Powder Products Delivery Programme & Applications

Applications:

- Welding Electrodes
- Hardfacing Electrodes
- Stainless Steel Welding
- Thermal Spraying
- Powder Metallurgy
- CVD Coatings
- Hardmetal

Products:

- Chromium Powder
- Chromium Carbide Powder
- Chromium 90 Powder
- Nitrided Chromium Powder
- High Carbon Chromium Powder
- Extra High Carbon Chromium Powder
- Ferro Titanium (25%, 30%, 40%, 70%) Powder
- Ferro Niobium Powder
- Ferro Silico Titanium Powder
- Ferro Boron Powder
- Ferro Silico Boron Powder
- Nickel Boron Powder
- Chromium Boron Powder
- Ferro Vanadium Powder
- Nickel Aluminium Powder
- Ferro Aluminium Powder
- Titanium Aluminium Powder
- Aluminium Powder
- Ferro Tungsten Powder
- Ferro Silico Zirconium Powder
- Manganese Powder
- Ferro Manganese (High, Medium and Low Carbon) Powder
- Tungsten Powder
- Nickel Powder
- Titanium Powder
- XTiC Powders (FeNbC, FeWTiC and FeTiC)

Powder sizes typical as below for welding consumable production:

MMA stick electrodes	e.g. minus 300 micron
Hardfacing wires	e.g. minus 300 micron plus 63 micron
Flux cored wires	e.g. minus 100 micron

These products are supplied in accordance with a Quality Assurance system which meets the standards of ISO9001 and AS9100

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Chromium Metal Powder

Production Method:

Aluminothermic reaction.

Size & Packaging:

Available to customers' requirements, and size controlled by particle size analysis.

Chemical analysis in wt%			
Grade	**REG Cr**	**VMG Cr**	**VMG (Low Al) Cr**
Cr	min 99.2%	min 99.4%	min 99.4%
C	0.03% max	0.02% max	0.02% max
Fe	0.50% max	0.35% max	0.35% max
Al	0.20% max	0.10% max	0.015% max
Si	0.15% max	0.10% max	0.10% max
S	0.02% max	0.01% max	0.01%max
P	0.01% max	0.01% max	0.01% max

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Chromium Carbide, High Carbon Chromium & Extra High Carbon Chromium Powder

Production Method:

Aluminothermic reaction.

Size & Packaging:

Available to customers' requirements, and size controlled by particle size analysis.

Chemical analysis in wt%				
Grade	High C Cr (Cr_7C_3)	High C Cr (Cr_7C_3)	Chromium Carbide (Cr_3C_2)	Extra High C Cr (Cr_3 - C)
Cr	min 88.0%	min 86.5%	min 85.5%	min 74.0%
C	9.0 - 11.0%	10.5 - 12.5%	12.8 - 13.8%	18.0 - 24.0%
Fe	1.0% max	1.0% max	1.0% max	1.0% max
Al	0.20% max	0.20% max	0.20% max	0.50% max
Si	0.30% max	0.30% max	0.30% max	0.30% max
S	0.03% max	0.03% max	0.03% max	0.03% max
P	0.01% max	0.01% max	0.01% max	0.01% max

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Speciality Chromium Alloy Powders

Production Method:

Aluminothermic reaction.

Size & Packaging:

Available to customers' requirements, and size controlled by particle size analysis.

Chemical analysis in wt%		
Grade	**Nitrided Cr – CrN**	**Chromium 90 – Cr90**
Cr	min 88.2%	85.5 - 90.0%
C	0.05% max	0.05% max
Fe	0.50% max	Main balance
Al	0.20% max	0.20% max
Si	0.15% max	0.50% max
S	0.02% max	0.20%max
P	0.01% max	0.20% max
N	8.0 - 11.0%	-

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Ferro Titanium Powder (Low Carbon)

Production Method:

Induction furnace melted.

Size & Packaging:

Available to customers' requirements, and size controlled by particle size analysis.

Chemical analysis in wt%

Grade	FeTi 25%	FeTi 30%	FeTi 40%	FeTi 70%
Ti	23.0 - 27.0%	28.0 - 32.0%	38.0 - 42.0%	68.0 - 72.0%
Al – High Purity Grade	1.0% max	1.0% max	1.0% max	-
Al – Standard Grade	7.0% or 3.5% max	7.0% or 3.5% max	7.0% or 3.5% max	5.0% max
Si	2.0% max	2.0% max	2.0% max	2.0% max
C	0.10% max	0.15% max	0.15% max	0.15% max
S	0.02% max	0.02% max	0.02% max	0.02% max
P	0.03% max	0.03% max	0.03% max	0.03% max
V – High Purity Grade	0.5% max	0.5% max	0.5% max	-
V – Standard Grade	2.5% max	2.5% max	2.5% max	3.5% max

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Ferro Silico Titanium Powder (Low Carbon)

Production Method:

Induction furnace melted.

