FST

Flame Spray Technologies

POWDERS

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

Index

Powders

CROSS REFERENCE LIST (chemistry only)						
Powder Type	**FST p/n**	**Metco**	**Praxair**	**Amperit**	**PAC**	**Page Nr.**
Abradables						8
AlSi-Polyester	M-111	601	AL 228 AL 229	–	905-3	8
Aluminum Oxide						8
Al_2O_3	C-506	105 6103	ALO 101 ALO 114	740	705	8
Al_2O_3-TiO_2 97/3	C-328	101 6203	ALO 105 ALO 159	742	701	8
Al_2O_3-TiO_2 87/13	C-336	130 6221	ALO 187 ALO 188	744	730	8
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-341	131	ALO 121	745	731	9
Al_2O_3-TiO_2 60/40	C-342	131	ALO 121	745	731	9
Al_2O_3-TiO_2 60/40	C-343	131	ALO 121	745	731	9
Chrome Carbide						10
CrC-NiCr 80/20	K-804	710... 3007	CRC 351	578	-	10
CrC-NiCr 75/25	K-854 K-856	720... 730...	1375	588 584	-	10
CrC-NiCr 75/25	K-855	3004 81	CRC 106 CRC 108	585	130 131	10
CrC-CoNiCrAlY	K-880	–	–	594	-	10
Chrome Oxide						11
Cr_2O_3	C-604	106 6156	CRO 131 CRO 167 CRO 172 CRO 174 CRO 179	704 707	1106	11
Cr_2O_3/SiO_2/TiO_2	C-650	136 6462	CRO 192	716	732	11
Cr_2O_3/SiO_2/TiO_2	C-651	136 6462	CRO 192	716	732	11
Cr_2O_3 TiO_2 75/25	C-670	–	–	712	-	11

CROSS REFERENCE LIST (chemistry only)						
Powder Type	**FST p/n**	**Metco**	**Praxair**	**Amperit**	**PAC**	**Page Nr.**
Cobalt Based Alloys						12
T-800	M-499	68 3001 4800	CO 111 1248	342	T800	12
T-400	M-494	66 3002	CO 109 1247	340	T400	12
Alloy 6	M-484	4060	CO 106 1256	344	6 46	12
Copper Based Alloys						14
Pure Copper	M-901	55 1007	CU 105 CU 159	–	10	14
Cu-Ni	M-931	57	CU 103 CU 116	–	12	14
Al-Bronze	M-950	51 1004	CU 114 CU 104	–	16	14
CuNiIn	M-958	58	CU 101 CU 102	–	658	14
Iron Based Alloys						15
316L Stainless	M-684	41 1003	FE 101 1236	377	96	15
431 Stainless	M-687	42	–	–	97	15
420 Stainless	M-642					15
MCrAlY						15
CoNiCrAlY	M-427	995 9951 9954	CO 210 CO 211 CO 127	415	9950	15
NiCrAlY	M-321	962 4195 4200	NI 211 NI 164 NI 343	413	9620	15
Molybdenum Based Alloys						16
Mo	M-800	63 4063	MO 102 MO 103 1293	105 106 109	118	16
Mo-25NiS/F	M-855	1371	–	–	902	16
Mo-Mo2C	M-860	–	–	110	-	16

Powders

CROSS REFERENCE LIST (chemistry only)

