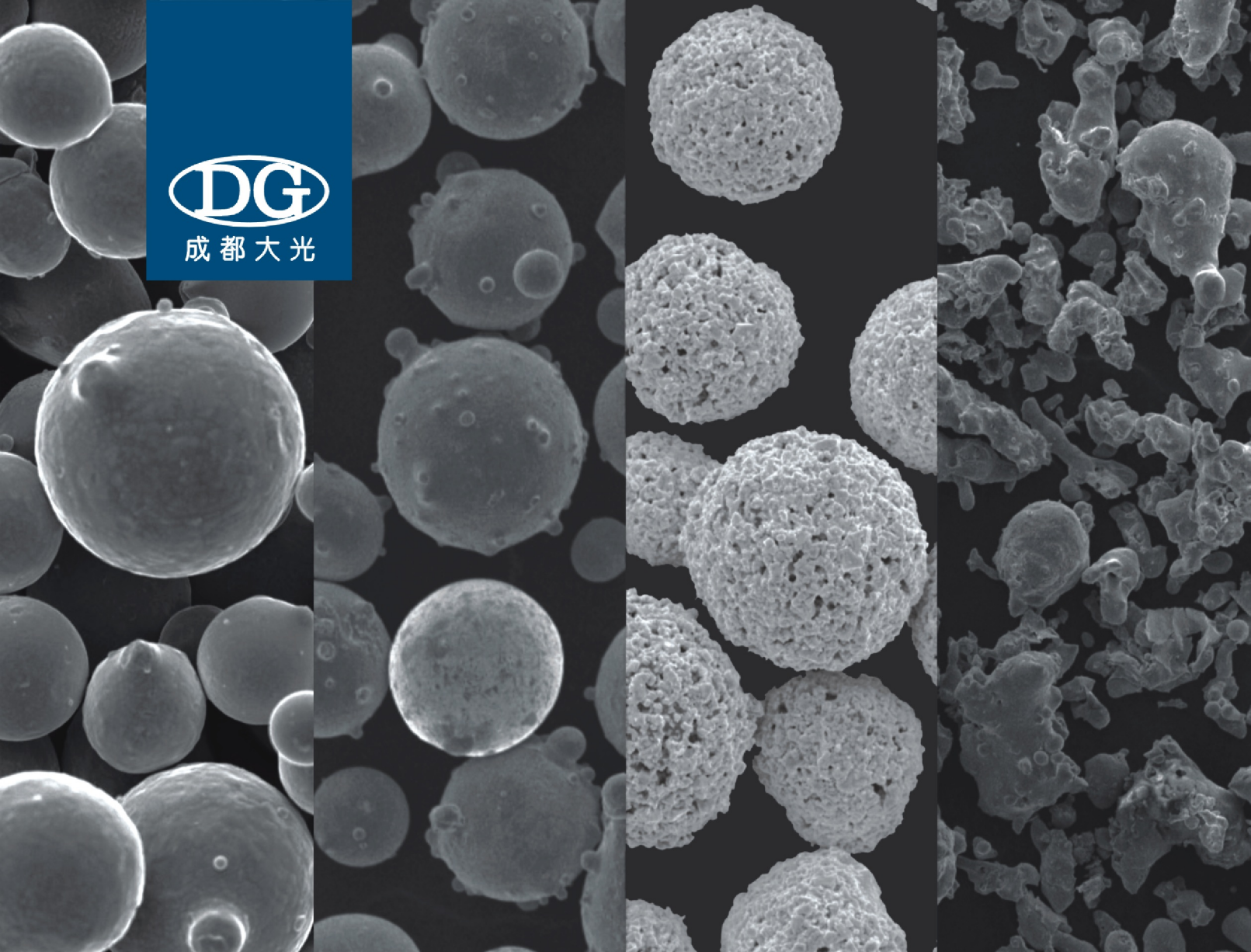




成都大光热喷涂材料有限公司 (CHENGDU DA GUANG THERMAL SPRAYING MATERIAL CO., LTD)

成都大光新材料有限公司 (CHENGDU DA GUANG NEW MATERIALS CO., LTD)

成都大光热喷涂材料 ——产品手册

CHENGDU DA GUANG THERMAL SPRAYING MATERIAL
PRODUCT MANUAL

始于1996年 Established in 1996



成都大光新材料占地面积约30000平方米

Chengdu Daguang New Materials covers an area of approximately 30000 square meters

CATALOG

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特种镍合金粉（气雾化，水雾化） Special nickel-based alloy powders （Gas atomization, Water atomization）



四川·成都
Sichuan Chengdu

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01 ABOUT US 关于我们

成都大光热喷涂材料有限公司创立于 1996 年，是专业的热喷涂粉末生产企业，目前年产值 2 亿元，公司通过了国际 ISO9001 认证和高新技术企业，在成都有龙泉和新都两个生产基地，拥有粉末生产线 8 条，建立了化学成分分析、金相分析以及粉体性能检测实验室，建成了包括等离子喷涂，超音速火焰喷涂，喷涂在线监测等新型喷涂工艺实验室；公司具有先进的团聚，水雾化，气雾化生产线，专业生产，销售镍基，钴基，铁基及碳化物类粉末，产品服务于钢铁，石油，化工，汽车，机械，印刷以及新能源，增材制造等各个领域的 1000 多家客户，目前公司具有年产各类粉末 5000 吨以上的能力。



Chengdu Daguang Thermal Spraying Materials Co., Ltd. was founded in 1996, a professional thermal spraying powder production enterprise, with a current output value of 200 million yuan. The company is a high-tech enterprise and has passed the interational ISO9001 certification. The company has two production bases in Chengdu Longquan and Xindu, With 8 powder production lines. The company has established laboratories for chemical composition analysis, metallographic analysis, and powder performance testing. It has also built an experimental laboratory for new spray coating processes including plasma spraying, high-velocity oxy-fuel spraying, and spray coating online monitoring. The company has advanced agglomeration, water atomization, and gas atomization production lines, specializing in the production and sales of nickel-based, cobalt-based, iron-based, carbide-based, and metal-ceramic powders. The products serve over 1000 clients in various fields such as steel, petroleum, chemical, automotive, machinery, printing, and new energy, as well as additive manufacturing. Currently, the company has the capacity to produce 5000 tons of various powders annually.

01 OUR PRODUCTION EQUIPMENT 我们的生产装备



公司在成都有龙泉和新都两个生产基地，拥有最先进的雾化和团聚烧结粉末生产线 8 条，取得多项专利证书，2005 年获得高新技术企业认证，持续通过质量体系认证。

The company has two production bases in Chengdu Longquan and Xindu, has 8 most advanced atomization and agglomeration sintering powder production lines, has obtained a number of patent certificates, obtained high-tech enterprise certification in 2005, and continues to pass the quality system certification.

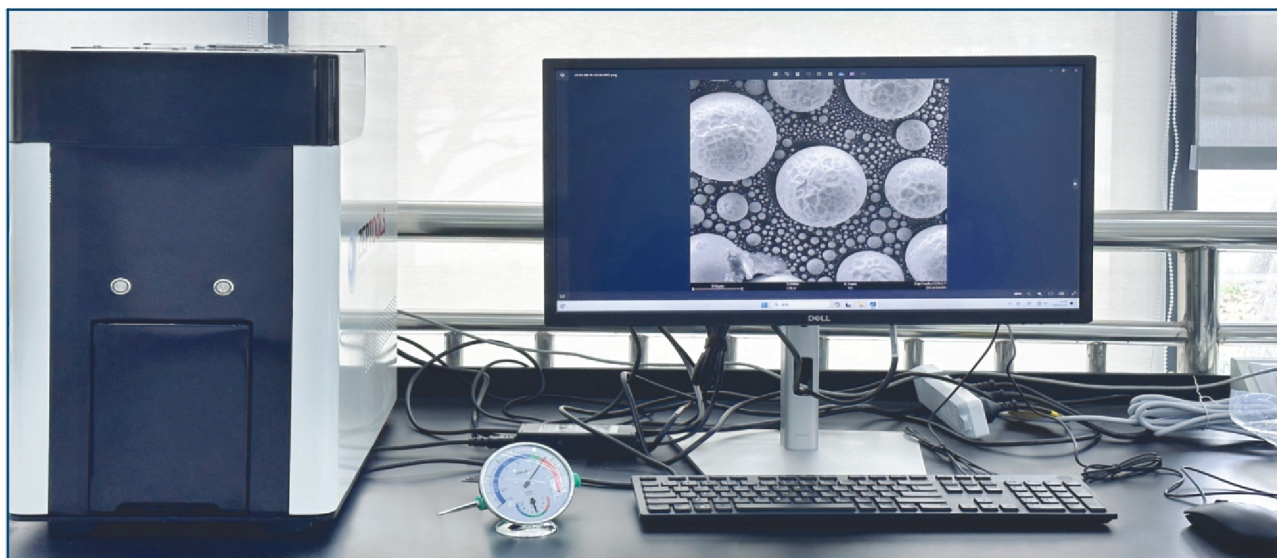


01 OUR QUALITY MANAGEMENT 我们的质量把控

公司从 1996 年成立起，始终注重产品品质，靠稳定的产品质量及精益求精的工匠精神，得以发展到今天的规模，为了给客户呈现更完美的产品，公司在引入先进生产设备和质量管理体系的基础上，又全面升级了粉体检测和涂层检测实验室，使产品品质管控有了更可靠的保障，能够给客户提供最好的产品体验。

Since its establishment in 1996, the company has always paid attention to product quality, relying on stable product quality and craftsmanship spirit of excellence, to develop to today's scale, in order to present customers with more perfect products, the company has introduced advanced production equipment and quality management system on the basis of a comprehensive upgrade of powder testing and coating testing laboratory, so that product quality control has a more reliable guarantee, can provide customers with the best product experience.





