FST

Flame Spray Technologies

POWDERS

THERMAL SPRAY CONSUMABLES GUIDE

Thermal Spray Consumables Guide

PARTICLES SIZE Conversion Chart	
MICRON	MESH
38	400
45	325
53	270
63	230
75	200
90	170
106	140
125	120
150	100

BOND STRENGTH Conversion Chart	
MPA	Psi
10	1450
25	3626
30	4351
35	5076
40	5802
50	7252
60	8702
70	10153

COATING THICKNESS Conversion Chart	
MICRON	mil
10	0.4
20	0.8
50	2.0
100	3.9
200	7.9
300	11.8

HOSE LENGTH Conversion Chart	
Metric	Imperial
4.5m	15ft
5m	16ft
6m	20ft
9m	30ft
15m	50ft

Note: conversions are approximations only

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Powders

CROSS REFERENCE LIST (chemistry only)

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ZrO2-Y2O3-Poly-hBN	M-113	2395	–	–	–	8
ZrO2-Y2O3-Poly	M-114	2460	–	–	–	8
Ni Graphite 75/25	M-390	307	–	–	–	8
Aluminum Oxide						8
Al_2O_3	C-506/507	105 6103	ALO 101 ALO 114	740	705	8
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Al_2O_3-TiO_2 87/13	C-338	130 6221	ALO 187 ALO 188	744	730	9
Al_2O_3-TiO_2 87/13	C-339	130 6221	ALO 187 ALO 188	744	730	9
Al_2O_3-TiO_2 60/40	C-342	131	ALO 121	745	731	9
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CrC-NiCr 80/20	K-804	7101 7107 7102 7103 7105	–	578	-	10
CrC-NiCr 75/25	K-854	7201 7202 7203 7205	1375 CRC 300	588 584	-	10
CrC-CoNiCrAlY	K-880	–	–	594	-	10
Chrome Oxide						11
Cr_2O_3	C-604/607	106 6156	Metco 6445 6155, 6156, 6416 Amdry 6415 ,6420	704 707	1106	11
Cr_2O_3/SiO_2/TiO_2	C-650	136 6462	CRO 192	716	732	11
Cr2O3 TiO2 97/3	C-667	–	–	–	–	11
Cr_2O_3 TiO_2 75/25	C-670	6485	–	712	-	12
Cr2O3 TiO2 60/40	C-677	6483	–	–	–	12
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CROSS REFERENCE LIST (chemistry only)						
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Alloy 12	M-481	8102	–	–	–	13
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Alloy 1	M-487	8100	–	–	–	13
Copper Based Alloys						14
Pure Copper	M-901 M-901P	55 1007	CU 105 CU 159	–	10	14
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Iron Based Alloys						15
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431 Stainless	M-687	42	–	–	97	15
420 Stainless	M-642	1002	–	–	–	15
Ultra Hard Steel	M-688	–	–	–	–	15
Molybdenum Based Alloys						16
Mo	M-801	63 4063	MO 102 MO 103 1293	105 106 109	118	16
Mo-25NiS/F	M-855	1371	–	–	902	16
MB NiCr	M-880	–	–	–	-	16
Nickel Based Alloys						16
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Alloy 625	M-325	1005	NI 328 1265	380	625	17

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CROSS REFERENCE LIST (chemistry only)						
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Alloy 718	M-328	1006	NI 202 1278	407	718	17
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Nickel S/F Alloys						19
NiCrSiB (59-64 HRC)	M-771	15 2001	–	–	–	19
NiCrSiB (50-55 HRC)	M-770	14	–	–	–	19
NiCrSiB (35-40 HRC)	M-772	12	–	–	–	19
NiCrSiBCuMo (58-64 HRC)	M-778	16	–	–	–	20
NiCrSiB (30-35 HRC)	M-774	–	–	–	–	19
NiCrSiB (35-43 HRC)	M-775	–	–	–	–	19
NiCrSiB (45-50 HRC)	M-776					20
NiCrSiB (55-60 HRC)	M-773					19
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NiCrSiBW (57-61 HRC)	M-782					20
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Pure Ti	M-224					22
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WC-Co 88/12	K-624	3101 3106 3102 3103 5105	1342 WC 727	518	125 126 127	23

CROSS REFERENCE LIST (chemistry only)						
Powder Type	**FST p/n**	**Metco**	**Praxair**	**Amperit**	**PAC**	**Page Nr.**
WC-Co 83/17	K-674	3201 3202 3203 5143	1343 WC 729	526	200	24
WC-Co-Cr 86/10/4	K-647 K-648	5847 3652 3653 3655 3654	1350 WC 731	558 557	–	24
WC-Co-Cr 86/10/4	K-646	5843 3903	WC 496	554	–	24
WC-Ni 88/12	K-611	330...	1310 WC 791	547	–	23
WC-Ni 83/17	K-612	3501 3502 3503 3505	1310 WC 724	547	–	23
WC-CoCrNi 85/9/5/1	K-665	3601 3602 3603 3604				25
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ZrO_2-Y_2O_3	C-295	204 231 234	ZRO 182 AI 1075 1484	827 831 832	2008	27
ZrO_2-22MgO	C-234	210	ZRO 103		810	27
ZrO_2-5CaO	C-241	201				27

