CARPENTER
Powder Products

Plasma Transferred Arc (PTA) and Laser Overlay

Plasma Transferred Arc (PTA) and Laser Overlay processes are used with metal powders to produce protective surfaces with metallurgical bonds to the substrate. These protective attributes include:

- Corrosion resistance
- Abrasion resistance
- Wear resistance
- Heat resistance

In addition, the processes are often used to repair worn parts at a lower cost than a replacement part and with potentially longer service life than with the original materials. PTA is particularly well suited to automation and large volume production of parts with deposition rates up to 20 lbs/hr possible. While the low heat input of the laser process results in a low heat affected zone which provides a nearly stress free overlay, fine microstructure, and high hardness. The low dilution rate and metallurgical bond provide a nearly impenetrable barrier to corrosive materials when the proper alloy is chosen and properly applied for the intended service.

A wide array of metal powders is available to enhance surface properties and protect industrial surfaces from corrosion, oxidation, and erosion due to wear and extreme temperatures. They are used in many applications from hard faced engine valves to forging punches and other tooling applications to coatings for offshore oil platforms and for coating or repairing a wide variety of other automotive or industrial parts.

Ready to Meet Your Needs

A pioneer in the development and production of metal powders, CPP offers a tremendous variety of alloys covering nearly every application. Great pride is taken in our ability to control the alloy's chemistry and particle size to meet customers' stringent requirements. Superb consistency is provided within and between production lots.

Being the only major powder metals manufacturer with production facilities in both North America and Europe enables CPP to supply customers in a timely and cost effective manner. Currently in place are one 450 kg and two 1000 kg furnaces in Bridgeville, PA, USA, a 1200 kg furnace in Woonsocket, RI, USA and twin 5500 kg furnaces in Torshalla, Sweden. This is one of the largest capacities for gas atomized powder available from any manufacturer.

Extensive research and development capabilities are available for developing new alloys to meet our customers' needs including a 150 kg furnace in Reading, PA, USA. Facilities include cover gas, vacuum, and air induction melt furnaces which are capable of using a variety of gasses for atomization depending upon the alloy being produced. Certifications include ISO 9001, AS 9100, and NADCAP.

Producing metal powders for over 40 years, CPP has hundreds of years of combined experience and is committed to continuous manufacturing improvement. Strategic relationships are often initiated with customers to develop and supply new powder metal alloys in the exact specification which best suits the requirements of their application.