02 OUR PRODUCTS 我们的产品

镍基 Nickel-based

镍基自熔合金粉

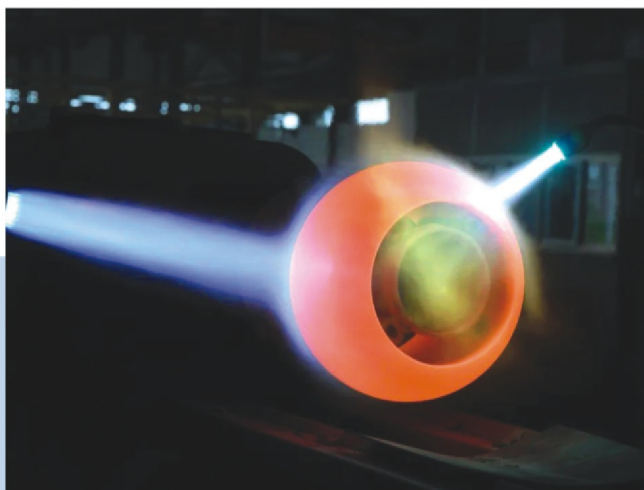
所谓自熔性合金，就是指含硼和硅等脱氧元素且熔点低，在加热熔化过程中，合金的成份能还原自身及基材的氧化物，形成低熔点的硼硅酸盐渣覆盖于表面，防止合金的氧化并改善润湿性能，使合金与基材得到良好的冶金结合的合金材料。自熔合金的焊层与基材的结合强度一般为 $30-50\text{kgf/mm}^2$ ($300-500\text{Mpa}$)。根据不同的化学组成，可以得到HRC15-65的不同硬度的焊层。喷焊工艺主要适合于冲击负载较大，热疲劳环境及对工件变形要求不严格的地方。

镍基粉末主要是镍铬硼硅合金和镍硼硅合金。此类合金的共同特点是熔点低、自熔性好，具有良好的耐磨、耐蚀、耐热和抗氧化等综合性能，是使用最早和最广泛的自熔性合金。

Nickel-based Powders

Self-fluxing alloy is one kind of alloy materials, which contains such as Boron and Silicon deoxidized contents with low melting point. During the heating and melting process, the composition of the alloys can restore the oxide substrates in itself and the base materials to form a low melting point borosilicate to cover its surface. The cover can prevent alloys from oxidation and improve its wetting properties, and a good metallurgical bonding of alloys and base materials achieved. Usually the adhesive strength of self-fluxing alloys among its welding layer and base materials is $30-50\text{kgf/mm}^2$ ($300-500\text{Mpa}$). Different chemical composition, the hardness for welding layer of HRC15-65 is also different. Spray-welding process is mainly utilized in larger impact load, thermal fatigue environment.

Nickel-based powders are main nickel chromium boron silicon alloys and nickel boron silicon alloys. The common features are low melting point, fine self fluxing, good wear, corrosion and heat resistances, and high antioxidation property. Ni-based powders now are the earliest and most widely used in alloys materials.



镍基自熔合金粉（气雾化，水雾化） Nickel-based self-fusing alloy powder（Gas atomization, Water atomization）

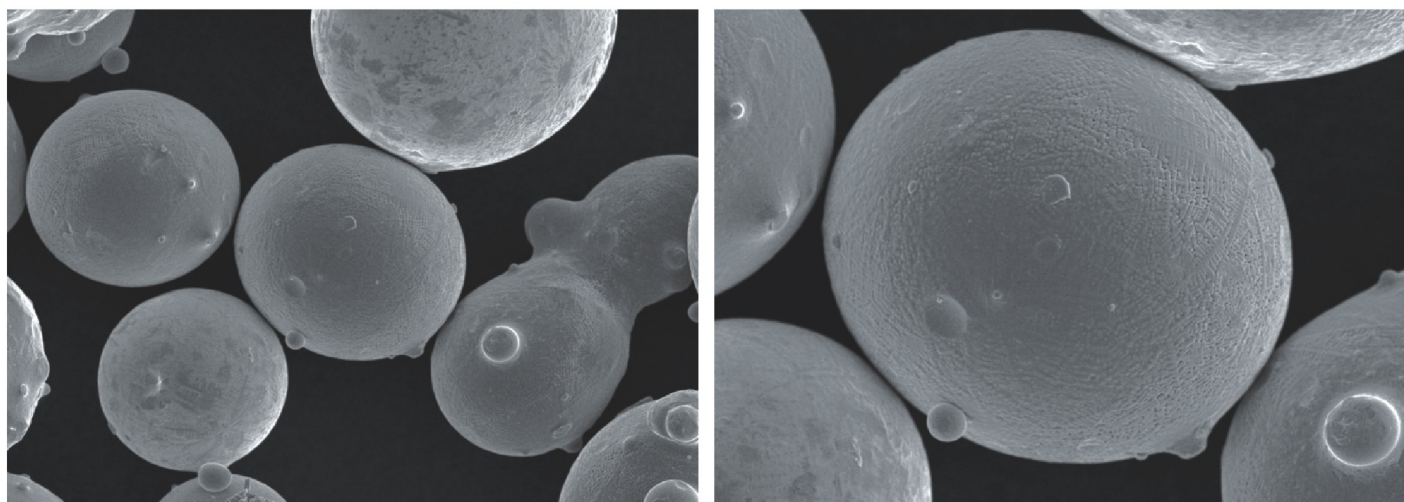
序号	牌号 name of article	HRC硬度 hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG.Ni15	15	C0.1,Si2,B1.2,Cr0.5,Fe≤5,Ni余量（Bal）	为修复铸件开发，如：模具/气缸/导轨等 Mould, air cylinder and guild rail repair	火焰/等离子 激光/超音速 FLS/ PLS / Laser HVOF,HVOF
2	DG.Ni17	17	C0.1,Si2,B1,Cr1,Fe≤5, Ni余量（Bal）		
3	DG.Ni20A	20	C0.1,Si3,B1,Cr1,Fe ≤6.Ni余量（Bal）		
4	DG.Ni20B	20	C0.1,Si2,B1,Cr5,Fe≤15,Ni余量（Bal）		
5	DG.Ni22AA	22	Co.1,Si3,B1,Cr1,Fe≤0.1,Ni余量（Bal）		
6	DG.Ni25A	25	C0.1,Si3,B1,Cr1,Fe≤6,Ni余量（Bal）	铸铁，钢零部件及玻璃模具的修复 Cast iron and steel parts and glass moulds repair	火焰/等离子 激光/超音速 FLS/ PLS / Laser HVOF,HVOF
7	DG.Ni25B	25	C0.1,Si3,B1,Cr5,Fe ≤15,Ni余量（Bal）		
8	DG.Ni35A	35	C0.3,Si3,B2.2,Cr8,Fe ≤5,Ni余量（Bal）	轴类、冲头、气门、齿轮面等修复 Axis, punch, valve and face of gearrepair	火焰/等离子 激光/超音速 FLS/ PLS / Laser HVOF,HVOF
9	DG.Ni35	35	C0.3,Si3,B2.2,Cr8,Fe ≤15,Ni余量（Bal）		
10	DG.Ni40A	40	CO.3,S13,B2.5,Cr10,Fe≤5,Ni余量（Bal）	冲头、阀门、气门、齿轮面等修复 punch, valve surface and face of gear repair	
11	DG.Ni45A	45	CO.4,SiB,B2.8,Cr12,Fe≤5,Ni余量（Bal）	密封面、气门、阀门、活塞、转子等的 修复 Sealing surface, valve, piston and rotor repair	
12	DG.Ni45	45	C0.4,Si3,B2.8,Cr12,Fe≤15,Ni余量（Bal）		
13	DG.Ni50A	50	C0.5,Si3,B3, Cr12,Fe≤5,Ni余量（Bal）	阀门，密封面，石油柱塞，轴类等的修复 Valve, sealing surface, oil plunger and shafts repair	火焰/等离子 激光/超音速 FLS/ PLS / Laser HVOF,HVOF
14	DG.Ni50	50	C0.5,S13,B3,Cr12,Fe ≤15,Ni余量（Bal）		
15	DG.Ni55A	55	C0.8,Si4,B3,Cr14,Fe ≤5, Ni余量（Bal）		
16	DG.Ni55	55	C0:8,Si4,B3,Cr14,Fe ≤15,Ni余量CBal）		
17	DG. Ni60AA	60	C0.9,Si4,B3.2,Cr16,Fe≤2.5,Ni余量（Bal）	拉丝滚筒，凸轮，柱塞，输送辊等的修复 Drawing roller, cam, plunger, and conve-ying roller repair	火焰/等离子 激光/超音速 FLS/ PLS / Laser HVOF,HVOF
18	DG. Ni60A	60	C0.9,Si4,B3.2,Cr16,Fe ≤5.Ni余量（Bal）		
19	DG.Ni60B	60	C0.9,Si4,B3.2,Cr16,Fe≤15,Ni余量（Bal）		
20	DG.Ni60CuMo	60	C0.9,Si4,B4,Cr16,Cu3.2,Mo3,Fe ≤5,Ni余量（Bal）	修复阀门，叶轮，柱塞，气门等 Valve, impeller, plunger and valve repair	
21	DG. Ni60CuMoW	60	C0.9,Si4,B4,Cr16,Cu3.2,Mo3, W3,Fe≤5,Ni余量（Bal）		
22	DG. Ni65	65	C0.9,S14,B4,Cr16,W3,Fe≤5,Ni余量（Bal）	修复拉丝滚筒，凸轮，柱塞，气门 Drawing roller, cam, plunger, and valve repair	



