SURFACING ALLOYS

TECH-PTA / LASER SELECTOR CHART

WALLCOLMONOY
SURFACING ALLOYS

COLMONOY®
(nickel-based)

ALLOY	NOMINAL COMPOSITION (%)									ROCKWELL HARDNESS (C-scale)	SUPPLIED AS	DESCRIPTION AND GENERAL USES
	B	C	Cr	Fe	Mo	Si	W	Ni	Others			
23	1.5					2.5		Bal		16-25	Atomized Powder	High oxidation resistance and is easily furnished with a file or by grinding. Chipped, cracked, or severely worn cast-iron parts are easily salvaged through the application of this alloy.
625		0.1	22.0	5.0	9.0	0.5		Bal	Mn: 0.5 Nb: 3.7 Ti: 0.4	16-17	Atomized Powder	An alloy with high fatigue strength and toughness, from cryogenic temperatures to 1050°C (1922°F). Colmonoy® 625 has good oxidation resistance. In addition, when heated in air and oxidising environments, Colmonoy® 625 forms a passivating oxide layer, protecting the alloy from corrosive attack in numerous media.
686		0.02	21.5	2.0	16.0	0.95	3.8	Bal	Mn: 0.5 Ti: 0.07	22	Atomized Powder	A nickel-based superalloy with high levels of chromium, molybdenum and tungsten, achieving one of the highest ratings possible for pitting corrosion resistance. Coatings made using Colmonoy® 686 also offer outstanding general and crevice corrosion resistance and have a low coefficient of friction.
276		0.02	16.0	5.0	16.0	4.2	4.2	Bal	Co: 2.5 Mn: 1.0 V: 0.35	22	Atomized Powder	A nickel-based superalloy powder, similar to Hastelloy C276, with the alloyed elements of chromium, molybdenum and tungsten with higher PREN number. Coatings are made using this alloy offering higher corrosion resistance with excellent pitting resistance and crevice corrosion.
2800	0.9	0.3	5.8	1.5		3.0		Bal		25-30	Atomized Powder	Nickel-based hard- surfacing alloys used for glass moulding components and welding cast iron. Has high oxidation resistance and are easily furnished with a file or by grinding. Chipped, cracked, or severely worn cast- iron parts are easily salvaged through the application of these alloys.
21A	0.9	0.3	5.8	1.5		4.1		Bal		27-32	Atomized Powder	Used primarily on glass container moulds and related parts, to fill in defects and worn areas. Contains chromium for resistance to wear and sulfur-containing media. Also used as cushion for harder overlays such as Colmonoy® 56PTA. Also available for Laser Cladding.
21A PTA-G	0.9	0.3	5.2	1.4		2.9		Bal	Al: 0.5	27-33	Atomized Powder	Colmonoy® 21 A PTA-G contains aluminum and is specifically designed for PTA welding of cast iron parts. The presence of aluminum kills porosity which can be caused by high carbon in cast iron base metals. Also available for Laser Cladding.
3000	1.8	0.1		1.5		3.5		Bal		30	Atomized Powder	A nickel-silicon-boron alloy designed for deposition the PTA Welding process. Applications include restoring dimensions to worn parts and protecting OEM parts from wear. This powder can be blended with tungsten carbide or other hardmetals to achieve a highly wear resistant surface.
4	1.4	0.6	13.0	4.0		3.9		Bal		37-44	Atomized Powder	Optimized Colmonoy® 4 formulation for plasma transferred arc (PTA) application. Has greater impact resistance and workability than Colmonoy® 5. For dies, moulds, valves, and plungers. Finished with carbide tools and grinding.
45	2.3	0.5	12.0	3.5		3.0		Bal		44-48	Atomized Powder	Optimized Colmonoy® 45 formulation for plasma transferred arc (PTA) application. Used for riser pins, gate valves and seats. Has potential use for parts in the glass industry.
52	2.3	0.5	12.0	4.5		3.3		Bal		45-53	Atomized Powder	Nickel based, hard-surfacing alloys for use on new parts to resist against wear, corrosion, heat and galling. Used for repair of worn or out of tolerance parts. The benefits of this alloy are the combined effects of moderate hardness, increased ductility and impact resistance.
5	1.6	0.7	14.3	4.9		4.8		Bal		47-52	Atomized Powder	Optimized Colmonoy® 5 formulation for plasma transferred arc (PTA) application. Has greater ductility, better impact resistance and workability than Colmonoy® 6. For wear rings, plungers, dies. Finished with carbide tools and grinding.
56	1.9	0.9	18.0	5.4		5.3		Bal		53-58	Atomized Powder	Specifically designed for protecting and restoring plastics extrusion screws using plasma transferred arc (PTA) application. Between Colmonoy® 6 and 5 in chemistry and hardness. Better ductility and impact resistance than Colmonoy® 6. Finished with carbide tools and grinding.
6	2.1	1.1	20.0	5.7		5.6		Bal		56-62	Atomized Powder	The original, nickel-based hard-surfacing alloy designed for plasma transferred arc (PTA) application. Optimized formulation to offset dilution and alloy loss from the arc. Extremely resistant to wear, especially under corrosive conditions. Low coefficient-of-friction. Can be hot-formed. Finished by grinding.
84	1.4	1.1	29.0	3.0		2.4	7.5	Bal		40-45	Atomized Powder	A nickel-based alternative to cobalt surfacing alloys, for service temperatures up to 1500° F. Boron and silicon content provide better weldability at lower application temperatures.
57	2.5	0.5	11.5	3.5		3.5	16.0	Bal		52-57	Atomized Powder	Specifically formulated for overlaying the flights of new and rebuilt extrusion or injection molding screws. Other potential applications where resistance to abrasion and corrosion are important include food processing industry feed screws, air locks and scraper blades. Finished with carbide tools, wet grinding, or dry lapping. Also available for Laser Cladding.
88	3.0	0.7	15.0	3.5		4.0	15.5	Bal		59-64	Atomized Powder	Unique alloy containing chromium and tungsten borides and carbides for maximum abrasion and corrosion resistance. For high-temperature, highly abrasive applications, glass mould plungers, pump plungers and sleeves, valve seats, plastics extrusion screws. Finished by grinding or CBN tools.