Powder Type	FST p/n	Metco	Praxair	Amperit	PAC	Page Nr.
Nickel Based Alloys						17
Pure Ni	M-300	56	NI 101 NI 118 1166	175	900	17
NiCr 80/20	M-301	43 5640 4535	NI 105 NI 106 NI 107 1262	250 251	98	17
NiCr 80/20	M-302	43 5640 4535	NI 105 NI 106 NI 107 1262	250 251	98	17
NiCrAl	M-307	443	NI 122	–	908	17
NiCrFe	M-308	44	NI 488	–	99	17
NiAl 80/20	M-352	404	NI 108	–	909	18
NiAl 95/5	M-358	480	NI 185 Ni 970	280 281	906	18
NiAl 95/5	M-359	450	NI 109	–	906	18
NiAlMo	M-373	447	NI 453	–	912	19
Alloy 625	M-325	1005	NI 328 1265	380	625	19
Alloy 718	M-328	1006	NI 202 1278	407	718	19
Alloy C-276	M-341	4276	NI 544 1269	409	C276	19
Nickel S/F Alloys						20
NiCrSiB (60 HRC)	M-771	15 2001	NI 167 1275	335	60	20
NiCrSiB (50 HRC)	M-776	14	–	–	69	20
NiCrSiB (40 HRC)	M-772	12	NI 563	–	65	20
NiCrSiBCuMo (60 HRC)	M-777	16	Ni 553	–	600	20
WCNi-NiS/F	M-721	36	WC 562	–	81	20
Titanium						21
Pure Ti	M-222	4010	-	155	-	21
Titanium Oxide						21
TiO_2	C-407	102	-	782	702	21

CROSS REFERENCE LIST (chemistry only)						
Powder Type	**FST p/n**	**Metco**	**Praxair**	**Amperit**	**PAC**	**Page Nr.**
Tungsten Carbide						22
WC-Co 88/12	K-623	5812 311...	1342 WC 727	519	125 126 127	22
WC-Co 88/12	K-624	5812 310...	1342 WC 727	518	125 126 127	23
WC-Co 83/17	K-674	73 320...	1343 WC 729	526	200	23
WC-NiMoCrFeCo 82/18	K-661	–	–	529	–	23
WC-Co-Cr 86/10/4	K-647 K-648	5847 365...	1350 WC 731	558 557	–	23
WC-Ni 88/12	K-611	330...	1310 WC 724	547	–	24
WC-CrC-Ni 73/20/7	K-607	370...	1356 WC 733	551	–	24
yttrium oxide						24
Y2O3	C-200	6035 6015	YO 118 YO 125	849	2100	24
Zirconium Oxide						25
ZrO_2-Y_2O_3	C-296	204 233 222	ZRO 182 AI 1075 1484	827 832 831	2008	25
ZrO_2-Y_2O_3	C-295	204 231 234	ZRO 182 AI 1075 1484	827 831 832	2008	25
ZrO_2-22MgO	C-234	210	ZRO 103	–	810	25

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	-100 +10 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).

ALUMINUM OXIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Al_2O_3	Al_2O_3 Min. 99.5% Fused	C-506.01 C-506.25	-25 +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.
Al_2O_3-TiO_2 97/3	Al_2O_3 97.0% TiO_2 3.0% Fused	C-328.02 C-328.25	-22 +5 um -45 +22 µm	• Grey Alumina • Good for abrasion, erosion and sliding wear applications • Good in alkalis and acid environments • Applications can be found in the textile industry or synthetic fiber manufacturing • Useful up to 540°C (1000°F) • Grind only, use silicon carbide or diamond wheels.
Al_2O_3-TiO_2 87/13	Al_2O_3 87.0% TiO_2 13.0% Composite	C-336.22	-45 +10 µm	• Good for abrasion, erosion and sliding wear applications • Good in alkalis and acid environments • Useful up to 540°C (1000°F) • Similar to Al_2O_3-TiO_2, 97/3, but more ductile and less resistant to chemicals • Grind only, use silicon carbide or diamond wheels.