序号	牌号 name of article	HRC硬度 hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG.Ni20AAA	20	C0.03, B0.7, Cr4.5, Si2.0, Fe0.1, Ni (Bal)	适用于玻璃模具及其他模具焊层。硬度适中，延展性好，制备好的焊层精磨后，无针眼，气泡，裂纹等缺陷。 It is suitable for glass molds and other molds Preparation of weld layer, moderate hardness, good ductility, After the prepared weld layer is finely ground, there is none Needle holes, bubbles, cracks and other deficiencies Sink.	氧乙炔火焰焊 Oxyacetylene flame welding
2	DG.Ni220M1	20-26	C0.03, B1.0, Cr4.9, Si3.0, Fe2.4, Mn0.2, Ni (Bal)		等离子PTA
3	DG.Ni22AAA	22	C0.2, B1.5, Cr0.1, Si2.8, Fe0.5, Mn0.5, Ni (Bal)		氧乙炔火焰焊 Oxyacetylene flame welding
4	DG.Ni22M2	22	C0.05, B0.8, Cr3.0, Si2.3, Ni (Bal)		等离子PTA
5	DG.Ni22S	22-26	C<0.1, B1.3, Cr≤0.05, Si2.8, Fe≤1.0, Ni (Bal)		激光熔覆Laser cladding
6	DG.Ni23L	22-26	C<0.05, B1.5, Cr≤1.0, Si3.1, Fe≤1.0, Ni (Bal)		激光熔覆Laser cladding
7	DG.Ni30AAA	30	C0.15, B1.4, Cr2.5, Si2.6, Fe≤1.0, Mn0.3, Ni (Bal)		氧乙炔火焰焊 Oxyacetylene flame welding
8	DG.Ni31M	30	C0.05, B1.4, Cr3.5, Si3.1, Fe≤3.0, Mn0.4, Ni (Bal)		氧乙炔火焰焊
9	DG.Ni35AAA	35	C0.2, B1.4, Si3.0, Cr4.0, Fe1.4, Mn0.1, Mo0.1, Ni (Bal)		氧乙炔火焰焊 Oxyacetylene flame welding
10	DG.Ni37AAA	37	C0.15, B1.4, Cr4.5, Si3.2, Fe≤1.0, Ni (Bal)		氧乙炔火焰焊 Oxyacetylene flame welding
11	DG.Ni40AAA	40	C0.3, B1.4, Cr7.5, Si3.2, Fe≤1.0, Mn0.1, Ni (Bal)		氧乙炔火焰焊 Oxyacetylene flame welding
12	DG.Ni43AAA	43	C0.2, B1.4, Cr5.0, Si3.5, Fe≤1.0, Mn0.5, Mn3.0, Ni (Bal)		氧乙炔火焰焊 Oxyacetylene flame welding
13	DG.Ni45S	45	C0.3, B1.9, Si3.5, Cr9, Fe<4		激光熔覆Laser cladding

镍基碳化钨合金粉（气雾化，水雾化） Nickel-based tungsten carbide alloy powder（Gas atomization, Water atomization）

序号	牌号 name of article	HRC硬度 hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG.Ni6005WC	≥60	95%DG.Ni60A+5%WC包覆（covered）	在Ni60A的基础上，添加了碳化钨颗粒，使Ni60A包覆了碳化钨，大大增加了碳化钨在工件上的沉积率，常用于各种：螺杆，农机刀片，耐磨螺旋，风机叶片，截齿，等需要耐磨的工件上。	火焰/等离子/激光/超音速 FLS/ PLS/ Laser/ HVOF,HVOF
2	DG.Ni6010WC	≥60	90%DG.Ni60A+10%WC包覆（covered）		
3	DG.Ni6015WC	≥60	85%DG.Ni60A+15%WC包覆（covered）		
4	DG.Ni6020WC	≥60	80%DG.Ni60A+20%WC包覆（covered）		
5	DG.Ni6025WC	≥60	75%DG.Ni60A+25%WC包覆（covered）		
6	DG.Ni6030WC	≥60	70%DG.Ni60A+30%WC包覆（covered）		
7	DG.Ni6035WC	≥60	65%DG.Ni60A+35%WC包覆（covered）		
8	DG.Ni6040WC	≥60	60%DG.Ni60A+40%WC包覆（covered）		等离子，激光，超音速喷涂 PLS / Laser/HVOF,HVOF
9	DG.Ni6045WC	≥60	55%DG.Ni60A+45%WC包覆（covered）		
10	DG.Ni60WC50	≥60	50%DG.Ni60A+50%WC机械混合（mixed）		
11	DG.Ni60WC55	≥60	45%DG.Ni60A+50%WC机械混合（mixed）	在Ni60A的基础上，添加了碳化钨颗粒，以机械混合的制作工艺将碳化钨颗粒与Ni60A混合，机械混合的碳化钨比例可以做的比包覆的更高，常用于各种：螺杆，农机刀片，耐磨螺旋，风机叶片，截齿等更加需要耐磨的工件。	等离子，激光，超音速喷涂 PLS / Laser/HVOF,HVOF
12	DG.Ni60WC60	≥60	40%DG.Ni60A+60%WC机械混合（mixed）		
13	DG.Ni60WC65	≥60	35%DG.Ni60A+65%WC机械混合（mixed）		
14	DG.Ni60WC70	≥60	30%DG.Ni60A+70%WC机械混合（mixed）		
15	DG.Ni60WC75	≥60	25%DG.Ni60A+75%WC机械混合（mixed）		
16	Ni25+WC （任意比例）	--	任意比例Ni25+任意比例WC机械混合	中、低硬度的镍基合金，机械混合铸造碳化钨，兼具韧性和耐磨性。	等离子，激光熔覆 PLS / Laser
17	Ni35+WC （任意比例）	--	任意比例Ni35+任意比例WC机械混合		
18	Ni45+WC （任意比例）	--	任意比例Ni45+任意比例WC机械混合		
19	Ni55+WC （任意比例）	--	任意比例Ni55+任意比例WC机械混合		



纯镍粉（气雾化，水雾化）Pure nickel powder（Gas atomization, Water atomization）

序号	牌号 name of article	HRC硬度 hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG. Ni-1	/	Ni+Co $\geq$ 99.5, C $\leq$ 0.04, Fe $\leq$ 0.1, Si $\leq$ 0.03, Cu $<$ 0.05, S $<$ 0.003, P $<$ 0.002, 氢损 $<$ 0.3, Co $<$ 0.1	粉末冶金添加剂或其他喷涂使用 The powder metallurgy additive	压制烧结/等离子/超音速 Pressed and sintered PLS/HVAF, HVOF
2	DG. Ni-2	/	Ni+Co $\geq$ 99.2, C $<$ 0.04, Fe $\leq$ 0.25, Si=0.1, Cu $<$ 0.08, S $<$ 0.02, P $<$ 0.01, 氢损 $<$ 0.35, Co $<$ 0.2		