Powders

ABRADABLES

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
AlSi-Polyester	Si 12.0% Polyester 40.0% Al Bal. Blend	M-111.92	-125 +12 µm	• Plasma. • Premium Silicon Aluminum and Polyester powder. • Quality abradable coatings for clearance control coatings in aircraft engines. • Application can also be found in turbo charges and land based turbines. • Useful up to 325°C (620°F).
ZrO_2 Y_2O_3 Polyester	ZrO_2 Bal. Y_2O_3 7,5% Polyester 4.0% Blend	M-114.985	-180 +10 µm Average: 70 µm	• Coatings of these materials can be applied with high porosity levels. • Sprayable to higher levels than normal Zirconia Coatings.
ZrO_2 Y_2O_3 Polyester hBN	ZrO_2 Bal. Y_2O_3 7,5% Polyester 4.5% hBN 0.7% Blend	M-113.985	-180 +10 µm Average: 70 µm	• Coatings of these materials can be applied with high porosity levels. • Sprayable to higher levels than normal Zirconia Coatings.
Ni Graphite 75/25	Ni Bal. C 25.0%	M-390.91	-106 +45 µm	• Coating service temperature capability approaching 480 °C. • Suitable for abradable coatings to rub against nickel alloy and steel. • Used in the glass industry as an low friction protective coating.

ALUMINUM OXIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Al_2O_3	Al_2O_3 > 99.5% Fused & Crushed	C-506.01 C-506.21 C-506.25	-25 +5 µm -45 +5 µm -45 +22 µm	• Good for abrasion, erosion and sliding wear applications • Good in alkalis and acid environments • Excellent dielectric properties • Useful up to 1600°C (3000°F) • Grind only with silicon carbide or diamond wheels.

ALUMINUM OXIDE				
Powder Type	**Nom.Composition**	**FST p/n**	**Size Range**	**Typical Properties and Applications**
Al_2O_3	Al_2O_3 > 99.9% Spheridized	C-507.02 C-507.17 C-507.23 C-507.32	-20 +5 µm -38 +10 µm -45 +15 µm -53 +15 µm	• High Purity Aluminium Oxide. • Good for abrasion, erosion and sliding wear applications. • Good in alkalis and acid environments. • Excellent dielectric properties. • Useful up to 1600°C (3000°F). • Grind only with silicon carbide or diamond wheels.
Al_2O_3-TiO_2 97/3	Al_2O_3 97.0% TiO_2 3.0% Fused & Crushed	C-328.01 C-328.25	-25 +5 µm -45 +22 µm	• Coatings are recommended for resistance to wear by abrasive grains, hard surfaces, fiber and thread, fretting, cavitation and particle erosion. • Resistance top cavitation, and to the effects of molten zinc, aluminium and copper. • Useful in the textile industry on any machine element application which comes in contact with fibers and threads.
Al_2O_3-TiO_2 87/13	Al_2O_3 87.0% TiO_2 13.0% Fused & Crushed	C-338.01 C-338.25	-25 +5 µm -45 +22 µm	• Similar to C-328, but less hard and less brittle
Al_2O_3-TiO_2 87/13	Al_2O_3 87.0% TiO_2 13.0% Blend	C-339.01 C-339.25	-25 +5 um -45 +22 µm	• Similar to C-338 • Different morphology
Al_2O_3-TiO_2 60/40	Al_2O_3 60.0% TiO_2 40.0% Fused & Crushed	C-342.01 C-342.25	-22 +5 um -45 +22 µm	• Chemical processing industry to resist weak acidic environments • Textile manufacturing equipment and tooling • Pump components, shaft sleeves and mechanical seals used in a variety of industries.

Powders

ALUMINUM OXIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Al_2O_3-MgO 74/26	Al_2O_3 74.0% MgO 26.0% HOSP	C-351.45 C-351.52	-63 +10 µm -75 +20 µm	• Spinel • High thermal shock resistance. • Because of resistance to wetting by molten aluminium many applications in the aluminium industry can be found. Commonly used for the coating of oxygen sensors for gas erosion resistance and gas permeability control.