ALUMINUM OXIDE				
Powder Type	**Nom.Composition**	**FST p/n**	**Size Range**	**Typical Properties and Applications**
Al_2O_3-TiO_2 87/13	Al_2O_3 87.0% TiO_2 13.0% Fused	C-338.15 C-338.25	-30 +5 µm -45 +22 µm	• Similar to C-336.31 • Different morphology
Al_2O_3-TiO_2 87/13	Al_2O_3 87.0% TiO_2 13.0% Blend	C-339.02 C-339.25	-22 +5 um -45 +22 µm	• Similar to C-336.31 • Different morphology
Al_2O_3-TiO_2 60/40	Al_2O_3 60.0% TiO_2 40.0% Blend	C-341.25	-45 +22 µm	• Good for abrasion, erosion and sliding wear applications • Lower wear resistance; better grindability than coatings containing less titania • Polished coatings are used in chemical industry because of their low degree of wettability for dilute solutions of common acids • Useful up to 540°C (1000°F) • Similar to Al_2O_3-TiO_2 , 87/13, but softer and less resistant to chemicals • Grind only, use silicon carbide or diamond wheels.
Al_2O_3-TiO_2 60/40	Al_2O_3 60.0% TiO_2 40.0% Fused	C-342.25	-45 +22 µm	• Similar to C-341.25 • Different morphology
Al_2O_3-TiO_2 60/40	Al_2O_3 60.0% TiO_2 40.0% Composite	C-343.21	-45 +5 µm	• Similar to C-341.25 • Different morphology

Powders

CHROME CARBIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
CrC-NiCr 80/20	C 10.0% Ni 15.0% Cr Bal. Agglomerated & Sintered	K-804.17 K-804.23	-38 +10 um -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.
CrC-NiCr 75/25	C 10.0% Ni 20.0% Cr Bal. Agglomerated & Sintered	K-854.17 K-584.23	-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.
CrC-NiCr 75/25	C 10.0% Ni 20.0% Cr Bal. Blend	K-855.21	-45 +5 µm	• Plasma • Coarse dense carbide • 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 • Best finished by wet grinding.
CrC-CoNiCrAlY 75/25	Co 9.50% Ni 7.50% Al 1.75% Y 0.20% C 10.00% Cr Bal. Agglomerated & Sintered	K-880.23	-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 99.5% Fused	C-604.01 C-604.25	-25 +5 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.
$Cr_2O_3/SiO_2/TiO_2$	Cr_2O_3 Bal. SiO_2 5.0% TiO_2 3.0% Blend	C-650.32	-53 +15 µm	• Similar to C-604 • Better impact resistant than C-604 • Good low friction features • Grind only, use silicon carbide or diamond wheels.
$Cr_2O_3/SiO_2/TiO_2$	Cr_2O_3 Bal. SiO_2 5.0% TiO_2 3.0% Composite	C-651.22	-45 +10 µm	• Similar to C-650 • Different morphology
Cr_2O_3 TiO_2 75/25	Cr_2O_3 Bal. TiO_2 25.0% Fused	C-670.23	-45 +15 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

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 3.0% Co Bal. Gas Atomized	M-499.24 M-499.33	-45 +20 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 8.5% Si 2.5% Co Bal. Gas Atomized	M-494.24 M-494.33	-45 +20 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
Alloy 6	Cr 28.0% W 5.0% C 1.2% Si 1.0% Co Bal. Gas Atomized	M-484.24 M-484.33	-45 +20um -53 +20 µm	• Equivalent to Stellite® 6 • M-484 is resistant to wear, galling and corrosion and retain these properties at high temperatures. Their exceptional wear resistance is due mainly to the unique inherent characteristics of the hard carbide phase dispersed in a CoCr alloy matrix. • 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. • Hardeness: 36-45 HRC, 380-490 HV

COBALT BASED ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Alloy 12	Cr 29.0% W 9.0% C 1.7% Si 1.0% Co Bal	M-481.24 M-481.33	-45 +20um -53 +20 µm	• Equivalent to Stellite®12 • M-481 could be considered an intermediate alloy between M-484 and M-489. It contains a higher fraction of hard, brittle carbides than M-484, and has increased resistance to lowangle erosion, abrasion, and severe sliding wear whilst retaining reasonable impact and cavitation resistance. • Better high-temperature properties compared to M-484, and it can be used at temperatures up to about 700˚C. • Typically used for cutting tools that need to withstand abrasion, heat and corrosion. • Examples include industrial knives for cutting carpets, plastics, paper and synthetic fibres, saw tips in the timber industry, control plates in the beverage industry, pump vanes, bearing bushes, narrowneck glass mold plungers, engine valves, pinch rollers in the metal-processing industries, rotor blade edges. • Hardeness 45-51 HRC, 435-590 HV
Alloy 1	Cr 30,0% W 12.0% C 1.5% Co Bal	M-489.24 M-489.33	45 +20um -53 +20 µm	• Equivalent to Stellite®1 • M-489 1 is a hardfacing alloy possessing excellent abrasion and corrosion resistance for applications such as pump sleeves, rotary seal rings, wear pads, expeller screws and bearing sleeves. • M-489 retains its hardness at temperatures in excess of 760°C (1400°F). M-489 contains a high proportion of hard, wear resistant primary carbides. • Applications involving extreme low-angle erosion and severe abrasion, with some sacrifice in toughness. • Hardness: 50-58 HRC 550-720 HV