镍基打底粉（气雾化，水雾化）Nickel-based primer（Gas atomization, Water atomization）

序号	牌号 name of article	HRC硬度 hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG. Ni20Cr	/	Ni80, Cr20	抗高温氧化涂层，WC涂层的粘结层 High-temperature oxidation resistant coating, Bond layer of WC coating	火焰/等离子 激光/超音速 FLS/PLS Laser/HVAF, HVOF
2	DG. NiCrAl	/	Cr20, Al5, Fe $<$ 1, Ni余量（Bal）	陶瓷粉过渡层，高温抗氧化层 Ceramic powder transition layer, high temperature anti-oxidation layer	
3	DG. NiCrAlY	/	Cr20, Al5, Y0.5, Co0.4, Fe $<$ 1, Ni余量（Bal）	氧化锆等陶瓷的过渡层 Ceramic powders such as Zirconia transition layer	
4	DG. NiCrCoAlY	/	Cr20, Co6, Al5, Y0.5, Co0.4, Fe $<$ 1, Ni余量（Bal）	高温打底层，高温抗氧化涂层 High temperature bond coating, high temperature oxidation resistant coating	

特种镍合金粉（气雾化，水雾化）Special nickel-based alloy powders（Gas atomization, Water atomization）

序号	牌号 name of article	HRC硬度 hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG.Ni625	/	C0.1,Cr22,Mo8,Nb3.5,Fe<5, Ni余量 (Bal)	优秀的抗腐蚀能力，类似Inconel625合金 Fine corrosion resistance, similar with In-conel 625"	等离子/激光/超音速 PLS/Laser/HVAF, HVOF
2	Ni625H	> 50	C0.3,B3,Si4,Cr22,Mo8,Nb3.5, Fe<5,Ni余量 (Bal)	兼具抗腐蚀和耐磨性能。	火焰/等离子/激光/超音速 FLS/PLS/Laser/HVAF, HVOF
3	DG.C276	/	C≤0.01,Si≤0.08,Fe4.5,Cr16.0,Mo16.5, Mn0.8,Co≤2.5,W3.5,Ni余量 (Bal)	哈氏合金，具有优异的抗腐蚀能力 Hastelloy, which has excellent corrosion resistance	等离子/激光/超音速 PLS/Laser/HVAF, HVOF
4	DG.Ni718	/	Cr19,Fe18,Mo3,Nb5,Al0.5,Ti0.8, Ni余量 (Bal)	优异的抗高温氧化性能，高低温环境下均有很好的耐应力腐蚀开裂，和抗点蚀能力。 Excellent resistance to high-temperature oxidation, good resistance to stress corrosion cracking and corrosion resistance in high and low temperature environments.	火焰/等离子/超音速 FLS/PLS/HVAF, HVOF
5	DG.蒙乃尔K400	/	Cu30,Fe<2,Mn<1.5,Ni余量 (Bal)	在海水，碱性介质及各种酸性介质中，都有很好的耐蚀性。 It has good corrosion resistance in seawater alkaline medium and various acidic media.	
6	DG.蒙乃尔K500	/	Cu30,Fe<2,Mn<1.5,Al2.5,Ti0.5, Ni余量 (Bal)	在海水，碱性介质及各种酸性介质中都有很好的耐蚀性，比K400具有更高的强度。 On the basis of good corrosion resistance in seawater alkaline media and various acidic media, it has higher strength than K400.	
7	DG.Ni30Cr	/	Ni70,Cr30	耐高温腐蚀，用于高温设备，储罐等，亦用于靶材行业喷涂。 High temperature corrosion resistance, used in high temperature equipment, storage tanks, etc., also used in target industry spraying.	等离子/超音速 PLS/HVAF,HVOF
8	DG.Ni40Cr	/	Ni60,Cr40		
9	DG.Ni50Cr	/	Ni50,Cr50		
10	DG.NiFe合金	/	Fe10-50%,Ni余量 (Bal)	软磁材料 Soft magnetic materials	等离子/超音速 PLS/HVAF,HVOF

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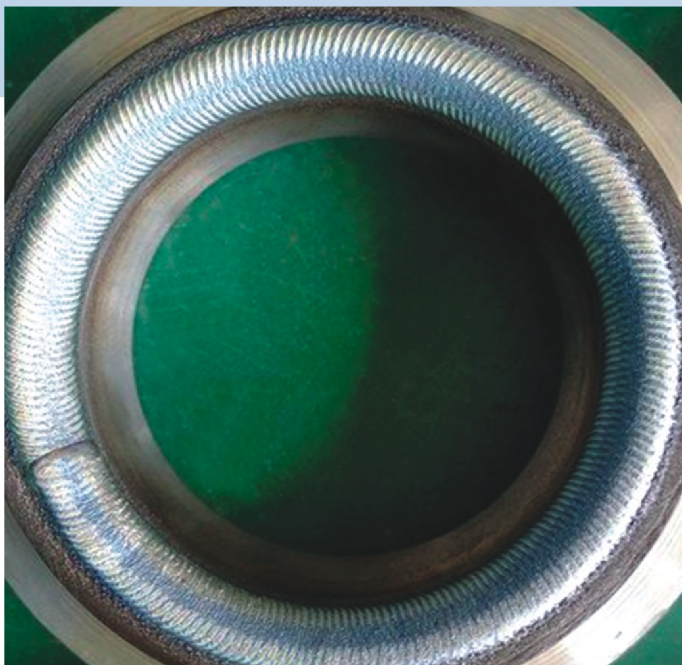
钴基 Cobalt-based

钴基粉

通常是在钴铬钨合金的基础上发展的，较镍基有更好的热强性和高温红硬性，同时也具有良好的耐蚀和耐磨性，但由于金属钴的价格较贵，应用受到一定的限制。

Cobalt-based powders

cobalt chromium tungsten alloys. Compared with Nickel-based powders, Co-based powders have higher heat-resisting strength and high temperature red hardness. But its application is restricted in some areas because of the price of Cobalt metal is expensive.



钴基合金粉（气雾化）Cobalt-based alloy powders（gas atomization）

序号	牌号 name of article	HRC硬度 hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG.Co1	—	C2.5, Cr30.0, Fe2.5, Si0.7, W12.0, Co余量 (Bal)	用于气门, 阀座, 叶片, 等零件的修复和预保护 It is used for the repair and pre-protection of valves, valve seats, blades, and other parts.	等离子堆焊, 超音速 PTA/HVAF,HVOF
2	DG.Co6	37-43	C1.2, Cr29.0, Fe2.5, Ni2.5, Si1.1, W4, Co余量 (Bal)		
3	DG.Co12	40-50	C1.5, Cr30.5, Fe2.5, Ni2.5, Si1.5, W8, Co余量 (Bal)	用于高温高压阀门, 锯齿, 螺杆等 Used for high temperature and high pressure valves, serrations, screws, etc.	
4	DG.Co190	≥57	C3.3, Cr26, Si0.8, W14, Co余量 (Bal)	用于石油行业的各类钻具 All kinds of drilling tools used in the petroleum industry.	
5	DG.Co19	48	C0.19, Cr31.0, B1.0, Si1.0, W10.5, Fe3.0, Ni3.0, Mn1.05, Co余量 (Bal)	热冲压模、挤压模、锯齿 Hot stamping dies, extrusion dies, serrations.	
6	DG.Co20	58	C2.45, Cr32.5, Si1.0, W17.5, Fe3.0, Mo1.0, Ni3.0, Mn0.5, Co余量 (Bal)	轴承套筒、耐磨板 bearing sleeve, wear plate	
7	DG.Co21	25-30	C.025, Cr27.5, Fe2.0, Ni2.5, Si2, W0.15, Mo5.5, Mn1.0, Co余量 (Bal)	涡轮机叶片, 各种阀门, 阀座等 Turbine blades, various valves, valve seats, etc.	
8	DG.Co25	<20	C.01, Cr20.0, Fe3.0, Ni10.0, Si1.0, W15.0, Mo1.0, Mn1.5, Co余量 (Bal)		
9	DG.Co158	38-42	C0.75, Cr26.0, Fe3.0, Ni3.0, Si1.9, B0.7, W5.5, Mo0.5, Mn0.1, Co余量 (Bal)	耐热气腐蚀, 高温工作环境中的耐磨工件, 耐冲击 Resistant to hot gas corrosion, wear-resistant workpieces in high-temperature working environments, impact resistant	
10	DG.Co158V	45-50	C1.0, Cr30.0, Fe4.0, Ni3.0, Si1.0, B0.7, W8.0, Mo0.5, Mn0.1, Co余量 (Bal)		
11	DG.Co-SF6	45	C0.7, Cr19.0, Fe3.0, Ni13.0, Si2.3, B1.7, W7.5, Mn1.0, Co余量 (Bal)	发动机气门、高温高压阀门 engine valve, high temeperature & press valves	
12	DG.Co-SF12	50	C1.0, Cr19.0, Fe3.0, Ni13.0, Si2.8, B1.8, W9.0, Mn1.0, Co余量 (Bal)	高温高压阀门、热剪切刀刃等 high temeperature & pressure valves, hot shears, etc.	
13	DG.Co-SF20M	60	C1.0, Cr19.0, Fe2.0, Ni14.0, Si3.0, B3.0, W15.0, Mn1.0, Co余量 (Bal)	轴承, 套筒 bearing sleeve	
14	DG.Co-FH	40	C1.0, Cr28.0, Fe3.0, Ni22.0, Si1.2, W12.0, Mo0.8, Mn0.5, Co余量 (Bal)	内燃机进排气阀 engine inlet and exhaust valve	
15	DG.CoT400	53	C<0.08, Cr8.5, Fe<2.0, Ni1.5, Si2.6, Mo28.5, Co余量 (Bal)	用于高温强腐蚀介质中的: 阀门, 挤塑螺杆 Used in high-temperature and strongly corrosive media: valves, extrusion screws.	
16	DG.CoT800	55	C<0.08, Cr18.0, Fe<2.0, Ni1.0, Si3.4, Mo28.5, Co余量 (Bal)		
17	DG.CoT900	—	C<0.08, Cr18.0, Fe<3.0, Ni16.0, Si2.6, Mo23.0, Co余量 (Bal)	密封圈, 阀门, 阀座 Seals, valves, seats.	

