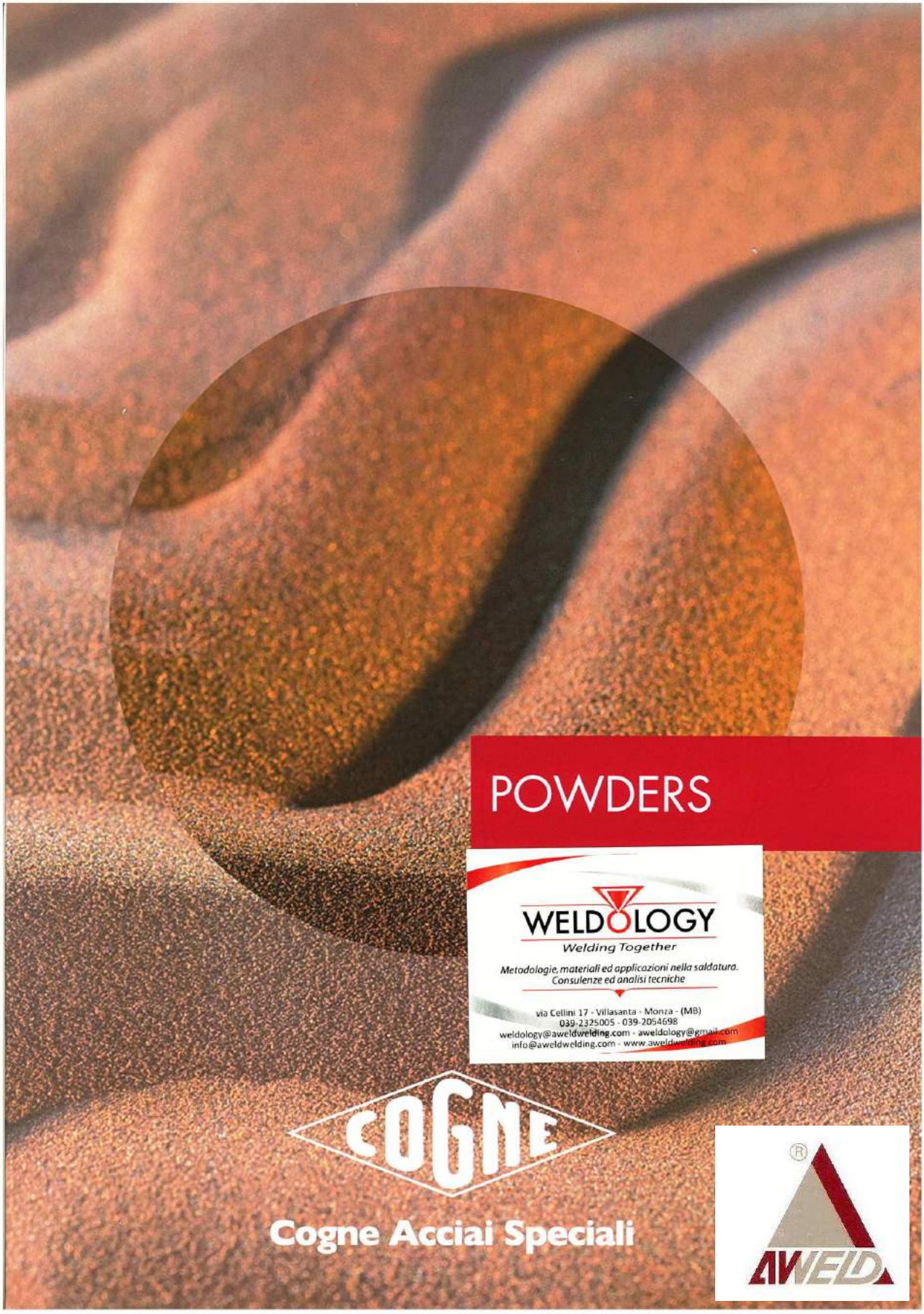
POWDERS
WELDOLOGY
Welding Together
Metodologie, materiali ed applicazioni nella saldatura.
Consulenze ed analisi tecniche
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COGNE
Cogne Acciai Speciali
AWELD