CHROME CARBIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
CrC-NiCr 80/20	NiCr 20.0% CrC Bal. Agglomerated & Sintered	K-804.17 K-804.23	-38 +10 µm -45 +15 µm	• HVOF, Plasma • Useful up to 870°C (1600°F) • Higher hardness than K-854.23 • Good corrosion, abrasion, particle erosion, fretting and cavitation resistance • Good hot gas corrosion resistance • Excellent for high temperature wear applications • Best finished by wet grinding.
WC-CrC-NiCrCo 45/37/18	W Bal. Cr 41.0% Ni 11,5% Co 7.0% C 8.0% Agglomerated & Sintered	K-810.17	-38+10 µm	• HVOF • Usefull up to 700 C • Dense, oxidation and erosion resistant coatings • Good hot gas corrosion resistance • Cost efficient due to lower density then WC based materials
CrC-NiCr 75/25	NiCr 25.0% CrC Bal. Agglomerated & Sintered	K-854.17 K-854.23	-38 +10 µm -45 +15 µm	• HVOF, Plasma • Useful up to 870°C (1600°F) • Good corrosion, abrasion, particle erosion, fretting and cavitation resistance • Good hot gas corrosion resistance • Excellent for high temperature wear applications • Higher DE than K-804.22 • Best finished by wet grinding.

CHROME CARBIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
CrC-CoNiCrAlY 75/25	Co 9.0% Ni 8.0% Al 2.0% Y 0.15% C 9.5% Cr Bal. Agglomerated & Sintered	K-880.17 K-880.23	-38 +10 µm -45 +15 µm	• HVOF • Useful up to 1000°C (1800°F) • Excellent wear and erosion resistance up to 1000°C (1800°F) • Better oxidation resistance than CrC-NiCr • Used for furnace roll in steel industry and turbine components.

CHROME OXIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Cr_2O_3	Cr_2O_3 > 99.8% Reaction Sintered	C-604.03 C-604.151 C-604.25	-25 +10 µm -30 +10 µm -45 +22 µm	• Plasma • Hard, dense wear resistant coating • Insoluble in acids, alkalis and alcohol • Useful up to 540°C (1000°F) • Excellent engraving properties • Used for anilox rolls, pump seal areas, wear rings etc. • Grind only, use silicon carbide or diamond wheels.
Cr_2O_3	Cr_2O_3 > 99.5% Fused & Crushed	C-607.01 C-607.25	-25 +5 µm -45 +22 µm	• Same a C-604 • Different morphology
$Cr_2O_3/SiO_2/TiO_2$	Cr_2O_3 Bal. SiO_2 5.0% TiO_2 3.0% Fused & Crushed	C-650.01 C-650.25 C-650.45	-25 +5 µm -45 +22 µm -63 +15 µm	• Similar to C-604 • Better impact resistant than C-604 • Good low friction features • Grind only, use silicon carbide or diamond wheels.
Cr_2O_3 TiO_2 97/3	Cr_2O_3 Bal. TiO_2 3.0% Reaction Sintered	C-667.151 C-667.25	-30 +10 µm -45 +22 µm	• Similar to C-604 • Lower Hardness than C-604 but better toughness than C-604 • Used in wear applications where more toughness is needed • Grind only, use silicon carbide or diamond wheels.

Powders

CHROME OXIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Cr_2O_3 TiO_2 75/25	Cr_2O_3 Bal. TiO_2 25.0% Reaction Sintered	C-670.151 C-670.25	-30 +10 µm -45 +22 µm	• Similar to C-667 • Lower Hardness than C-667 but better toughness than C-667 • Used in wear applications where more toughness is needed • Grind only, use silicon carbide or diamond wheels.
Cr_2O_3 TiO_2 60/40	Cr_2O_3 Bal. TiO_2 40.0% Reaction Sintered	C-677.151 C-677.25	-30 +10 µm -45 +22 µm	• Similar to C-670 • Lower Hardness than C-670 but better toughness than C-670 • Used in wear applications where more toughness is needed • Grind only, use silicon carbide or diamond wheels.

COBALT BASED ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
T-800	Mo 28.0% Cr 17.0% Si 3.5% Co Bal. Gas Atomized	M-499.22 M-499.33	-45 +10 µm -53 +20 µm	• HVOF, Plasma • Excellent sliding wear properties from room temperature up to 810°C (1500°F) • Good hot hardness, oxidation and corrosion properties • Low coefficient of friction • Suitable where there is low lubrication • Machines readily with Silicon Carbide tools. • Similar to Tribaloy® 800
T-400	Mo 28.0% Cr 8.0% Si 2.5% Co Bal. Gas Atomized	M-494.25 M-494.33	-45 +22 µm -53 +20 µm	• HVOF, Plasma • Excellent wear properties from room temperature up to 810°C (1500°F) • Good hot hardness, oxidation and corrosion properties • Low coefficient of friction • Wet grinding with Silicon Carbide tools • Similar to Tribaloy® 400