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3001-604	0.5	2.5	2.3	0.6		1.3	57.7	Bal		30	Composite Powder	Colmonoy® 3001-604 and Colmonoy® 3001-654 are blends using extremely hard and wear resistant spherical tungsten carbide. These powders are designed for application by Laser Cladding but can also be applied by PTA Welding processes. Laser Clad deposits offer extreme wear resistance and good resistance to high temperature corrosion and erosion.
3001-654	0.4	2.7	2.0	0.5		1.1	62.5	Bal		30	Composite Powder	Colmonoy® 3001-604 and Colmonoy® 3001-654 are blends using extremely hard and wear resistant spherical tungsten carbide. These powders are designed for application by Laser Cladding but can also be applied by PTA Welding processes. Laser Clad deposits offer extreme wear resistance and good resistance to high temperature corrosion and erosion.
7303-60	0.4	3.7	2.3	0.6		1.6	56.3	Bal		30-35	Composite Powder	Specifically designed for overlays that require a combination of high impact resistance and abrasion resistance. Typical applications include mining and drilling equipment, impact hammers, earth moving and aggregate processing equipment and die plates. Also available for Laser Cladding.
7303-65	0.4	4.0	2.1	0.6		1.5	59.0	Bal		30-40	Composite Powder	A composite blend of atomized nickel-based alloy powder and 65% by weight monolithic tungsten carbide. The combination of an extremely tough matrix and very hard carbide produces an exceptional impact and wear resistance combination. A dense carbide distribution with small inter-carbide spacing allows for a large surface area of tungsten carbide to be exposed to the wear environment to provide maximum service life.
7403-60	0.6	3.8	5.2	1.6		1.6	56.3	Bal		40-45	Composite Powder	Very similar to Colmonoy® 7303-60P4 but is harder, more wear resistant and slightly less ductal. Also available for laser cladding.
83	1.0	1.9	20.3			1.7	34.1	Bal		45-55	Composite Powder	A tough nickel-chromium-tungsten-boron matrix alloy containing chromium carbides with the addition of extremely hard tungsten-carbide particles for excellent abrasive wear protection. Excellent edge retention. Specifically for plasma transferred arc (PTA) application. Also available for Laser Cladding.
5001-601	1.3	2.3				1.3	57.5	Bal		50	Composite Powder	Nickel-silicon-boron alloy blended with 60% of cast & crushed tungsten carbide. Colmonoy® 5001-604 is a nickel-silicon-boron alloy blended with 60% of spherical tungsten carbide. Designed for deposition by the PTA Welding process and can also be used for Laser Cladding applications.
5001-604	1.2	2.4				1.2	57.5	Bal		50	Composite Powder	Nickel-silicon-boron alloy blended with 60% of spherical tungsten carbide. Designed for deposition by the PTA Welding process and can also be used for Laser Cladding applications.
5002-604	0.6	2.6	4.4	1.5		1.6	57.7	Bal		50	Composite Powder	A spherical tungsten carbide composite that offers extreme wear resistance and good resistance to high temperature corrosion and erosion.
5002-654	0.6	2.8	4.7	1.6		1.7	62.0	Bal		50	Composite Powder	A spherical tungsten carbide composite that offers extreme wear resistance and good resistance to high temperature corrosion and erosion.
7301-60	0.4	2.4	2.0	0.5		1.1	57.5	Bal		50-60	Composite Powder	A composite powder blend consisting of a nickel alloy matrix and cast tungsten carbide. Laser Clad deposits offer extreme wear resistance and good resistance to high temperature corrosion and erosion. Since the composite deposit has a large amount of tungsten carbide the macrohardness is higher than expected based on the matrix.