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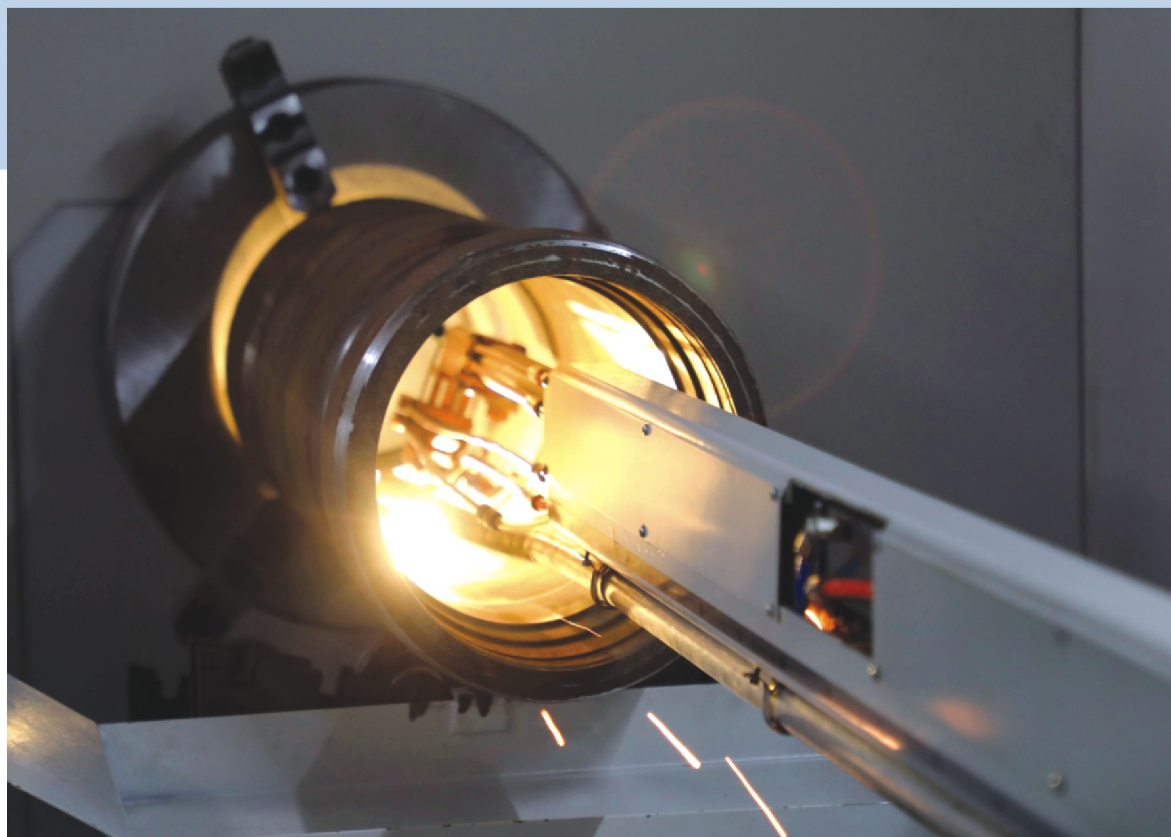
铁基 Iron-based

铁基粉

比钴基、镍基自熔性合金的使用更为广泛。其具有一定的耐磨、耐热性能，虽然喷焊性和自熔性不如镍基和钴基喷焊合金，操作也较难掌握，但是粉末价格低是其主要优势。

Iron-based Powders

Compared with Cobalt-based and Nickel-based self-flux alloy powders, Iron-based powders have a wider using range, good wear and heat resistance and more advantage price. But its spray welding and self-flux properties are lower, and it's also very difficult to operate.



铁基自熔合金粉（气雾化，水雾化）Iron-based self-fusing alloy powder（Gas atomization, Water atomization）

序号	牌号 name of article	HRC硬度 hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG.Fe30	30	C0.2,Si3,B1.5,Cr6,Ni28,Fe余量（Bal）	抗疲劳优良，用于承受反复冲击的硬度不高的场合 With excellent anti-fatigue performance, it isutilized in repeated impact can be bear and hardness is not high occasions	等离子，超音速 PTA/HVAF,HVOF
2	DG.Fe45	45	Co.6,Si3,B2, Cr12,Ni20,W3,Fe余量（Bal）	用于阀门，密封面及机械的易磨损部位的修复 Valve, sealing surface and the abrading sections repair	
3	DG.Fe55	55	C1.2,Si3.5,B2.6,Cr22,Ni15,Fe余量（Bal）	修复耙片，锄齿，石油钻杆接头，刮板轴 Blade, shovel tooth, drill pipe joint and scraper shaft repair"	
4	DG.Fe60	60	C1.5,Si3.5,B3,Cr35,Ni15,Fe余量（Bal）		
5	DG.Fe60-D	60	C4.5,B1.5,Si1.5,Cr37,Ni3,Fe余量（Bal）		
6	DG.Fe253	35	C1.8, Cr28, Ni16, Mn0.7, Mo4.5, Si1.3, Fe余量（Bal）	用于发动机气门	等离子 PTA
7	DG.Fe253H	40	C2.0, Cr30, Ni16, Mn0.9, Mo7.0, Si1.6, Fe余量（Bal）		
8	DG.ZJ55T	55-60	—	兼具抗磨抗裂性能，摩擦系数低：专为石油钻杆开发 With anti-wear and anti-cracking properties and low friction coefficient, It is specifcally used in developing oil drill pipe	等离子，超音速 PTA/HVAF,HVOF
9	DG.Fe-6	>50	C0.15,B0.74,Si0.87,Ni3.47,Mo1.35,Mn0.85,W0.35,Cr15.8,Fe余量	专门为激光熔覆开发的铁基合金粉末，激光熔覆不开裂，焊面光洁。 Iron-based alloy powder specially developed for laser cladding, laser cladding does not crack, and the welding surface is smooth and clean.	激光熔覆 Laser cladding
10	DG.Fe-7	>55	C0.18,B0.84,Si0.9,Ni3.25,Mo1.34,Mn0.54,W0.54,Cr17.1,Fe余量		