Iron base alloys

COGNE Grade	C	Si	Cr	Ni	Mo	Mn	Others	Fe	Commercial reference	Grain size
202Z	< 0.1	1.0	18.5	8.0	-	7.0		bal.	1.4370	50-150 µm – 45-125 µm - 15-53 µm
304L	< 0.03	0.5	18	-	-	1.3		bal.	1.4306	50-150 µm – 45-125 µm - 15-53 µm
309L	< 0.03	1.0	23.5	13.5	-	2.0		bal.	1.4332	50-150 µm – 45-125 µm - 15-53 µm
316L	< 0.03	0.5	18.0	11.0	2.5	1.3		bal.	1.4430 - 1.4404	50-150 µm – 45-125 µm - 15-53 µm
630	< 0.05	0.5	17.0	4.0	-	-	Cu: 4.0 Nb: 0.4	bal.	1.4542 - 17-4 PH	50-150 µm – 45-125 µm - 15-53 µm
410	< 0.15	0.5	13.0	-	-	< 1.0		bal.	1.4006	50-150 µm – 45-125 µm - 15-53 µm
E415	< 0.03	0.5	13.0	4.0	0.8	< 1.0		bal.	1.4313	50-150 µm – 45-125 µm - 15-53 µm
420	< 0.4	0.5	13.0	-	-	< 1.0		bal.	1.4021	50-150 µm – 45-125 µm - 15-53 µm
WD54	1.2	-	4.0	-	5.0	-	W: 5.5 V: 3.0	bal.	HSS: AISI M 3	50-150 µm – 45-125 µm - 15-53 µm
WD91	1.0	-	3.8	-	8.5	-	W: 2.0 V: 2.0	bal.	HSS: 1.3348 - AISI M 7	50-150 µm – 45-125 µm - 15-53 µm
UD12	0.4	1.0	5.0	-	1.5	0.5	V: 0.4	bal.	H11 - 1.2343	50-150 µm – 45-125 µm - 15-53 µm
UD14	0.4	1.0	5.0	-	1.5	0.5	V: 1.0	bal.	H13 - 1.2344	50-150 µm – 45-125 µm - 15-53 µm
FE12V	2.8	1.0	7.0	-	1.5	-	V: 12	bal.		50-150 µm – 45-125 µm - 15-53 µm
FE23C2	2.0	1.5	26.0	10.0	5.0	-		bal.	SAE S 68000	50-150 µm – 45-125 µm - 15-53 µm

Nickel base alloys

COGNE grade	C	Si	B	Cr	Mo	Fe	Others	Ni	Commercial reference	Hardness	Grain size
IN600	< 0.1	< 0.5		16,0	-	8,0		Bal	2.4816		50-150 µm – 45-125 µm – 15-53 µm
IN625	< 0.1	< 0.5		21,5	9,0	< 3,5	Nb: 3.5	Bal	2.4856		50-150 µm – 45-125 µm – 15-53 µm
IN718	< 0.1	< 0.35		19,0	3,0	19,0	Nb: 5,0; Ti: 1,0; Al: 0,6	Bal	2.4668		50-150 µm – 45-125 µm – 15-53 µm
IN82	< 0.1	< 0.5		20,5		< 3,0	Mn: 3,0; Nb: 2,5	Bal	2.4806		50-150 µm – 45-125 µm – 15-53 µm
IN825	< 0.05	< 0.5		21,0	3,0	30,0	Ti: 1.0; Cu: 2.0	Bal	2.4858		50-150 µm – 45-125 µm – 15-53 µm
C22	< 0.02	< 0.08		22,0	13,0	3,0	W: 3.0	Bal	2.4602		50-150 µm – 45-125 µm – 15-53 µm
C276	< 0.01	< 0.08		15,0	16,0	5,0	W: 4.0	Bal	2.4819		50-150 µm – 45-125 µm – 15-53 µm
NP20	< 0.2	2,5	1,5			< 1.0	~ 1.9	Bal		18-21 HRC	20-106 µm – 38-106 µm
NP25	< 0.5	2,5	1,7			< 1.0	~ 2.0	Bal		22-26 HRC	20-90 µm – 38-106 µm
NI25	< 0.05	2,5	1,5			< 0,5		Bal		22-26 HRC	20-90 µm – 38-106 µm – 50-150 µm
NI35	0,3	3,5	1,3	6,0		2,0		Bal		30-36 HRC	20-90 µm – 38-106 µm – 50-150 µm
NI40	0,25	3,5	1,6	7,5		2,5		Bal		38-42 HRC	20-90 µm – 38-106 µm – 50-150 µm
NI50	0,45	3,8	2,3	11,0		2,5		Bal		48-54 HRC	20-90 µm – 38-106 µm – 50-150 µm
NI60	1,0	4,0	3,2	15,0		4,0		Bal		56-62 HRC	20-90 µm – 38-106 µm – 50-150 µm
NI60/1	0,6	4,0	3,5	15,0	3,0	3,0	Cu: 2,5	Bal		56-62 HRC	20-90 µm – 38-106 µm – 50-150 µm
N102		4,5	3,0	7,0		3,0		Bal	B-Ni2		< 106 µm
NI105		10,0		19,0				Bal	B-Ni5		< 106 µm