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Powders

COPPER BASED ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Pure Copper	Cu Gas Atomized	M-901.17 M-901.33 M-901.71	-38 +10 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.
Cu-Ni	Cu 62.0% Ni 38.0% Gas Atomized	M-931.22 M-931.54	-45 +10 µm -75 +45 µm	• HVOF, Plasma • Protect against galling and fretting • Dense coatings • Typically used as-sprayed, machined or lapped. • Commercially also known as Monel.
Al-Bronze	Al 9.5% Fe 1.0% Cu Bal. Gas Atomized	M-950.32 M-950.93	-53 +15 µm -125 +45µm	• 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.
CuNiIn	Ni 36.0% In 5.0% Cu Bal. Gas Atomized	M-958.23 M-958.54	-45 +15 µm -75 +45 µm	• Plasma • Dense coating with good resistance against galling and fretting • Applications can be found in Turbines • Used as-sprayed machined or lapped.

IRON BASED ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
316L Stainless	Cr 17.00% Ni 12,00% Si <0,75% C <0,03% Fe Bal. Atomized	M-684.22 M-684.33 M-684.91	-45 +10 µm -53 +20 µm -106 +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 0.2% Fe Bal. Atomized	M-687.93	-125 +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 0,15% Fe Bal.	M-642.33 M-642.52	-53 +20 um -70 +22 um	• Martensitic Stainless Steel • Repair and Wear resistance Application

MCrAlY

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
CoNiCrAlY	Ni 32.0% Cr 21.0% Al 8.0% Y 1.0% Co Bal. Gas atomized	M-427.25 M-427.54 M-427.71	-45 +22 µm -75 +45 µm -90 +45 µm	• Plasma, HVOF • Excellent corrosion and oxidation properties up to 1040°C (1900°F) • Heat treatment is recommended for optimum performance • Typically used for either a TBC bondcoat or protection coating in high temperature corrosive or oxidizing environments.
NiCrAlY	Cr 22.0% Al 10.0% Y 1.0% Ni Bal. Gas Atomized	M-321.25 M-321.54 M-321.93	-45 +22 µm -75 +45 µm -125 +45 µm	• Plasma, HVOF • Good diffusional stability and oxidation properties up to 980°C (1800°F) • Typically used as a TBC bondcoat • Wet grind with Silicon-Carbide wheels.

Powders

MOLYBDENUM BASED ALLOYS				
Powder Type	**Nom.Composition**	**FST p/n**	**Size Range**	**Typical Properties and Applications**
Mo	Mo >99.0% Sintered & crushed	**M-800.31** **M-800.71**	-53 +10 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.
Mo-Mo2C	C 2.3% Mo Bal. Agglomerated & Sintered	**M-860.23** **M-860.71**	-45 +15 µm -90 +45 µm	• Plasma • Max. operating temperature 320°C (608°F) • Tough coating with high hardness • Excellent anti scuffing properties • Typical applications include: piston ring, piston rods.