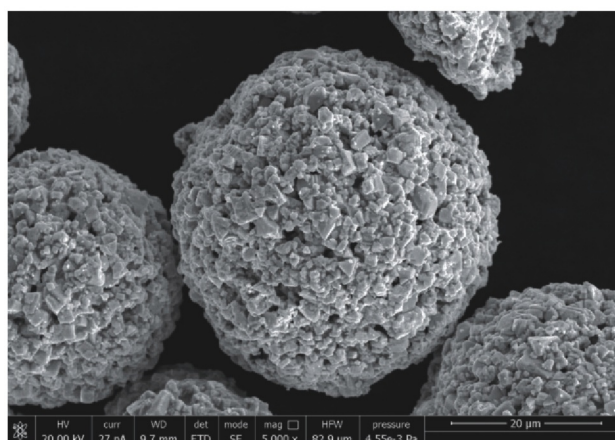
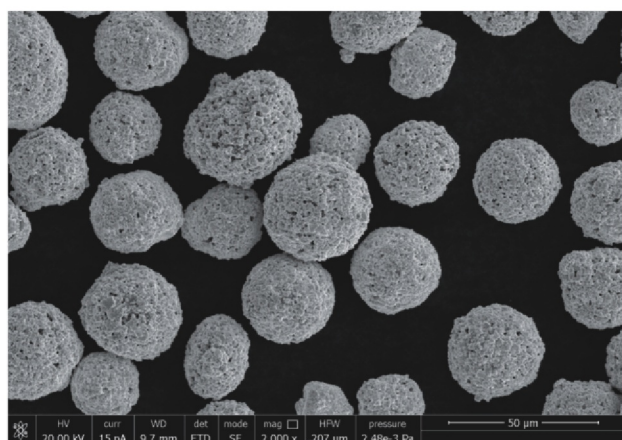
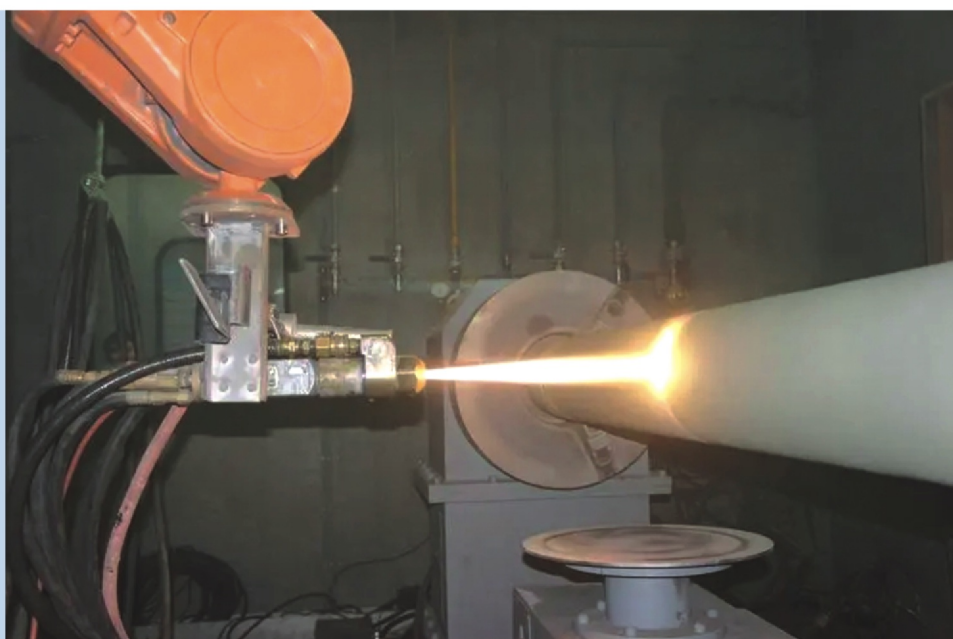
不锈钢粉（气雾化，水雾化）Stainless steel powder（Gas atomization, Water atomization）

序号	牌号 name of article	HRC硬度 hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG.Fe304	—	C<0.08,Si<2,Ni10,Mn<2,Cr18,Fe余量 (Bal)	用于抗腐蚀, 气蚀、低温颗粒冲蚀保护, 及补救和维修, 使用温度高达540°C (1000°F) for corrosion, cavitation, low-temperature particle erosion protection and remediationand service, service temperature up to 540°C (1000°F)	超音速喷涂, 等离子激光, 粉末冶金 HVAF,HVOF/PTA Laser /Power metallurgy
2	DG.Fe304L	—	C<0.03,Si<2,Ni10,Mn<2,Cr18,Fe余量 (Bal)		
3	DG.Fe316	—	C<0.08,Si<2,Ni12,Mo<2,Cr17,Fe余量 (Bal)		
4	DG.Fe316L	—	C<0.03,Si<2,Ni12,Mo<2,Cr17,Fe余量 (Bal)		
5	DG.Fe430	—	C0.12,Si0.75,Mn1,P0.04,S0.03,Ni0.6,Cr16,Fe余量 (Bal)		
6	DG.Fe431	—	C0.15-0.25,B<1.0,Si<1.0,Ni1.5-2.5,Mo1.0-2.0,Mn<1.0,Cr15.0-170,Fe余量 (Bal)		
7	DG.Fe309	—	C0.08,Si1,Mn2,S0.03,P0.035,Cr18,Ni10,Fe余量 (Bal)		
8	DG.Fe310s	—	C<0.03,Si<2,Mo0.04,Ni20.5,Mn1.0,Cr24.5, V0.11,Fe余量 (Bal)		
9	DG.Fe2205	—	C<0.03,Ni4.0-7.0,Mo2.0-5.0,Cr20.0-25.0,Fe余量 (Bal)		

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碳化钨 Tungsten carbide



团聚烧结钴碳化钨电镜照片

Electron microscope photograph of agglomerated sintered cobalt tungsten carbide

钴-碳化钨喷涂粉（团聚烧结）Cobalt-tungsten carbide spraying powder（agglomeration sintering）

序号	牌号 name of article	HV硬度 Hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG.WC-Co8	1200	Co8.0,C5.5,W余量（Bal）	致密、坚硬、耐磨涂层 Compact and hard anti-wear coating	等离子喷涂 超音速喷涂 PTA/HVOF/HVAF
2	DG.WC-Co12	1200	Co12.0,C5.2,W余量（Bal）	550℃下极好的抗磨粒磨损能力，增加了抗腐蚀和耐磨性 thas fine abrasive wear performance under 550℃, the anti-corrosion and wear resistance increased	
3	DG.WC-Co17	1200	Co17.0,C4.9,W余量（Bal）	比WC-12Co的Co含量高，提供更好的韧性、冲击强度和延性 High Co contents than WC-12Co, provide better toughness, impact strength and malleability	
4	DG.WC-Co10Cr4	1200	Co9.5,Cr4.0,C5.16,W余量（Bal）	比WC-Co和WC-N抗氧化和腐蚀性能改善 Compared with WC-Co and WC-Ni, its antioxidant and anti-corrosion are improved	

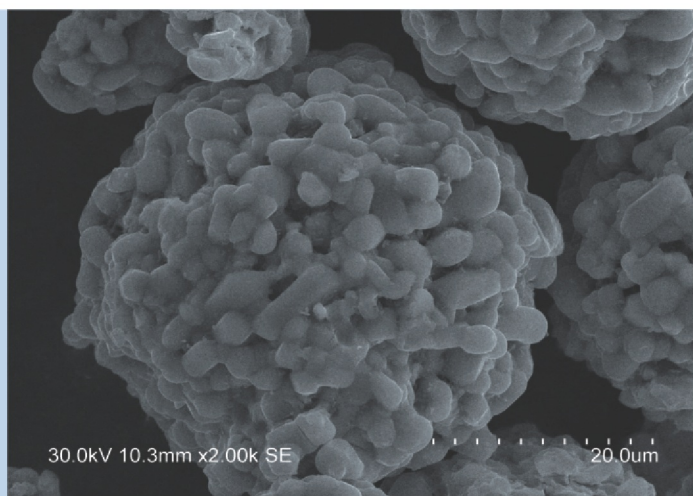
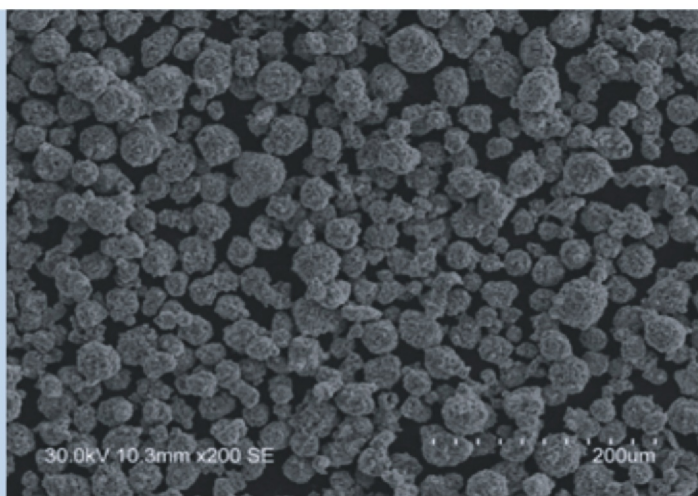
镍-碳化钨喷涂粉（团聚烧结）Nickel-tungsten carbide spraying powder（agglomeration sintering）

序号	牌号 name of article	HV硬度 Hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG.WC-Ni10	1200	Ni10,C5.4,W余量（Bal）	比WC-Co耐蚀性好 It has a better corrosion resistance than WC-Co	等离子喷涂 超音速喷涂 PTA/HVOF/HVAF
2	DG.WC-Ni12	1200	Ni12,C5.2,W余量（Bal）		
3	DG.WC-Ni15	1200	Ni15,C5.0,W余量（Bal）		
4	DG.WC-Ni17	1200	Ni15,C4.9,W余量（Bal）		
5	DG.WC-CrC-7Ni	1200	Cr20.0,Ni7.0,C5.8,W余量（Bal）	比其它碳化钨基材料抗氧化和腐蚀性能优越 It has a better antioxidantand anticorrosion than other WC-based materials	