COBALT BASED ALLOYS				
Powder Type	**Nom.Composition**	**FST p/n**	**Size Range**	**Typical Properties and Applications**
Alloy 12	Cr 29.0% W 8.0% C 1.5% Co Bal. Gas Atomized	M-481.25 M-481.33 M-481.71 M-481.93	-45 +22 µm -53 +20 µm -90 +45 µm -125 +45 µm	• Equivalent to Stellite® 12 • Resistant to wear, galling and corrosion and retain these properties at high temperatures. • It is regarded as the industry standard for general-purpose wear resistance applications. • Good resistance to impact and cavitation erosion. • Examples include valve seats and gates; pump shafts and bearings, erosion shields and rolling couples.
Alloy 6	Cr 29.0% W 4.5% C 1.2% Co Bal. Gas Atomized	M-484.25 M-484.33 M-484.71 M-484.93	-45 +22 µm -53 +20 µm -90 +45 µm -125 +45 µm	• Equivalent to Stellite® 6 • Resistant to wear, galling and corrosion and retain these properties at high temperatures. • It is regarded as the industry standard for general-purpose wear resistance applications. • Good resistance to impact and cavitation erosion. • Examples include valve seats and gates; pump shafts and bearings, erosion shields and rolling couples.
Alloy 1	Cr 29,0% W 13.0% C 2.5% Co Bal Gas Atomized	M-487.25 M-487.33 M-487.71 M-487.93	-45 +22 µm -53 +20 µm -90 +45 µm -125 +45 µm	• Equivalent to Stellite® 1 • Resistant to wear, galling and corrosion and retain these properties at high temperatures. • It is regarded as the industry standard for general-purpose wear resistance applications. • Good resistance to impact and cavitation erosion. • Examples include valve seats and gates; pump shafts and bearings, erosion shields and rolling couples.

Powders

COPPER BASED ALLOYS				
Powder Type	**Nom.Composition**	**FST p/n**	**Size Range**	**Typical Properties and Applications**
Pure Copper	Cu Gas Atomized P=High Purity	M-901.17 M-901P.17 M-901.25 M-901P.25 M-901.33 M-901.71	-38 +10 µm -38 +10 µm -45 +22 µm -45 +22 µm -53 +20 µm -90 +45 µm	• HVOF, Plasma, Cold Gas • Good electrical and thermal conductivity • Non Magnetic • Used for build-up and repair of copper based alloys • Applications can be found in printing industry. Resistance against corrosive effects of inks • Dense coatings • Machine with high speed steel or carbide tools.
Al-Bronze	Al 9.5% Fe 1.0% Cu Bal. Gas Atomized	M-950.33 M-950.71	-53 +20 µm -90 +45 µm	• HVOF, Plasma • Good bearing material • Resistant to fretting and galling at low temperatures • Easily machined coatings • Typical applications include: pump parts, piston guides, seal area's (soft bearing surfaces) • Good cavitation resistance • Machines with high speed steel or carbide tools.
Al-Bronze	Al 10.0% Cu Bal. Gas Atomized	M-952.33 M-952.71	-53 +20 µm -90 +45 µm	• HVOF, Plasma • Good bearing material • Resistant to fretting and galling at low temperatures • Easily machined coatings • Typical applications include: pump parts, piston guides, seal area's (soft bearing surfaces) • Good cavitation resistance • Machines with high speed steel or carbide tools.

IRON BASED ALLOYS				
Powder Type	**Nom.Composition**	**FST p/n**	**Size Range**	**Typical Properties and Applications**
316L Stainless	Cr 17.00% Ni 12.00% Mo 2.5% Si <0.75% C <0.03% Fe Bal. Gas Atomized	M-684.23 M-684.33 M-684.71	-45 +15 µm -53 +20 µm -90 +45 µm	• Good corrosion properties • Smooth and easy to machine coatings • Good against fretting, cavitation and erosion • Good for dimensional restoration and build-up • Easily machined with carbide or tool steel.
431 Stainless	Cr 16.0% Ni 2.0% C 0.03% Fe Bal. Gas Atomized	M-687.23 M-687.33 M-687.71	-45 +15 µm -53 +20 µm -90 +45 µm	• Corrosion resistant coating used mostly for repair and wear applications, requiring a hard ground finish • The coating may contain martensitic phases • Easily machined with carbide or tool steel.
420 Stainless	Cr 13.00% C 0.08% Fe Bal. Gas Atomized	M-642.23 M-642.33 M-642.71	-45 +15 µm -53 +20 µm -90 +45 µm	• Martensitic Stainless Steel • Repair and Wear resistance Application
Ultra Hard Steel	Cr 32.0% Ni 8.0% B 4.1% C 0.6% Gas Atomized	M-688.23 M-688.33	-45 +15 µm -53 +20 µm	• Hard bearing surfaces: bearing journals, fuel pump rotors, sleeves • Resist abrasive grains: cylinder liners, pistons, pump plungers, hydraulic rams, crankshaft bearings • Resist fretting (intended or non-intended motion): machine bedways, wear rings, press fits, bearing seats • Resist particle erosion (low temperature): exhaust fans, hydroelectric valves • Salvage and buildup on grindable steel: mis-machine parts, worn parts • High temperature environments to resist oxidation