PTA, Hardfacing, and Laser Overlay Powders

Micro-Melt®	UNS No.	Nominal Chemical Composition (typical values in wt.%)									Typical Deposited Hardness (HRC)	Application
		C	Cr	Ni	Mo	Fe	Co	Si	Mn	Others		
Stainless Steel												
309L	S30983	<0.1	24.0	13.0	<1.0	Bal	—	<0.5	<1.8	—	—	Corrosion, Intermediate Layer
316L	S31683	<0.1	17.0	11.0	2.0	Bal	—	0.6	1.5	**Cu:** <1.0	—	Corrosion, Intermediate Layer
316L Si	S31688	<0.1	19.0	12.0	2.5	Bal	—	0.8	1.75	**Cu:** <1.0	—	High Silicon For Flat Weld Beads
410	S41080	<0.2	12.5	≤0.6	—	Bal	—	≤1.0	≤1.0	—	38-42	Corrosion, Wear
410L	S41008	<0.1	12.5	≤0.5	—	Bal	—	0.6	≤1.0	—	30-36	Corrosion, Wear
420	S42080	<0.5	12.5	1.75	—	Bal	—	—	—	—	48-50	Corrosion, Wear
431	—	<0.2	16	1.75	—	Bal	—	—	—	—	—	Corrosion, Wear
17/4	S17400	<0.1	16.0	4.0	—	Bal	—	≤0.5	≤0.5	**Cu:** 4.0, **Nb:** 0.3	—	Build-up
Cobalt Based												
1	R30001	2.8	31.5	1.5	0.5	1.5	Bal	1.0	0.5	**W:** 13.5	50-52	Hot Wear, Corrosion
6	R30006	1.1	28.5	1.5	0.5	1.5	Bal	1.0	0.5	**W:** 5.0	40-42	Hot Wear, Corrosion
12	R30012	1.6	30.5	1.5	0.5	1.5	Bal	1.0	0.5	**W:** 9.0	45-47	Hot Wear, Corrosion
21	R30021	0.25	27.5	<2.5	5.5	<2.0	Bal	—	—	—	28-40	Hot Wear, Corrosion
CCM Plus®[1]	—	0.25	27.5	<1.0	5.5	<1.5	Bal	1.0	—	—	35-43	Hot Wear, Corrosion
CCW	—	<0.2	28.0	10.0	5.5	<2.0	Bal	<1.0	<1.0	**W:** 4.5, **Ta:** 0.8, **Co:** Bal	25-45	Critical Corrosion and Wear
F	R30002	1.7	28.0	23.0	—	2.0	Bal	1.0	<0.1	**W:** 12.5	38-40	Hot Wear, Corrosion
T-400	R30400	—	8.5	—	28.5	—	Bal	2.6	—	—	—	High Temp Wear, Metal to Metal Wear
T-800	—	—	17.5	—	28.5	—	Bal	3.4	—	—	—	High Temp Wear, Metal to Metal Wear
Nickel Based Super Alloys												
625	N06625	<0.1	21.5	Bal	9.0	2.0	—	0.5	0.5	**Nb:** 3.6, **Al:** <0.1, **Ti:** <0.1	34-36	Corrosion, Wear
622	—	<0.02	21.5	Bal	13.5	3.0	—	0.5	0.4	**W:** 3.0, **V:** 0.35	—	High Temp Corrosion
690	—	<0.02	29.0	Bal	—	10.0	—	—	—	—	—	High Temp Corrosion
718	—	0.04	18.5	Bal	3.0	19.0	—	—	—	**Nb:** 5.0, **Ti:** 1.0, **Al:** 0.5	—	High Temp Corrosion
Nickel Based Hardfacing												
B27	—	<0.1	—	Bal	—	—	—	3.5	—	**B:** 1.3	25-28	Build-up, Cast Iron
B40	—	0.2	9.0	Bal	—	2.9	—	3.1	—	**B:** 1.7	37-42	Wear, Corrosion
B50	N99645	0.4	12.0	Bal	—	3.5	—	3.8	—	**B:** 2.4	48-52	Wear, Corrosion
B56	N99645	0.5	14.5	Bal	—	4.0	—	3.7	—	**B:** 3.0	53-57	Wear, Corrosion
Tool Steels												
H-13	T20813	0.4	5.1	—	1.3	Bal	—	—	—	**V:** 1.0	—	Build-up
A11LVC	—	1.8	5.0	—	1.2	Bal	—	1.0	0.4	**V:** 9.0	—	Wear, Corrosion
420CW	—	<2.5	12.8	—	1.3	Bal	—	<1.0	<1.0	**V:** 9.3	—	Wear, Corrosion
4140	—	<0.5	1.0	—	0.2	Bal	—	<0.5	<1.0	—	—	Build-up
NiTung Blends - Proprietary Alloys Developed for Extreme Wear Applications												
NT-40	—	—	—	—	—	—	—	—	—	40 WC	—	—
NT-50	—	—	—	—	—	—	—	—	—	50 WC	—	—
NT-60	—	—	—	—	—	—	—	—	—	60 WC	—	—
NT-70	—	—	—	—	—	—	—	—	—	70 WC	—	—

1 U.S. Patent Number 5,462,575

The information and data presented herein are typical or average values and are not a guarantee of maximum or minimum values. Applications specifically for material described herein are made solely for the purpose of illustration to enable the reader to make his or her own evaluation and are not intended as warranties, either express or implied, of fitness for these or other purposes. There is no representation that the recipient of this literature will receive updated editions as they become available.

Please contact us with your requests for alloys not listed. We have many more alloys available that space limitations prevent us from listing.

CARPENTER
Powder Products

www.cartech.com **1-800-992-6825**

Main Office
Manufacturing & Sales
600 Mayer Street
Bridgeville, PA 15017 USA
CPPBVL@Cartech.com

Woonsocket, RI USA
Manufacturing

Reading, PA USA
Research and Development

Torshalla, Sweden
Manufacturing and Sales
+46-16-34-9800
CPPAB@Cartech.com

Dusseldorf, Germany
Sales
+49-211-175 2083-0
CPPGMBH@Cartech.com

Singapore
Sales
+65-6738-2401