WALLEX™
(cobalt-based)

21		0.25	27.0		5.5			2.75	Co: Bal	28-38	Atomized Powder	A cobalt-chromium-molybdenum based alloy with excellent high temperature properties. Wallex® 21 combines resistance to galling, cavitation, erosion and corrosion with toughness and work hardening properties.
6		1.2	29.0	1.5		1.2	4.5		Co: Bal	38-46	Atomized Powder	Cobalt-Chrome Tungsten Carbide (Co-Cr-Tu-C) alloy with excellent resistance to erosion and cavitation.
40	2.0	0.6	16.2	2.0		1.9	7.6	23.5	Co: Bal	41-46	Atomized Powder	A cobalt-nickel alloy powder that forms deposits similar to those of Wallex 50, but softer. Finished with carbide tools and grinding. Developed as a lower temperature alternative for many cobalt-6 applications. Also available for laser cladding.
12		1.5	29.0	2.0		1.5	8.5		Co: Bal	43-53	Atomized Powder	Cobalt-based alloy that has high heat, abrasion and wear resistance. It has low coefficient of friction and is non-galling. It retains high hardness at red heat, and recovers full hardness after exposure to temperatures as high as 1100°C.
1		2.5	30.0	1.5		1.5	12.0		Co: Bal	50-58	Atomized Powder	Cobalt-based alloy with excellent abrasion and high-temp corrosion resistance.
50	3.4	0.8	19.0	2.0		2.8	10.0	18.0	Co: Bal	55-61	Atomized Powder	Good corrosion resistance and low coefficient-of-friction provides good metal-to-metal wear protection (not involving much impact). For bushings, knives, and cams. Finished by grinding.

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316		0.3	17.0	Bal	2.5	1.0		12.0		Atomized Powder	Austenitic stainless steel alloy with good corrosion resistance and high impact, tensile, and creep strength at elevated temperatures. Contains 2.5% molybdenum and <0.03% carbon for excellent resistance to pitting and crevice corrosion, especially in chloride-rich environments. Ideal for processing equipment, valves, heat exchangers, augers, tanks, and vessels across oil & gas, food, marine, pulp & paper, medical, and automotive industries. Finished by grinding or filing.