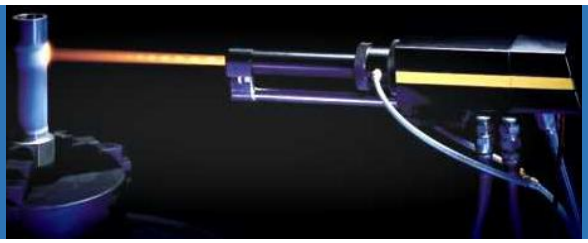
LW POWDER

LWPM



Thermal spraying&weldings









INTRODUCTION

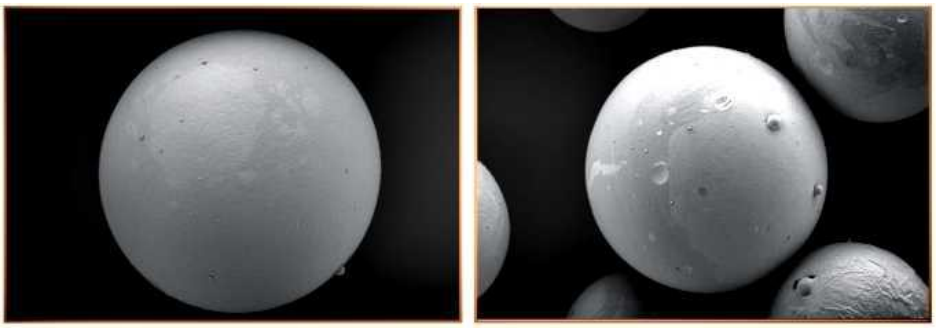
Thermal spraying technology is widely used in pre-protection and remanufacturing industries. The thermal spraying techniques are coating processes in which melted (or heated) materials are sprayed onto a surface.Coating materials include metals, alloys, ceramics, plastics and composites. They are mostly fed in powder form. Thermal Spray Powders are used in a variety of applications including Plasma Transfer Arc (PTA), Spray and Fuse, High Velocity Oxy-Fuel (HVOF), Laser Additive (3D print).

Typically, these applications require hardness, morphology and a particular particle size distribution. The hardness of powder are between HRC 15 and 70. Particle size distribution can be adjusted according to customer needs.

2. Cobalt base alloy powder

Cobalt base alloys typically contain tungsten and carbon for strengthening. Carbon has low solid solubility in cobalt and therefore most of its partitions are in WC, W2C, M6C or other carbides. These hard phases have a strengthening effect, giving such alloys high hardness and strength at temperatures under 800P. The cobalt-chromium-tungsten-carbon alloys generally have excellent properties to resist high temperature, oxidation and thermal fatigue.

Cobalt has a hexagonal-close-packed (hep) crystal structure at temperatures below 417C. Intrinsically, it has low coefficient of friction resulting in excellent wear resistance. At temperatures above 417C, cobalt transforms from HCP to FCC (face-centered-cubic) crystal structure, thereby, generating thermal stresses. Therefore, it is recommended that in weld overlaying and spraying, the parts being coated are pre-heated to 500-600C to avoid cracking in the coating or overlay.



