SURFACING ALLOYS

TECH 1-K SELECTOR CHART

COLMONOY®
(nickel-based)

WALLCOLMONOY
SURFACING ALLOYS

ALLOY	NOMINAL COMPOSITION (%)									ROCKWELL HARDNESS (C-scale)	FUSING TEMPERATURE (Approx.)	SUPPLIED AS	METHOD OF APPLICATION	DESCRIPTION AND GENERAL USES
	B	C	Cr	Fe	Mo	Si	W	Ni	Others					
with Chromium Carbide[1]														
42	2.0	0.4	10.0	2.5		3.0		Bal		35-40	980 °C 1800 °F	Atomised Powder	Spraywelder, HVOF**, 5P	Better ductility and toughness than Colmonoy 52. Less hardness and slightly less abrasion and corrosion resistance. Finished by carbide tools and grinding.
84	1.4	1.1	29.0	2.0		2.2	7.5	Bal		40-45	1095 °C 2000 °F	Atomised Powder, Ingot	Spraywelder, DS8000 / RoToTeC 80, PTA*, Laser Cladding**	A nickel-based alternative to cobalt surfacing alloys, for service temperatures up to 815°C (1500 °F). Boron and silicon content provide better weldability at lower application temperatures.
45	2.3	0.4	12.0	3.5		3.0		Bal		43-46	1045 °C 1910 °F	Atomised Powder, Ingot	Spraywelder, DS8000 / RoToTeC 80, PTA*, Laser Cladding*	Developed for the oil patch industry for the sole purpose of being able to be polymer quenched. This quenching process is more severe than "salt bath" quenching to achieve a deeper and more thorough hardening of the base metal. The polymer is held at around 150°F (65°C).
52	3.0	0.5	13.5	4.0		3.7		Bal		45-50	1065 °C 1950 °F	Atomised Powder	Spraywelder, DS8000 / RoToTeC 80, HVOF**, 5P	Similar to Colmonoy 62, but has increased ductility with slightly lower abrasion resistance and similar corrosion resistance. Finished by grinding.
56	2.6	0.5	13.0	4.0		3.8		Bal		50-55	1030 °C 1185 °F	Atomised Powder, Bare Rods, Ingot, Cored Wire	GTAW, Oxyacetylene, GMAW, PTA*, Laser Cladding*	Better ductility and impact resistance than Colmonoy 6. Finished with carbide tools and grinding. Used for valve seats, ball valves, and marine engine valves.
62	3.2	0.7	15.5	4.0		4.2		Bal		56-64	1025 °C 1875 °F	Atomised Powder	Spraywelder, DS8000 / RoToTeC 80, HVOF**, 5P	Hard nickel-chromium-boron alloy containing chromium carbides. Excellent abrasion and corrosion resistance. Recommended for hardfacing parts to resist wear, corrosion, heat and galling. Typical applications: shafts, sleeves, pump plungers, sucker rod couplings, bed knives, camshafts, bushings, mill guides, mixer blades, seal rings, brick manufacturing equipment, and conveyor screws. Finished by carbide tools and grinding.
72[2]	3.2	0.5	12.0	4.0		3.0	13.0	Bal		57-62	1060 °C 1940 °F	Atomised Powder, Bare Rods, Ingot	Spraywelder, DS8000 / RoToTeC 80, Fusewelder, Oxyacetylene, GTAW PTA*, 5P	Tungsten content strengthens the nickel matrix, giving this alloy excellent resistance to low-stress abrasion and scouring action. Wear resistance often superior to Colmonoy 6. For pump parts. Finished by grinding.
88[1]	3.0	0.8	17.0	3.5		4.0	17.0	Bal		59-64	1100 °C 2020 °F	Atomised Powder, Bare Rod, Cored Wire	Spraywelder, DS8000 / RoToTeC 80, Fusewelder, GMAW, Oxyacetylene, GTAW, PTA*, Laser* Cladding, HVOF**, 5P	Unique alloy contains 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.
69	3.0	0.7	14.0	4.0	2.2	4.5		Bal	Cu 2.0	57-63	1030 °C 1890 °F	Atomised Powder	Spraywelder, DS8000 / RoToTeC 80, HVOF**, 5P	Additions of chromium and molybdenum for better corrosion resistance. Wide plastic range makes overlays easier to fuse without sagging. For marine and petro-chemical applications. Finished by grinding.