Powders

MOLYBDENUM BASED ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Mo	Mo >99.0% Agglomerated & Sintered	M-801.23 M-801.52 M-801.71	-45 +15 µm -75 +25 µm -90 +45 µm	• Plasma • Tough coatings with fair hardness and excellent sliding properties. • Useful up to 320°C • Fret resistant • Bonds well to steel • Used for pump parts, piston rings, synchronizing rings, press fits, valves, gears and other similar applications.
Mo-25NiS/F	Mo 75.0% NiCrSiB 25.0% Blend	M-855.691	-90 +15 µm	• Plasma • Useful up to 350°C • Low coefficient of friction • Wear resistant coating with excellent sliding properties • Bonds well to steel • Used for pump parts, piston rings, synchronizing rings, press fits, valves • Can be finished by wet grinding.
MoB-NiCr	Mo Bal. B 7.5% Ni 20% Cr 5%	M-880.25	-45 +22 µm	• Resistant to high temperature erosion and sliding wear • Thermal shock resistance is fair • High temperature corrosion is good • Excellent non-stick properties • Excellent resistance to molten metals such and Aluminum and Zinc

NICKEL BASED ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Pure Ni	Ni >99.8% Gas Atomized	M-300.25 M-300.71	-45 +25 µm -90 +45 µm	• Plasma, HVOF • Can be used for salvage and build-up of Nickel based alloys that have been damaged or mis-machined • Easily machined • Coatings with dense and moderate hardness • Machines with most grades of cutting tools.

NICKEL BASED ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
NiCr 80/20	Cr 20.0% Ni Bal. Gas Atomized	M-301.25 M-301.33 M-301.71	-45 +22 µm -53 +20 µm -90 +45 µm	• HVOF, Plasma • Good to resist oxidation and corrosion gases up to 980°C (1800°F) • Good for general repair and build-up • Suitable as ceramic bondcoat • Good bonding • Easily machined with all grades of cutting tools.
NiAl 95/5	Al 5.0% Ni 95.0% Gas Atomized	M-358.33 M-358.71	-53 +20 µm -90 +45 µm	• Plasma • Self bonding to most metallic surfaces • Good oxidation and abrasion resistant • Recommended for use as oxidation resistant bond coats which can be used below 800°C (1470°F) • Good for general repair and build-up • Thick coatings are possible.
Alloy 625	Cr 21.0% Mo 9.0% Nb 3.7% Ni Bal. Gas Atomized	M-325.25 M-325.33 M-325.71	-45 +22 µm -53 +20 µm -90 +45 um	• HVOF, Plasma • Excellent high temperature oxidation and corrosion properties • Good for repair and build-up of similar chemistry super alloy components • Useful up to 980°C (1800°F) • Machines ready with Silicon-Carbide tools. • Similar to Inconel® 625
Alloy 718	Cr 19.0% Fe 18.0% Mo 3.0% Nb+Ta 5.0% Ti 1.0% Ni Bal. Gas Atomized	M-328.25 M-328.33 M-328.71	-45 +22 µm -53 +20 µm -90 +45 um	• HVOF, Plasma • Excellent high temperature oxidation and corrosion properties • Good for repair and build-up of similar chemistry super alloy components • Useful up to: 980°C (1800°F) • Machines ready with Silicon-Carbide tools. • Similar to Inconel® 718

Powders

NICKEL BASED ALLOYS				
Powder Type	**Nom.Composition**	**FST p/n**	**Size Range**	**Typical Properties and Applications**
Alloy C-276	Cr 15.5% Mo 16.0% W 4.0% Fe 4.0% Ni Bal. Gas Atomized	M-341.23 M-341.33	-45 +15 µm -53 +20 µm	• HVOF, Plasma • Excellent high temperature oxidation and corrosion properties • Good for repair and build-up of similar chemistry super alloy components. • Equivalent to Hastelloy C276
Alloy C-22	Cr 21.0% Mo 13.5% W 3.0% Fe 4.0% Ni Bal. Gas Atomized	M-342.23 M-342.33	-45 +15 um -53 +20 µm	• HVOF, Plasma • Excellent high temperature oxidation and corrosion properties • Good for repair and build-up of similar chemistry super alloy components. • Equivalent to Hastelloy C22
Alloy X	Cr 22.0% Mo 9.0% W 0.6% Ni Bal. Gas Atomized	M-344.23 M-344.33	-45 +15 um -53 +20 µm	• HVOF, Plasma • Excellent high temperature oxidation and corrosion properties • Good for repair and build-up of similar chemistry super alloy components. • Equivalent to Hastelloy X