NICKEL BASED ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
Pure Ni	Ni >99.5% Water Atomized	M-300.25 M-300.71	-45 +22 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.
Pure Ni	Ni >99,5% Gas Atomized	M-303.18 M-303.25	-35 +15 um -45 +22um	• 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.
NiCr 80/20	Cr 20.0% Ni Bal. Gas Atomized	M-301.25 M-301.71	-45 +22 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.
NiCr 80/20	Cr 20.0% Ni Bal. Water Atomized	M-302.25 M-302.71	-45 +22 µm -90 +45 µm	• Similar to M-301 • Different morphology
NiCrAl	Cr 18.0% Al 6.0% Ni Bal. Composite	M-307.91	-106 +45 µm	• Plasma • Self bonding to most metallic surfaces • Good oxidation and corrosion properties • Good for general repair and build-up • Thick coatings are possible • Flame Sprayed coating are not self bonding but can be be used as an abradable • Machines/grinds readily with all grades of cutting tools.

Powders

NICKEL BASED ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
NiCrFe	Cr 16.0% Fe 8.0% Ni Bal. Atomized	M-308.91	-106 +45 µm	• Plasma, Flame • Self bonding to most metallic surfaces • Good oxidation and corrosion properties • Machinable coatings • Good for salvage and build-up applications on corrosion resistant steels, nickel, or nickel alloys substrates • Easily machined with all grades of cutting tools.
NiAl 80/20	Al 20.0% Ni 80.0% Composite	M-352.911	-106 +53 µm	• Plasma, Flame • Self bonding to most metallic surfaces • Good oxidation and abrasion resistant • Recommended for use as oxidation resistant bond coats which can be used up to 650°C (1200°F) • Good for general repair and build-up • Thick coatings are possible.
NiAl 95/5	Al 5.0% Ni 95.0% Gas Atomized	M-358.33 M-358.71	-90 +45 µm	• Plasma • Similar to M-359 • Different morphology • Better flowability that M-359.71 • Machines easily with Silicon-Carbide tools.
NiAl 95/5	Al 5.0% Ni 95.0% Composite	M-359.33 M-359.71	-53+20 um -90 +45 µm	• Plasma, Flame • 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.

NICKEL BASED ALLOYS				
Powder Type	**Nom.Composition**	**FST p/n**	**Size Range**	**Typical Properties and Applications**
NiAlMo	Al 5.5% Mo 5.5% Ni Bal. Composite	M-373.91	-106 +45 µm	• Plasma • Coatings are self bonding and very tough and capable of exhibiting good erosion and impact resistance • General purpose material for producing medium hard coatings for hard bearing and wear resistance applications • Application includes: machine elements, bearing seats and valves • Machines/grinds easily with all grades of cutting tools.
Alloy 625	Cr 19.0% Mo 9.0% Nb 3.7% Ni Bal. Gas atomized	M-325.23 M-325.33 M-325.96	-45 +15 um -53 +20 µm -150 +53 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 5.0% Ti 1.0% Ni Bal. Gas atomized	M-328.33 M-328.96	-53 +20 µm -150 +53um	• 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
Alloy C-276	Cr 15% Mo 16.0% W 4.5% Fe 3.5% Mn 1.2% Ni Bal. Gas atomized	M-341.24 M-341.33 M-341.96	-45 +20um -53 +20 µm -150 +53um	• HVOF, Plasma • Excellent high temperature oxidation and corrosion properties • Good for repair and build-up of similar chemistry super alloy components.