Size & Packaging:

Available to customers' requirements, and size controlled by particle size analysis.

Chemical analysis in wt%			
Grade	**FeSiTi 15%**	**FeSiTi 35%**	**FeSiTi 45%**
Ti	17.0 - 23.0%	20.0 - 24.0%	28.0 - 32.0%
Al	5.0% max	5.0% max	5.0% max
Si	13.0-17.0%	32.0-36.0%	42.0-46.0%
C	0.10% max	0.15% max	0.20% max
S	0.02% max	0.02% max	0.02% max
P	0.03% max	0.03% max	0.03% max
V – High Purity Grade	0.5% max	0.5% max	0.5% max
V – Standard Grade	2.5% max	2.5% max	2.5% max

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Niobium Containing Powders

Production Method:

Aluminothermic reaction.

Size & Packaging:

Available to customers' requirements, and size controlled by particle size analysis.

Chemical analysis in wt%		
Alloy	**Chrome Niobium**	**Ferro Niobium**
Nb	77 – 83%	min 60%
Cr	Main balance	0.1% max
Al	1.5% max	1.5% max
C	0.05% max	0.1% max
Fe	0.5% max	Main balance
P	0.01% max	0.03% max
S	0.01% max	0.02% max
Si	0.5% max	0.25% max
Pb	-	0.005% max
Ta	-	0.25% max
Ti	-	0.1% max
N	-	0.05% max
O	-	0.1% max

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Aluminium Containing Powders

Production Method:

Induction furnace melted.

Size & Packaging:

Available to customers' requirements, and size controlled by particle size analysis.

Chemical analysis in wt%

Alloy	Nickel Aluminium NiAl	Ferro Aluminium FeAl	Titanium Aluminium TiAl
Ni	48.0 – 52.0%	-	-
Fe	0.10% max	Main balance	2.0% max
Si	0.10% max	0.50% max	1.5% max
Mn	0.05% max	0.50% max	-
Cr	0.10% max	-	-
C	-	0.10% max	0.50% max
S	-	0.02% max	0.05% max
P	-	0.02% max	0.05% max
Al	Main balance	48.0 - 53.0%	Main balance
Ti	0.03% max	-	55.0 - 65.0%
Cu	0.10% max	-	-

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Boron Containing Powders

Production Method:

Carbothermic reduction or induction furnace melted.

Size & Packaging:

Available to customers' requirements, and size controlled by particle size analysis.

Chemical analysis in wt%				
Alloy	**FeB**	**FeSiB**	**NiB**	**CrB**
B	17.0 – 20.0%	3.5 – 5.5%	15.0 – 20.0%	min 15.0%
C	0.50% max	0.25% max	0.50% max	4.0 – 7.0%
Al	0.25% max	0.75% max	0.20% max	0.35% max
Si	0.50% max	19.0 – 23.0%	0.80% max	1.0% max
S	0.01% max	0.02% max	0.02% max	0.05% max
P	0.05% max	0.04% max	0.02% max	0.05% max
Fe	Main balance	Main balance	3.0% max	5.0% max
Ni	-	-	Main balance	-
Cr	-	-	-	Main balance

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Speciality Carbide Powders

Production Method:

Formed in-situ inside a metal matrix by self heating technology (SHS).

Size & Packaging:

Available to customers' requirements, and size controlled by particle size analysis.

Chemical analysis in wt%			
XTiC Powders	**FeNbC**	**FeWTiC**	**FeTiC**
Total Carbon (TC)	5.0 – 8.0%	9.5 – 10.5%	12.0 – 15.0%
Free Carbon (FC)	2.0% max	2.0% max	2.0% max
Metal (as carbide)	Nb 57.5 – 62.5%	W 34.0 – 38.0% Ti 28.5 – 32.5%	Ti 57.0 – 63.0%
Metal (as matrix)	Fe Main balance	Fe Main balance	Fe Main balance

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Ferro Alloy Powders

Production Method:

Aluminothermic reaction or induction furnace melted.

Size & Packaging:

Available to customers' requirements, and size controlled by particle size analysis.

Chemical analysis in wt%		
	FeSiZr	FeW
W	-	75.0 – 80.0%
C	0.50% max	0.15% max
Si	45.0 – 55.0%	1.0% max
Mn	-	0.50% max
S	0.02% max	0.10% max
P	0.04% max	0.10% max
Fe	Main balance	Main balance
Zr	30.0 – 40.0%	-

Chemical analysis in wt%		
	FeV 60	FeV 80
Fe	Main balance	Main balance
V	55.0 – 63.0%	75.0 – 84.0%
Al	2.0% max	2.0% max
C	0.3% max	0.3% max
P	0.05% max	0.05% max
S	0.05% max	0.05% max
Si	1.0% max	1.0% max

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Pure Metal Powders

Production Method:

Chemical processes.