NICKEL S/F ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
NiCrSiB (50-55HRC)	Ni Bal. Cr 12.0% B 3.0% Si 4.0% C 0.6% Fe 3.75%	M-770.23 M-770.33 M-770.91	-45 +15 µm -53 +20 µm -106 +45 µm	• Self Fluxing type alloy • Excellent corrosion and wear resistance • Serviceable up to 820°C (1500°F) • Coatings are dense and essentially oxide free • Machine with carbide tools or grind.
NiCrSiB (59-64HRC)	Ni Bal. Cr 17.0% B 3.3% Si 4.3% C 0.9% Fe 4.0%	M-771.23 M-771.33 M-771.91	-45 +15 µm -53 +20 µm -106 +45 µm	• Self Fluxing type alloy • Excellent corrosion and wear resistance • Serviceable up to 820°C (1500°F) • Coatings are dense and essentially oxide free • Machine with carbide tools or grind.
NiCrSiB (35-40HRC)	Ni Bal. Cr 8.0% B 1.9% Si 3.1% C 0.5% Fe 2.5%	M-772.23 M-772.33 M-772.91	-45 +15 µm -53 +20 µm -106 +45 µm	• Self Fluxing type alloy • Excellent corrosion and wear resistance • Serviceable up to 820°C (1500°F) • Coatings are dense and essentially oxide free • Machine with carbide tools or grind.
NiCrSiB (55-60HRC)	Ni Bal. Cr 15.0% B 3.0% Si 4.6% C 0.7% Fe 4.5%	M-773.23 M-773.33 M-773.91	-45 +15 µm -53 +20 µm -106 +45 µm	• Self Fluxing type alloy • Excellent corrosion and wear resistance • Serviceable up to 820°C (1500°F) • Coatings are dense and essentially oxide free • Machine with carbide tools or grind.
NiCrSiB (30-35HRC)	Ni Bal. Cr 6.3% B 1.2% Si 4.0% C 0.4% Fe 1.75%	M-774.23 M-774.33 M-774.91	-45 +15 µm -53 +20 µm -106 +45 µm	• Self Fluxing type alloy • Excellent corrosion and wear resistance • Serviceable up to 820°C (1500°F) • Coatings are dense and essentially oxide free • Machine with carbide tools or grind.
NiCrSiB (35-43HRC)	Ni Bal. Cr 10.0% B 1.8% Si 3.2% C 0.45% Fe 2.5%	M-775.23 M-775.33 M-775.91	-45 +15 µm -53 +20 µm -106 +45 µm	• Self Fluxing type alloy • Excellent corrosion and wear resistance • Serviceable up to 820°C (1500°F) • Coatings are dense and essentially oxide free • Machine with carbide tools or grind.

Powders

NICKEL S/F ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
NiCrSiB (45-50HRC)	Cr 13.0% B 2.5% Si 3.4% C 0.45% Fe 4.5%	M-776.23 M-776.33 M-776.91	-45 +15 µm -53 +20 µm -106 +45 µm	• Self Fluxing type alloy • Excellent corrosion and wear resistance • Serviceable up to 820°C (1500°F) • Coatings are dense and essentially oxide free • Machine with carbide tools or grind.
NiCrSiB (58-64HRC)	Ni Bal. Cr 17.0% B 3.8% Si 4.0% C 0.6% Fe 3.0% Cu 2.5% Mo 3,3%	M-778.23 M-778.33 M-778.91	-45 +15 µm -53 +20 µm -106 +45 µm	• Self Fluxing type alloy • Excellent corrosion and wear resistance • Serviceable up to 820°C (1500°F) • Coatings are dense and essentially oxide free • Machine with carbide tools or grind.
NiCrSiB (55-58HRC)	Ni Bal. Cr 13.7% B 2.6% Si 3.7% C 0.6% Fe 3.5% W 15.0%	M-781.23 M-781.33 M-781.91	-45 +15 µm -53 +20 µm -106 +45 µm	• Self Fluxing type alloy • Excellent corrosion and wear resistance • Serviceable up to 820°C (1500°F) • Coatings are dense and essentially oxide free • Machine with carbide tools or grind.
NiCrSiB (57-61HRC)	Ni Bal. Cr 12.5% B 3.0% Si 3.0% C 0.5% Fe 3.8% W 12.5%	M-782.23 M-782.33 M-782.91	-45 +15 µm -53 +20 µm -106 +45 µm	• Self Fluxing type alloy • Excellent corrosion and wear resistance • Serviceable up to 820°C (1500°F) • Coatings are dense and essentially oxide free • Machine with carbide tools or grind.
NiCr-SF + WC	WC (CTC) 35% NiCr-S/F (60Rc) 65% Blend	M-733.91	-106 +45 µm	• Blend with Fused Tungsten Carbide • Coatings are extremely wear resistant to abrasive grains, hard surfaces, fretting and particle erosion. • The most wear resistant of all self fluxing coatings • Essentially Cobalt free for stain resistance.

NICKEL S/F ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
NiCr-SF + WC-Co	WC-Co (A/S) 35% NiCr-S/F 65% (60Rc) Blend	M-735.93	-125 +45 µm	• Blend with Agglomerated WC-Co Tungsten Carbide • Coatings are extremely wear resistant to abrasive grains, hard surfaces, fretting and particle erosion. • The most wear resistant of all self fluxing coatings • Essentially Cobalt free for stain resistance.
NiCr-SF + WC	WC (CTC) 35% NiCr-S/F 65% (50Rc) Blend	M-737.91	-106 +45 µm	• Blend with Fused Tungsten Carbide • Coatings are extremely wear resistant to abrasive grains, hard surfaces, fretting and particle erosion. • The most wear resistant of all self fluxing coatings • Essentially Cobalt free for stain resistance.