Cobalt base alloys

COGNE Grade	C	Si	Cr	Mo	Ni	W	Fe	Others	Co	Hardness	Commercial reference	Grain size
CO01	2.5	1.2	30	< 1.0	< 2.0	12.5	< 2.0	< 1.0	bal.	50-55 HRC	1	50-150 µm 45-125 µm - 15-53 µm
CO06	1.1	1.2	28	< 1.0	< 2.0	4.5	< 2.0	< 1.0	bal.	40-45 HRC	6	50-150 µm 45-125 µm - 15-53 µm
CO12	1.5	1.2	29	< 1.0	< 2.0	8	< 2.0	< 1.0	bal.	45-50 HRC	12	50-150 µm 45-125 µm - 15-53 µm
CO21	0.2	1.0	27	5.5	2.5	-	< 2.0	< 1.0	bal.	28-40 HRC	21	50-150 µm 45-125 µm - 15-53 µm
CO25	0.1	1.0	20	< 1.0	10.0	15.0	< 2.0	Mn < 1.5	bal.	20-25 HRC	25	50-150 µm 45-125 µm - 15-53 µm
CO1F	1.7	1.2	26	< 1.0	22.5	12.5	< 3.0	< 1.0	bal.	38-45 HRC	F	50-150 µm 45-125 µm - 15-53 µm
T400	< 0.1	1.0	8.5	28.5			< 1.5	< 1.0	bal.	50-57 HRC	T400	50-150 µm 45-125 µm - 15-53 µm

Copper base alloys

COGNE Grade	C	Si	Al	Ni	Fe	Cu	Grain size
CU85	< 0.01	< 0.1	10	5.0	1.0	bal	45-125 µm - 15-53 µm
CU90	< 0.01	< 0.1	10	-	1.0	bal	

Specific chemistry and grain sizes are available upon request

Welding powder

Powder welding is traditionally applied using oxi-acetylene torch (simple to use and low cost).

The most suitable materials to employ are NiBSi self-fluxing alloys.

The presence of B and Si gives good fluidity, reduces the melting point and allows the use at low temperatures (- 1000°C), obtaining a coating compact, well diluted and strongly bonded to the base material.

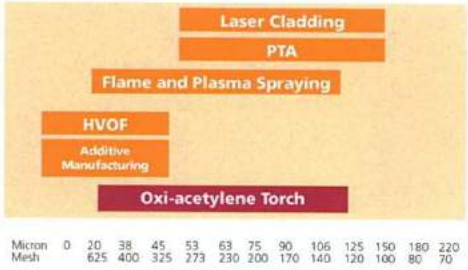
NiBSi self-fluxing alloys have good oxidation and wear resistance.

The addition of Cr and Mo increases corrosion and hot oxidation resistance.

The microstructure of the coating consists of a ductile Nickel matrix and hard particles, constituted by several elements.

The alloying elements and their proportional quantity give a wide range of hardness to the NiBSi self-fluxing alloys, 18 – 60 HRC.

The coating obtained has a smooth and bright surface which allows minimal or no machining (hardness coating below 25 HRC).