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碳化铬 Chromium carbide

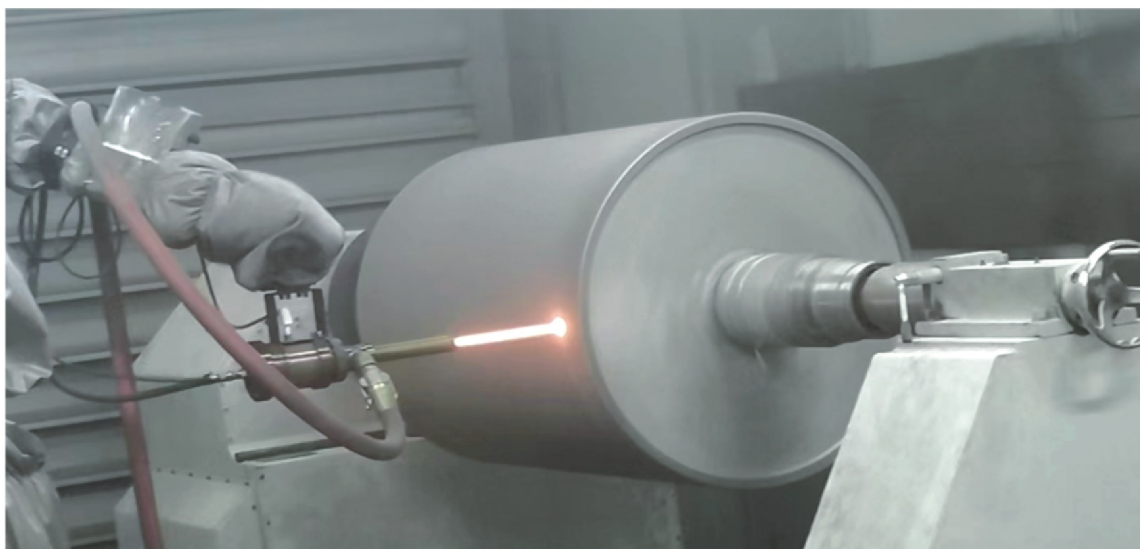
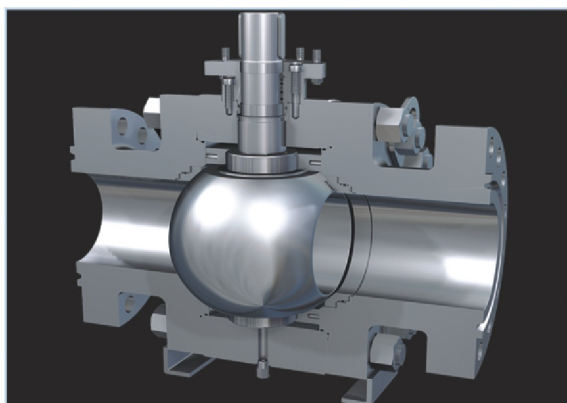
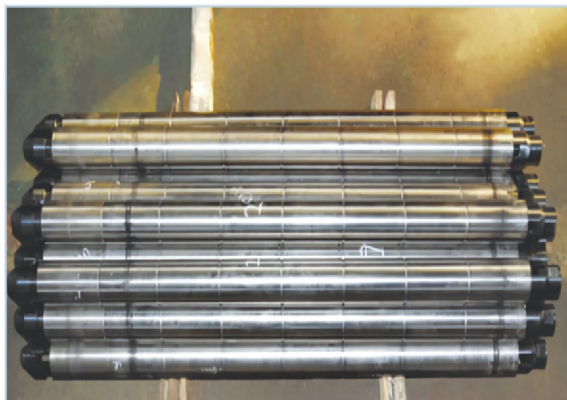


团聚烧结镍铬碳化铬电镜照片

Electron microscopy photos of nickel chromium carbide prepared by agglomeration sintering process

碳化铬喷涂粉（团聚烧结）Chromium carbide spraying powder（agglomeration sintering）

序号	牌号 name of article	HV硬度 Hardness	化学成分 chemical composition	典型用途 Typical uses	使用方法 Processing method
1	DG.Cr3C2-20NiCr	1000	Ni16, C10.6, Cr余量 (Bal)	高温耐磨，高硬度涂层，抗高温氧化温度800摄氏度左右 High temperature wear resistance, high hardness coating, high temperature oxidation resistance temperature of about 800 degrees Celsius	等离子喷涂 超音速喷涂 PTA/HVOF/HVAF
2	DG.Cr3C2-25NiCr	1000	Ni20, C9.9, Cr余量 (Bal)		



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常用硬度换算表 Hardness Conversion Table

维氏硬度HV 荷重(DPH) Vickers Hardness HV Load (DPH)	布氏硬度10mm球 荷重3000kg Brinell Hardness 10mm ball load 3000kg			洛氏硬度 (3R) Rockwell Hardness (3R)				洛氏薄片硬度 (3S) Rockwell Flat Hardness (3S)			肖氏 硬度 HS Shore Hardness HS	抗拉 强度 kg/mm ² Tensile Strength kg/mm ²	维氏硬度 HV 荷重50kg Vickers Hardness HV Load 50kg
	标准 球 Standard Ball	Hult Green球 Hult Green Ball	碳化 钨球 Tungsten Carbide Ball	HRA荷重 60kg金刚石 HRA Load 60kg diamond	HRB荷重 100kg1/6"球 HRB Load 100kg1/6"ball	HRC荷重 150kg金刚石 HRC Load 150kg diamond	HRD荷重 100kg金刚石 RD Load 100kg diamond	15N荷重 15kg 15N Load 15kg	30N荷重 30kg 30N Load 30kg	45N荷重 45kg 45N Load 45kg			
1700	—	—	—	92.5	—	80.5	—	—	—	—	—	—	1700
1600	—	—	—	92.0	—	80.0	—	—	—	—	—	—	1600
1550	—	—	—	91.5	—	79.0	—	—	—	—	—	—	1550
1500	—	—	—	91.0	—	78.0	—	—	—	—	—	—	1500
1450	—	—	—	90.5	—	77.0	—	—	—	—	—	—	1450
1400	—	—	—	90.0	—	76.0	—	—	—	—	—	—	1400
1350	—	—	—	89.5	—	75.0	—	—	—	—	—	—	1350
1300	—	—	—	89.0	—	74.0	—	—	—	—	—	—	1300
1250	—	—	—	88.5	—	73.0	—	—	—	—	—	—	1250
1200	—	—	—	88.0	—	72.0	—	—	—	—	—	—	1200
1150	—	—	—	87.5	—	71.5	—	—	—	—	—	—	1150
1140	—	—	—	87.0	—	71.0	—	—	—	—	—	—	1140
1076	—	—	—	86.5	—	70.0	—	—	—	—	—	—	1076
1004	—	—	—	86.0	—	69.0	—	—	—	—	—	—	1004
940	—	—	—	85.6	—	68.0	76.9	93.2	84.4	75.4	97	—	940
920	—	—	—	85.3	—	67.5	76.5	93.0	84.0	74.8	96	—	920
900	—	—	—	85.0	—	67.0	76.1	92.9	83.6	74.2	95	—	900
880	—	—	767	84.7	—	66.4	75.7	92.7	83.1	73.6	93	—	880
860	—	—	757	84.4	—	65.9	75.3	92.5	82.7	73.1	92	—	860
840	—	—	745	84.1	—	65.3	74.8	92.3	82.2	72.2	91	—	840
820	—	—	733	83.8	—	64.7	74.3	92.1	81.7	71.8	90	—	820
800	—	—	722	83.4	—	64.0	73.8	91.8	81.1	71.0	88	—	800
780	—	—	710	93.0	—	63.3	73.3	91.5	80.4	70.2	87	—	780
760	—	—	698	82.6	—	62.5	72.6	91.2	79.7	69.4	86	—	760
740	—	—	684	82.2	—	61.8	72.1	91.0	79.1	68.6	84	—	740
720	—	—	670	81.8	—	61.0	71.5	90.7	78.4	67.7	83	—	720
700	—	615	656	81.3	—	60.1	70.8	90.3	77.6	66.7	81	—	700
690	—	610	647	81.1	—	59.7	70.5	90.1	77.2	66.2	81	—	690
680	—	603	638	80.8	—	59.2	70.1	89.8	76.8	65.7	80	232	680
670	—	597	630	80.6	—	58.8	69.8	89.7	76.4	65.3	79	228	670
660	—	590	620	80.3	—	58.3	69.4	89.5	75.9	64.7	79	224	660
650	—	585	611	80.0	—	57.8	69.0	89.2	75.5	64.1	—	221	650