TITANIUM

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Pure Ti	Ti HDH CP (Blocky)	M-222.91 M-222.995	-106 +45 µm -180 +75 µm	• In accordance with ASTM F1580-12 • VPS, LPPS • Good corrosion resistance against salt water, Cl containing solutions and oxidizing acid solutions • Material for biomedical applications.
Pure Ti 6Al 4V	Al 6.0% V 4.0% Ti Bal. HDH CP (Blocky)	M-223.91 M-223.995	-106 +45 µm -180 +75 µm	• In accordance with ASTM F1580-12 • VPS, LPPS • Good corrosion resistance against salt water, Cl containing solutions and oxidizing acid solutions • Material for biomedical applications.

Powders

Pure Ti	Ti PREP (Spherical)	M-224.23 M-224.91	-45 +15 µm -106 +45 µm	• In accordance with ASTM F1580-12 • VPS, LPPS • Good corrosion resistance against salt water, Cl containing solutions and oxidizing acid solutions • Material for biomedical applications.
Pure Ti 6Al 4V	Al 6.0% V 4.0% Ti Bal. PREP (Spherical)	M-225.23 M-225.91	-45 +15 µm -106 +45 µm	• In accordance with ASTM F1580-12 • VPS, LPPS • Good corrosion resistance against salt water, Cl containing solutions and oxidizing acid solutions • Material for biomedical applications.

TITANIUM OXIDE				
Powder Type	**Nom.Composition**	**FST p/n**	**Size Range**	**Typical Properties and Applications**
TiO_2	TiO_2 > 99.5% Fused & Crushed	C-408.01 C-408.25 C-408.45	-25 +5 µm -45 +22 µm -63 +15 µm	• Moderate abrasive wear resistance • Lower hardness than Al_2O_3-TiO_2 coatings • Decorative "black" coatings • Slightly conductive; Static electricity does not build-up on coating surface • Soluble in alkalis and sulfuric acid • Coatings can be ground and/or lapped to very smooth finishes.

TUNGSTEN CARBIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
WC-Ni 88/12	Ni 12.0% WC Bal. Agglomerated & Sintered	K-611.17 K-611.23	-38 +10 µm -45 +15 µm	• Plasma, HVOF • Hard, tough, dense coatings with good abrasion, erosion and sliding wear resistance. • Very fine as sprayed surfaces possible • Better corrosion resistance the WC-Co coatings • Useful up to 480°C (900°F) • Excellent low temperature wear properties • Diamond wet grinding.
WC-Ni 83/17	Ni 17.0% WC Bal. Agglomerated & Sintered	K-612.17 K-612.23	-38 +10 µm -45 +15 µm	• Plasma, HVOF • Hard, tough, dense coatings with good abrasion, erosion and sliding wear resistance. • 17% Ni Coatings have better toughness that 12% Ni coatings • Very fine as sprayed surfaces possible • Better corrosion resistance the WC-Co coatings • Useful up to 480°C (900°F) • Excellent low temperature wear properties • Diamond wet grinding.
WC-NiCr 85/10/5	Ni 10.0% Cr 5.0% WC Bal. Agglomerated & Sintered	K-617.23	-45 +15 µm	• Coatings made from K-617protect against fretting, abrasion and hammer (impact) wear and sliding wear. • K-617 has been designed to produce coatings that are wear resistant in a seawater environment. • The use above 500 °C (930 °F) is not recommended. • As K-617 is cobalt-free, it can also be used in radioactive environments. • K-617 coatings have a higher hardness than tungsten carbide – nickel coatings as a consequence of the hardening effect of chromium in the binder alloy, but toughness is reduced. • The hardness of a K-617 coating is slightly lower than that of a tungsten carbide-cobalt-chromium coating.

Powders

TUNGSTEN CARBIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
WC-Co 88/12	Co 12.0% W Bal. Agglomerated & Sintered	K-624.15 K-624.17 K-624.23 K-624.33	-30 +5 µm -38 +10 µm -45 +15 µm -53 +20 µm	• Plasma, HVOF • Medium WC • Hard, dense coatings with good abrasion, erosion and sliding wear resistance. • Low oxidation and corrosion resistance • Useful up to 480°C (900°F) • Excellent low temperature wear properties • Diamond wet grinding.
WC-Co 83/17	Co 17.0% WC Bal. Agglomerated & Sintered	K-674.15 K-674.17 K-674.23	-30 +5 µm -38 +10 µm -45 +15 µm	• HVOF • Course WC • Higher Co level then K-624 results is improved toughness, impact strength and ductility • Useful up to 480°C (900°F) • Low oxidation and corrosion resistance • Diamond wet grinding.
WC-Co-Cr 86/10/4	Co 10.0% Cr 4.0% WC Bal. Sintered & Crushed	K-646.17 K-646.23	-38 +10 µm -45 +15 µm	• HVOF and APS • The CoCr matrix shows higher corrosion and abrasion resistance that the Co matrix materials • Usable in wet corrosive environments • Dense, smooth coatings with fine microstructure and high bond strengths • Used for Hard Chrome Replacement • Diamond wet grinding.
WC-Co-Cr 86/10/4	Co 10.0% Cr 4.0% WC Bal. Agglomerated & Sintered	K-647.15 K-647.17 K-647.23 K-647.33	-30 +5 µm -38 +10 µm -45 +15 µm -53 +20 µm	• HVOF • Medium WC • The CoCr matrix shows higher corrosion and abrasion resistance that the Co matrix materials • Usable in wet corrosive environments • Dense, smooth coatings with fine microstructure and high bond strengths • Used for Hard Chrome Replacement • Diamond wet grinding.