Physical characteristics

Grain size (µm) ASTM B214 *	Internal range	Apparent density (g/cm³) ASTM B212	Flow rate (s/50 g) ASTM B213
20 - 90	02	4.8**	13.5**
38 -106	03	4.3**	14.8**

* We guarantee 3% over and under grain size range

** Values are influenced by alloy chemical composition

PTA

Laser Cladding

Amongst the various cladding processes, Plasma Transferred Arc (PTA) and Laser Cladding have unique and somewhat similar capabilities.

They are both completely automated processes suitable for a wide range of high volume production, such as petrochemical and automotive sectors, plastic and glass industry.

The coating obtained has low dilution with the base material, metallurgical bond, uniform surface finish and very low porosity.

Physical characteristics

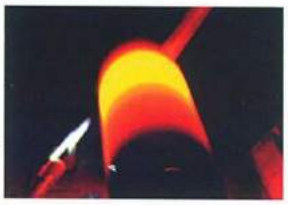
Grain size (µm) ASTM B214 *	Internal range	Apparent density (g/cm³) ASTM B212	Flow rate (s/50 g) ASTM B213
45 - 125	05	4.4 - 4.5**	14.4 - 15.0**
50 - 150	06	4.3 - 4.8**	14.0 - 14.6**
63 - 180	07	4.2 - 4.5**	14.8 - 15.5**

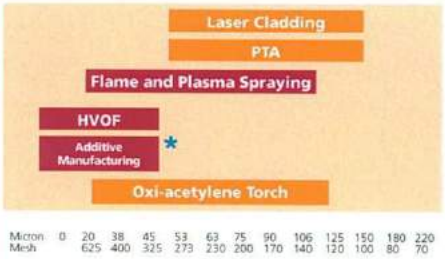
* We guarantee 3% over and under grain size range

** Values could be influenced by alloy chemical composition

Thermal Spray

In thermal spray process powder is molten and accelerated toward the device to be metallised. The coating obtained has high mechanical anchorage and good density up to 99.5%, according to the metal spraying method applied.
The thermal source, used to melt the particles, classifies thermal spraying processes.
Combustion Spray, exploits combustion energy; the main deposition techniques are: Flame-Powder, Detonation Gun and HVOF, where high spraying speed is achieved (1000 m/s) obtaining well anchored coating with good density.
Plasma Spray, exploits plasmogen gas (Ar, N_2, H_2) generated by an electric arc inside the torch. Temperatures reached are high, ~ 15000 °C, as well as the speed of particles ~ 100-300 m/s, at room pressure, until 400 m/s, at low pressure.





Physical characteristics

Grain size (µm) ASTM B214 *	Internal range	Apparent density (g/cm³) ASTM B212	Flow rate (s/50 g) ASTM B213
45 - 125	05	14.4 - 15.0**	4.4 - 4.5**
38 - 106	04	14.4 - 15.5**	4.3 - 4.5**
20 - 53	01	N.A	N.A

* We guarantee 3% over and under grain size range
** Values are influenced by alloy chemical composition

*NEW PRODUCTION ...ADDITIVE MANUFACTURING

Powders

Significant research and experience acquired from decades of manufacturing knowledge is the foundation from which COGNE Acciai Speciali has grown, becoming an undisputed leader in the stainless steel long products market.

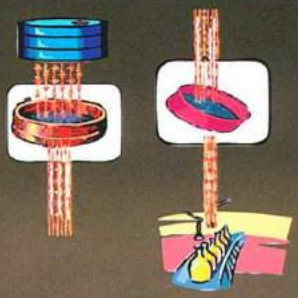
The Powder production took its origin within an R&D program started in 1988 and gradually evolved into a real industrial process.

COGNE Powder is inert gas atomised (process that allows the production of spherical, not oxidised, particles with homogeneous chemical composition) and sieved to obtain a precise grain distribution suitable for all applications.

COGNE has developed an integrated team which brings together the skills of Research, Production and Customer Services to support the high quality and the specific requirements of these niche products, satisfying all the Customers' needs in terms of different chemical compositions and grain distribution.

Raw Materials

Melting and Gas Atomisation



Sieving and Packaging

Particular of COGNE Powder at scanning electron microscope: spherical particles with uniform chemical composition and low oxygen content.