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Powders

NICKEL S/F ALLOYS

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
NiCrSiB (60HRC)	Cr 17.00% Fe 4.00% Si 4.50% B 3.30% C 0.90% Ni Bal. Atomized	M-771.22 M-771.33 M-771.91	-45 +10 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 (50 HRC)	Cr 13.00% Fe 3.40% Si 3.50% B 2.50% C 0.50% Ni Bal. Atomized	M-776.33 M-776.91	-53 +20um -106 +45 µm	• Self Fluxing type alloy • Similar to M-771 but with improved ductility • Good corrosion and wear resistance • Lower hardness then M-771 • Coatings are dense and essentially oxide free • Machine with carbide tools or grind.
NiCrSiB (40 HRC)	Cr 8.00% Fe 2.50% Si 3.00% B 2.00% C 0.50% Ni Bal. Atomized	M-772.33 M-772.91	-53 +20um -106 +45 µm	• Self Fluxing type alloy • Similar to M-771 but with improved ductility • Less corrosion and wear resistance than M-771 • Coatings are dense and essentially oxide free • Lower hardness than M-771 & M-776 • Machine with carbide tools or grind.
NiCrSiBCuMo (60 HRC)	Cr 16.50% Fe 3.00% Si 4.50% B 3.80% C 0.55% Cu 2.10% Mo 5.00% Ni Bal. Atomized	M-777.33 M-777.91	-53 +20um -106 +45 µm	• Self Fluxing type alloy • Coatings are resistant to wear by abrasive grains, hard surfaces, particle erosion, fretting and cavitation • Machine with carbide tools or grind.
WCNi-NiS/F	WC-Ni 35.0% NiS/F 65.0% Blend	M-721.93	-125 +45 µm	• 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 >99%	M-222.45 M-222.941	<63 µm -125 +90 µm	• 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% Fused	C-408.25 C-408.71	-45 +22 µm -90 +45 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.

Powders

TUNGSTEN CARBIDE				
Powder Type	**Nom.Composition**	**FST p/n**	**Size Range**	**Typical Properties and Applications**
WC-Ni 88/12	Ni 12.0% C 5.4% W 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 • Low oxidation and corrosion resistance • Useful up to 480°C (900°F) • Excellent low temperature wear properties • Diamond wet grinding.
WC-Ni 88/17	Ni 17.0% C 5.2% W 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 • Low oxidation and corrosion resistance • 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% C 5.2% W 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.

TUNGSTEN CARBIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
WC-Co 88/12	Co 12.0% C 5.4% W Bal. Agglomerated & Sintered	K-624.17 K-624.23	-38 +10 µm -45 +15 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% C 5.1% W Bal. Agglomerated & Sintered	K-674.17 K-674.23	-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	C 5.5% Co 10.0% Cr 4.0% W Bal. Agglomerated & Sintered	K-647.17 K-647.23	-38 +10 µm -45 +15 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.
WC-Co-Cr 86/10/4	C 5.5% Co 10.0% Cr 4.0% W Bal. Agglomerated & Sintered	K-648.17 K-648.23	-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	C 5.5% Co 10.0% Cr 4.0% W Bal. Agglomerated & Sintered	K-649.17 K-649.23	-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.

Powders

TUNGSTEN CARBIDE

Powder Type	Nom.Composition	FST p/n	Size Range	Typical Properties and Applications
WC-CoCrNi 85/9/5/1	Co 9.0% Cr 5.0% Ni 1.0% C 5.2% W 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.
WC-CrC-Ni 73/20/7	C 5.50% Ni 7.25% Cr 19.00% W Bal. Agglomerated & Sintered	K-607.17 K-607.23	-38 +10 µm -45 +15 µm	• HVOF • Fine WC • Useful up to 760°C (1400°F) • 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 99,9% Agglomerated and Sintered	C-200.22	-45+10um	• Stable at high temperatures • Heat resistant in aggressive atmospheres • Used for protection of graphite sheets in the hard metal industry • Max. operating temperature in air 2200 °C (on graphite 1550 °)
Y_2O_3	99% Fused	C-203.22	-45+10um	• Stable at high temperatures • Heat resistant in aggressive atmospheres • Used for protection of graphite sheets in the hard metal industry • Max. operating temperature in air 2200 °C (on graphite 1550 °C)

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% Agglomerated and Sintered	C-296.691 C-296.93	-90 +15µm -125 +45µm	• 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.
ZrO_2-Y_2O_3	ZrO_2 Bal. Y_2O_3 8.0% HOSP	C-295.691 C-295.93	-90 +16 µm -125 +45 µm	• Excellent thermal barrier properties • Stabilizes during spray process • Useful up to 1300°C (2450°F) • Very good thermal shock resistance.
ZrO_2-22MgO	ZrO_2 Bal. MgO 22.0% Fused	C-234.51	-75 +10 µm	• Good thermal barrier properties • Resistant to molten metals • Good particle erosion resistance • Useful up to 930°C (1700°F).

Notes