常用硬度换算表 Hardness Conversion Table

维氏硬度HV 荷重(DPH) Vickers Hardness HV Load (DPH)	布氏硬度10mm球 荷重3000kg Brinell Hardness 10mm ball load 3000kg			洛氏硬度(3R) Rockwell Hardness (3R)				洛氏薄片硬度(3S) Rockwell Flat Hardness (3S)			肖氏 硬度 HS Shore Hardness HS	抗拉 强度 kg/mm ² Tensile Strength kg/mm ²	维氏硬度 HV 荷重50kg Vickers Hardness HV Load 50kg
	标准 球 Standard Ball	Hult Green 球 Hult Green Ball	碳化 钨球 Tungsten Carbide Ball	HRA荷重 60kg金刚石 HRA Load 60kg diamond	HRB荷重 100kg1/6"球 HRA Load 100kg1/6"ball	HRC荷重 150kg金刚石 HRC Load 150kg diamond	HRD荷重 100kg金刚石 RD Load 100kg diamond	15N荷重 15kg 15N Load 15kg	30N荷重 30kg 30N Load 30kg	45N荷重 45kg 45N Load 45kg			
640	—	578	601	79.8	—	57.3	68.7	89.0	75.1	63.5	77	217	640
630	—	571	591	79.5	—	56.8	68.3	88.8	74.6	63.0	—	214	630
620	—	564	582	79.2	—	56.3	67.9	88.5	74.2	62.4	75	210	620
610	—	557	573	78.9	—	55.7	67.5	88.2	73.6	61.7	—	207	610
600	—	550	564	78.6	—	55.2	67.0	88.0	73.2	61.2	74	203	600
590	—	542	554	78.4	—	54.7	66.7	87.8	72.7	60.5	—	200	590
580	—	535	545	78.0	—	54.1	66.2	87.5	72.1	59.9	72	196	580
570	—	527	535	77.8	—	53.6	65.8	87.2	71.7	59.3	71	193	570
560	—	519	525	77.4	—	53.0	65.4	86.9	71.2	58.6	71	189	560
550	505	512	517	77.0	—	52.3	64.8	86.6	70.5	57.8	—	186	550
540	496	503	507	76.7	—	51.7	64.4	86.3	70.0	57.0	69	183	540
530	488	495	497	76.4	—	51.1	63.9	86.0	69.5	56.2	—	179	530
520	480	487	488	76.1	—	50.5	63.5	85.7	69.0	55.6	67	176	520
510	473	479	479	75.7	—	49.8	62.9	85.4	68.3	54.7	—	173	510
500	465	471	471	75.3	—	49.1	62.2	85.0	67.7	53.9	66	169	500
490	456	460	460	74.9	—	48.4	61.6	84.7	67.1	53.1	—	165	490
480	448	452	452	74.5	—	47.7	61.3	84.3	66.4	52.2	64	162	480
470	441	442	442	74.1	—	46.9	60.7	83.9	65.7	51.3	—	158	470
460	433	433	433	73.6	—	46.1	60.1	83.6	64.9	50.4	62	155	460
450	425	425	425	73.3	—	45.3	59.4	83.2	64.3	49.4	—	151	450
440	415	415	425	72.8	—	44.5	58.8	82.8	63.5	48.4	59	148	440
430	405	405	405	72.3	—	43.6	58.2	82.3	62.7	47.7	—	144	430
420	397	397	397	71.8	—	42.7	57.7	81.8	61.9	46.4	57	138	420
410	388	388	388	71.4	—	41.8	56.8	81.4	61.1	45.3	—	135	410
400	379	379	379	70.8	—	40.8	56.0	81.0	60.2	44.1	55	131	400
390	369	369	369	70.3	—	39.8	55.2	80.3	59.3	42.9	—	128	390
380	360	360	360	69.8	(110.0)	38.8	54.4	79.8	58.4	41.7	52	124	380
370	350	350	350	69.2	—	37.7	53.6	79.2	57.4	40.4	—	123	370
360	341	341	341	69.7	(109.0)	36.6	52.8	78.6	56.4	39.1	50	120	360
350	331	331	331	68.1	—	35.5	51.9	78.0	55.4	37.8	—	117	350
340	322	322	322	67.6	(108.0)	34.4	51.1	77.4	54.4	36.5	47	113	340
330	313	313	313	67.0	—	33.3	50.2	76.8	53.6	35.2	—	110	330

常用硬度换算表 Hardness Conversion Table

维氏硬度HV 荷重(DPH) Vickers Hardness HV Load (DPH)	布氏硬度10mm球 荷重3000kg Brinell Hardness 10mm ball load 3000kg			洛氏硬度 (3R) Rockwell Hardness (3R)				洛氏薄片硬度 (3S) Rockwell Flat Hardness (3S)			肖氏 硬度 HS Shore Hardness HS	抗拉 强度 kg/mm ² Tensile Strength kg/mm ²	维氏硬度 HV 荷重50kg Vickers Hardness HV Load 50kg
	标准 球 Standard Ball	Hult Green 球 Hult Green Ball	碳化 钨球 Tungsten Carbide Ball	HRA荷重 60kg金刚石 HRA Load 60kg diamond	HRB荷重 100kg 1/16"球 HRA Load 100kg 1/16" ball	HRC荷重 150kg 金刚石 HRC Load 150kg diamond	HRD荷重 100kg 金刚石 RD Load 100kg diamond	15N荷重 15kg 15N Load 15kg	30N荷重 30kg 30N Load 30kg	45N荷重 45kg 45N Load 45kg			
320	303	303	303	66.4	(107.0)	32.2	49.4	76.2	52.3	33.9	45	106	320
310	294	294	294	65.8	—	31.0	48.4	75.6	51.3	32.5	—	103	310
300	284	284	284	65.2	(105.5)	29.8	47.5	74.9	50.2	31.1	42	99	300
295	280	280	280	64.8	—	29.2	47.1	74.6	49.7	30.4	—	98	295
290	275	275	275	64.5	(104.5)	28.5	46.5	74.2	49.0	29.5	41	96	290
285	270	270	270	62.4	—	27.8	46.0	73.8	48.4	28.7	—	94	285
280	265	265	265	63.8	(103.5)	27.1	45.3	73.4	47.8	27.9	40	92	280
275	261	261	261	63.5	—	26.4	44.9	73.0	47.2	27.1	—	91	275
270	256	256	256	63.1	(102.0)	25.6	44.3	72.6	46.4	26.2	38	89	270
265	252	252	252	62.7	—	24.8	43.7	72.1	45.7	25.2	—	87	265
260	247	247	247	62.4	(101.0)	24.0	43.1	71.6	45.0	24.3	37	85	260
255	243	243	243	62.0	—	23.1	42.2	71.1	44.2	23.2	—	82	255
250	238	238	238	61.6	99.5	22.2	41.7	70.6	43.4	22.2	36	80	250
245	233	233	233	61.2	—	21.3	41.1	70.1	42.5	21.2	—	78	245
240	228	228	228	60.7	98.1	20.3	40.3	69.6	41.7	19.9	34	76	240
230	219	219	219	—	96.7	(18.0)	—	—	—	—	33	71	230
220	209	209	209	—	95.0	(15.7)	—	—	—	—	32	68	220
210	200	200	200	—	93.4	(13.4)	—	—	—	—	30	65	210
200	190	190	190	—	91.5	(11.0)	—	—	—	—	29	62	200
190	181	181	181	—	89.5	(8.5)	—	—	—	—	28	59	190
180	171	171	171	—	87.1	(6.0)	—	—	—	—	26	56	180
170	162	162	162	—	85.0	(3.0)	—	—	—	—	25	53	170
160	152	152	152	—	81.7	(0.0)	—	—	—	—	24	50	160
150	143	143	143	—	78.7	—	—	—	—	—	22	46	150
140	133	133	133	—	75.8	—	—	—	—	—	21	44	140
130	124	124	124	—	71.2	—	—	—	—	—	20	40	130
120	114	114	114	—	66.7	—	—	—	—	—	—	—	120
110	105	105	105	—	62.3	—	—	—	—	—	—	—	110
100	95	95	95	—	56.2	—	—	—	—	—	—	—	100
95	90	90	90	—	52.0	—	—	—	—	—	—	—	95
90	86	86	86	—	48.0	—	—	—	—	—	—	—	90
85	81	81	81	—	41.0	—	—	—	—	—	—	—	85

目数粒度对照表 Mesh size table

目数 Mesh	粒度um Particle size um	目数 Mesh	粒度um Particle size um	目数 Mesh	粒度um Particle size um
5	3900	140	104	1600	10
10	2000	170	89	1800	8
16	1190	200	74	2000	6.5
20	840	230	61	2500	5.5
25	710	270	53	3000	5
30	590	325	44	3500	4.5
35	500	400	38	4000	3.4
40	420	460	30	5000	2.7
45	350	540	26	6000	2.5
50	297	650	21	7000	1.25
60	250	800	19		
80	178	900	15		
100	150	1100	13		
120	124	1300	11		

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