Co-Cr-W

GRADE	HRC	Chemical Composition										Mesh Size	Typical Application
		C	Cr	Si	W	Fe	Mo	Ni	Co	Mn	P		
Co01	48-54	2.4	30	1	12	≤3.00	≤1.00	≤3.00	Bal	≤1.00		100/270	Valve seats, bearings, cutting blades, seal rings
Co03	48-54	2.3	30	1	12	≤3.00	/	≤3.00	Bal	/		100/270	Needle valve seats, guide roils valve seats
Co06	38-44	1.2	30	1	4.5	≤3.00		≤3.00	Bal	≤1.00		100/270 mesh 300/500 mesh	Engine values, high temperature pressure valves, turbo engine blades
Co156		1.6	28	1.1	4				Bal			100/270	Automotive parts, military applications
CoO6H	43-48	1.3	30	1.5	5.5	3.0 Max	0.8	3.0 Max	Bal	1.0 Max		100/270	Engine valves, high temperature pressure valves,turbo engine blades
Co12	42-48	1.4	29	1.4	8.5	≤3.00	≤1.00	≤3.00	Bal	≤1.00		100/270	High temperature pressure valves,saw teeth,extrusion screws
Co12B	45-49	1.3	30	1	5.5	3.0 Max	5	10.5	Bal	1.0 Max		100/270	Saw. guide plates
Co12H	48-53	1.7	30	1.7	7	2.0Max	2	3.0Max	Bal	0.5Max		100/270	High temperature pressure valves, saw teeth,extrusion screws
Co6113	43-48	1.8	27				4	6	Bal			100/270	Resistance to corrosion and wear
Co107	40-44(46-50)	2	35	1	5	2.0Max		24	Bal	1		100/270	Work hardening
Co19	48-56	1.8	31	1	11	3.0Max		3.0Max	Bal	1		100/270	Cutting knives
CoF	37-44	1.6	26	1.1	12	3.0max	0.5Max	22.5	Bal	0.5Max		100/270	Engine valves
CoFH	38-44	1.4	28	1.2	12	3.0Max	0.8	22.5	Bal	0.5		100/270	Engine valves
Co20	57-53	2.5	32	1	18	≤3.00	≤1.00	≤3.00	Bal	≤1.00		300/500	Bearing sleeves, wear plates
Co07	30-36	0.4	26	0.9	5.5	3.0Max		3.0Max	Bal	0.3		100/270	Steam turbine blades, brass casting molds, extrusion molds
CoX-40	30-35	0.8	25.5	0.4	7.5	1.0Max	1.0Max	10.5	Bal	0.5Max	0.04 Max	100/270	Steam turbine pans for resisting high temperature degradation and erosion
Co31	30-35	0.4	25.5	0.8	7.5	2.0Max	0.5Max	10.5	Bal	0.5Max		100/270	Steam turbine pans for resisting high temperature degradation and erosion
Co694	47-53	1	28	1	19	2.5Max			Bal	1.0		100/270	Steam turbine parts for resisting temperature degradation and erosion
Co25	20Max	0.05 Max	20	0.8	15	3.0Max	8	10	Bal	1.3		100/270	Hot extrusion molds
Co306	34-40	0.4	25	1	2.5	4.0Max		6	Bal	1.0		100/270	Steel hot rolling shears, clangs, guide rolls.
Co238	20-26	0.1	26	1		20	3.0		Bal	1.0		100/270	Forging dies
Co190	57-63	3.3	26	0.8	14	3.0Max	1.0Max	3.0Max	Bal	1.0Max		100/270	Oil drilling heads
Co400	48-54	0.08 Max	8.5	2.5		2.0Max	29	1.0Max	Bal	0.5Max		100/270、300/500	Galvanizing line bearing sleeves and shaft sleeves.
Co400M1		0.08 Max	14	2.6		0.5Max	26	0.5	Bal	0.1Max		100/270、300/500	To resist high temperature corrosion, galvanizing bearing sleeves.shaft sleeves
CO400M2	46-52	0.08Max	17	1.2		0.5Max	22	0.5Max	Bal	0.5Max		100/270、300/500	Resist high temperature corrosion, galvanizing bearing sleeves, shaft sleeves, natural gas engine valves
Co800	52-58	0.08Max	17.5	3.5		2.0Max	29	1.0Max	Bal	0.5Max		300/500	Resist high temperature degradation

Co-Cr-Mo

GRADE	HRC	Chemical Composition								Mesh	Typical Application
		C	Cr	Si	Fe	Mo	Ni	Co	Mn		
Co706	38-43	12	29	0.5	3.0Max	5	3.0Max	Bal	1	100/270、300/500	Pressure valves with high temperature corrosion resistance
Co702	45-50	1.8	29	0.5	3.0Max	9	3.0Max	Bal	0.5	100/270	Pressure valves with high temperature corrosion resistance.extrusion screws
Co701	50-56	2.5	31	0.5	3.0Max	13	3.0Max	Bal	0.5	100/270	Pressure valves with high temperature corrosion resistance
Co720	54-60	2.5	33	0.5	3.0Max	18	3.0Max	Bal	0.8	300/500	Pressure valves with high temperature corrosion resistance
Co721	18-24	0.05Max	30	0.6	8	4	0.3Max	Bal	0.7	100/270	Steam turbine erosion-resistant parts

GRADE	HRC	Chemical Composition									Mesh	Typical Application
		C	Cr	Si	W	Fe	Mo	Ni	Co	Mn	B	
Co157	51-57	0.3	22	1.5	5	3.0Max		3.0Max	Bal		2.4	150/300	High temperature pressure valves
Co158	40-46	0.8	29	1.5	5.5	3.0Max	≤1.00	≤3.00	Bal	≤1.00	0.8	150/300	High temperature pressure valves
Co158V	45-50	1	30	1.2	8	3.0Max		3	Bal	0.3Max	0.8	200/400	Motorcycle engine valves
CoWC35	57-63	2.4	12	2.6	33	3.0Max		9	Bal		1.9	150/300	Motorcycle engine valves
C0SF6	40-46	0.6	18	2.3	7.5	3.0Max	1.0Max	14	Bal	0.5Max	1.7	150/300	Galvanizing line bearing and shaft sleeves
CoSF12	46-52	0.9	18	2.8	9	3.0Max		14	Bal	0.5Max	1.8	150/300	High temperature pressure valves and seats
CoSFI	52-58	12	19	2.8	12	3.0Max		12	Bal	0.5Max	2.4	150/300	High temperature pressure valves and seats
CoSF20	59-64	1.5	19	3	15	2.0Max		13	Bal	0.5Max	3	150/300	High temperature pressure valves and seats
CoSFT400	55-60	0.1	10	2.5		1.0Max	22	5	Bal	0.5Max	1.8	100/270	Galvanizing line bearing shaft sleeves

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