Size & Packaging:

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Chemical analysis in wt%	
Tungsten – W	
W	min 99.7%
Fe	0.005% max
Si	0.003% max
S	0.002% max

Chemical analysis in wt%	
Nickel – Ni	
Ni	min 99.7%
Co	0.15% max
Cu	0.02% max
C	0.03% max
Fe	0.02% max
Si	0.03% max
P	0.03% max
S	0.03% max

Chemical analysis in wt%	
Titanium – Ti	
Ti	min 99.0%
Fe	1.0% max
Si	0.50% max
C	0.15% max
Al	0.75% max

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Manganese Containing Powders

Production Method:

Electrolytic or EAF reduction.

Size & Packaging:

Available to customers' requirements, and size controlled by particle size analysis.

Chemical analysis in wt%	Manganese Electrolytic Mn	High Carbon Ferro Manganese HC FeMn	Medium Carbon Ferro Manganese MC FeMn	Low Carbon Ferro Manganese LC FeMn
Mn	min 99.7%	75.0 – 83.0%	78.0 – 83.0%	78.0 – 83.0%
Fe	0.12% max	Main balance	Main balance	Main balance
Si	0.02% max	2.0% max	1.0% max or 1.0 – 1.7%	1.0% max or 1.0 – 1.7%
P	0.01% max	0.25% max	0.15% max	0.15% max
S	0.07% max	0.05% max	0.015% max	0.015% max
C	0.07% max	5.0 – 8.0%	1.5% max	0.5% or 1.0% max

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Other Powders

A wide range of metal and alloy powders are also available from other companies associated and within the AMG group.

Elektrowerk Weisweiler, EWW (Germany)

- Nitrogen containing Low Carbon Ferro Chrome, NLCFeCr
- Nickel Titanium Aluminium, NiTiAl
- Silico Manganese Aluminium, SiMnAl
- Low Carbon Ferro Chrome, LCFeCr

Gesellschaft für Elektrometallurgie, GfE (Germany) (AMG Titanium Alloys and Coatings)

- Ferro Vanadium, FeV
- Chromium metal, Cr for contact materials
- Titanium based powders for medical, technical and aerospace applications
- Pure metal powders for coating technology

Aluminium Powder Company, ALPOCO (United Kingdom)

- Atomised Aluminium, Al and Aluminium Silicon, AlSi powders
- Atomised Aluminium, Alloy powders and Aluminium based premixes

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International Sieve Chart

International ISO 565(TBL2):1983	Nominal Opening mm/ µm	American ASTM E 11-87 Inch/sieve	Alt.U.S.Standard Inch/sieve	Tyler STD Screen 1910 Equivalent inch/mesh	British BS410:1986 Aperture mm/	Equivalent BS mesh	German DIN 4188:1977 Aperture mm	Approx DIN No	Japanese JIS Z8801:1966 µm	Mesh No
1.00		18		16	1.00	16	1.00	6	1000	16
850µm		20		20	850µm	18	0.900	-	840	20
-		-		-	-	-	0.750	8	-	-
710		25		24	710	22	0.710	-	710	24
-		-		-	-	-	0.630	-	-	-
600		30		28	600	25	0.600	10	590	28
500		35		32	500	30	0.500	12	500	32
425		40		35	425	36	0.430	14	420	36
-		-		-	-	-	0.400	16	-	-
355		45		42	355	44	0.355	-	350	42
-		-		-	-	-	0.340	18	-	-
300		50		48	300	52	0.300	20	297	48
250		60		60	250	60	0.250	24	250	60
212		70		65	212	72	0.224	-	210	70
-		-		-	-	-	0.200	30	-	-
180		80		80	180	85	0.180	-	177	80
-		-		-	-	-	0.170	35	-	-
150		100		100	150	100	0.150	40	149	100
125		120		115	125	120	0.125	-	125	120
-		-		-	-	-	0.120	50	-	-
106		140		150	106	150	0.112	-	105	145
-		-		-	-	-	0.100	60	-	-
90		170		170	90	170	0.090	70	88	170
75		200		200	75	200	0.075	80	74	200
-		-		-	-	-	0.067	90	-	-
63		230		250	63	240	0.063	-	63	250
-		-		-	-	-	0.060	100	-	-
53		270		270	53	300	0.056	110	53	280
-		-		-	-	-	0.050	120	-	-
45		325		325	45	350	0.045	-	44	350
		400		400	38	400	0.040	-	-	-
-		-		-	-	-	0.036	130	37	400
32		450		-	32	440	0.032	-	-	-
25		500		-	-	-	0.025	200	-	-
20		635		-	-	-	0.020	-	-	-

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