TUNGSTEN CARBIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
WC-Co-Cr 86/10/4	Co 10.0% Cr 4.0% W Bal. Agglomerated & Sintered	K-648.15 K-648.17 K-648.23	-30 +5 µm -38 +10 µm -45 +15 µm	• HVOF • Fine WC • The CoCr matrix shows higher corrosion and abrasion resistance that the Co matrix materials • Usable in wet corrosive environments • Dense, smooth coatings with fine microstructure and high bond strengths • Used for Hard Chrome Replacement • Diamond wet grinding.
WC-Co-Cr 86/10/4	Co 10.0% Cr 4.0% W Bal. Agglomerated & Sintered	K-649.15 K-649.17 K-649.23	-30 +5 µm -38 +10 µm -45 +15 µm	• HVOF • Sub-Micron WC • The CoCr matrix shows higher corrosion and abrasion resistance that the Co matrix materials • Usable in wet corrosive environments • Dense, smooth coatings with fine microstructure and high bond strengths • Used for Hard Chrome Replacement • Diamond wet grinding.
WC-CoCrNi 85/9/5/1	Co 9.0% Cr 5.0% Ni 1.0% WC Bal.	K-665.17 K-665.23	-38 +10 µm -45 +15 µm	• HVOF • Medium WC • The CoCrNi matrix shows higher corrosion and abrasion resistance that the Co and CoCr matrix materials • Usable in wet corrosive environments • Dense, smooth coatings with fine microstructure and high bond strengths • Used for Hard Chrome Replacement • Diamond wet grinding.

Powders

TUNGSTEN CARBIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
WC-CrC-Ni 73/20/7	Ni 7.0% CrC 20.0% W Bal. Agglomerated & Sintered	K-607.15 K-607.17 K-607.23 K-607.33	-30 +5 µm -38 +10 µm -45 +15 µm -53 +20 µm	• HVOF • Fine WC • Useful up to 700°C • Higher corrosion, oxidation and chemical resistance than other WC based coatings • Smooth coating with fine micro structure • High bond strength • Diamond wet grinding.

YTTRIUM OXIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Y_2O_3	Y_2O_3 99,5% Agglomerated and Sintered	C-200.45 C-200.71	-65+15 µm -90+45 µm	• Stable at high temperatures • Plasma etch and erosion resistance on surfaces exposed to reactive plasma gases in semiconductor manufacturing systems, such as vacuum chamber walls and other components. • Used for protection of graphite sheets in the hard metal industry • Max. operating temperature in air 2200 °C (on graphite 1550 °)

ZIRCONIUM OXIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
ZrO_2-Y_2O_3	ZrO_2 Bal. Y_2O_3 8.0% Spray Dried	C-295.45 C-295.71 C-295.92	-63 +15 µm -90 +15 µm -125 +45 µm	• Excellent thermal barrier properties • Stabilizes during spray process • Useful up to 1300°C (2450°F) • Very good thermal shock resistance • Thick, high porosity coating possible.

ZIRCONIUM OXIDE				
Powder Type	**Nom.Composition**	**FST p/n**	**Size Range**	**Typical Properties and Applications**
ZrO_2-Y_2O_3	ZrO_2 Bal. Y_2O_3 8.0% Fused & Crushed	C-297.02 C-297.23	-22 +5 µm -45 +15 µm	• Excellent thermal barrier properties • Stabilizes during spray process • Useful up to 1300°C (2450°F) • Very good thermal shock resistance. • Used for DVC (Dense Vertically Cracked) Coatings
ZrO_2-22MgO	ZrO_2 Bal. MgO 24.0% Fused & Crushed	C-234.25 C-234.71	-45 +22 µm -90 +45 µm	• Good thermal barrier properties • Resistant to molten metals • Good particle erosion resistance • Useful up to 900°C .
ZrO2-5CaO	ZrO2 Bal. CaO 5.0% Fused & Crushed	C-241.25 C-241.71	-45 +22 µm -90 +45 µm	• Thermal barrier coatings used in rocket and turbine engine combustion chambers and other hot section components. • Lining for special purpose crucibles to prevent contamination of the molten contents. • Abrasive wear resistant coatings for diesel engine pistons, valves, cylinder heads and coatings for casting molds and troughs up to approximately 900 °C. Coatings resist wetting and the corrosive effects of molten metal.

Notes