1 U.S. Patent No. 5,141,571
2 U.S. Patent No. 2,868,639

*See WCL_TECH-PTA / LASER Selector Chart

**See WCL_TECH-HVOF Selector Chart

Specification I
MIL-R-17131C:RNiCr-C-1
AWS 5.21: RNiCr-C & ENiCr-C
SFA 5.21:NiCr-C
AMS:4775A

Specification II
MIL-R-17131C:RNiCr-B-1
SFA 5.21:NiCr-B
AWS 5.21 NiCr-B

Specification III
SFA 5.21:NiCr-A
AWS 5.21 NiCr-A

Specification conformance by request

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(nickel-based)

WALLCOLMONOY
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ALLOY	NOMINAL COMPOSITION (%)									ROCKWELL HARDNESS (C-scale)	FUSING TEMPERATURE (Approx.)	SUPPLIED AS	METHOD OF APPLICATION	DESCRIPTION AND GENERAL USES
	B	C	Cr	Fe	Mo	Si	W	Ni	Others					
Fuseweld[1]														
225	0.5					2.2		Bal	P: 1.9	13-17	900 °C 1650 °F	Atomised Powder	Fusewelder	Patented alloy specially designed for glass container mould protection and restoration. Also used for rebuilding automotive parts (clutch components).
226	0.8					2.2		Bal	P: 1.9	16-21	935 °C 1717 °F	Atomised Powder	Fusewelder	Patented alloy specially designed for glass container mould protection and restoration. Also used for rebuilding automotive parts (clutch components).
227	0.9					2.7		Bal	P: 2.1	22-27	915 °C 1680 °F	Atomised Powder, Bare Rod	Fusewelder, Oxyacetylene, GTAW	Patented alloy specially designed for glass container mould protection and restoration. Also used for rebuilding automotive parts (clutch components).
23	1.6					3.6		Bal		23-28	1050 °C 1922 °F	Atomised Powder	Fusewelder	Similar to Colmonoy 25 but with increased fluidity.
229	0.9		2.8			2.7		Bal	P: 2.1	24-30	915 °C 1680 °F	Atomised Powder	Fusewelder	Specifically designed to be used with the Colmonoy Fusewelder Torches for glass mould components. Slightly harder than Colmonoy 227, but slightly softer than Colmonoy 228. An excellent alloy for use on rings, baffles, and seams.
25	1.8					2.7		Bal		25-31	1065 °C 1950 °F	Atomised Powder	Fusewelder	Widely used in the Glass Container Industry for protection of moulds and for the application of carbide studs for Oil Industry components.
228	1.0					3.7		Bal	P: 2.1	28-33	930 °C 1705 °F	Atomised Powder	Fusewelder	Patented alloy specially designed for glass container mould protection and restoration. Also used for rebuilding automotive parts (clutch components).
234	1.0	0.2	4.0		3.0	2.8		Bal	P: 2.1	32-36	960 °C 1760 °F	Atomised Powder	Fusewelder	Alloy specially designed for glass container mould protection and restoration. More abrasion resistant than Colmonoy 228, with better ductility than Colmonoy 43.
237	1.2	0.2	4.0		3.0	2.8		Bal	P: 2.1	35-38	930 °C 1706 °F	Atomised Powder	Fusewelder	Marginally harder alternative to Colmonoy 234. Alloy specially designed for glass container mould protection and restoration. More abrasion resistant than Colmonoy 228, with better ductility than Colmonoy 43.
39	1.5	0.3	7.5	1.0		3.8		Bal		38 (nominal)		Atomised Powder	Fusewelder	Marginally softer than Colmonoy 43. Designed for general hard facing including glass container equipment repair and manufacture, plastic blow moulding tools and dies.
43	1.5	0.3	7.5	1.0		3.5		Bal		38-43	980 °C 1800 °F	Atomised Powder	Fusewelder, HVOF**	Similar to Colmonoy 53, but better ductility, less hardness, and slightly less abrasion and corrosion resistance. Finished by carbide tools and grinding.
53	2.5	0.5	12	4.0		3.3		Bal		45-50	1065 °C 1950 °F	Atomised Powder	Fusewelder, HVOF**	Similar to Colmonoy 63, but has increased ductility with slightly lower abrasion and corrosion resistance. Finished by grinding.
63	3.0	0.6	15.0	4.0		4.5		Bal		57-61	1025 °C 1875 °F	Atomised Powder	Fusewelder, HVOF**	Hard nickel-chromium-boron alloy containing chromium carbides. Excellent abrasion and corrosion resistance. Finished by grinding.

1 Contains tungsten-carbide particles (hardness 2400 HV)
2 U.S. Patent 5,234,510
3 European Patent 0498989

*See WCL_TECH-PTA / LASER Selector Chart

**See WCL_TECH-HVOF Selector Chart

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(nickel-based)

ALLOY	NOMINAL COMPOSITION (%)									ROCKWELL HARDNESS (C-scale)	FUSING TEMPERATURE (Approx.)	SUPPLIED AS	METHOD OF APPLICATION	DESCRIPTION AND GENERAL USES
	B	C	Cr	Fe	Mo	Si	W	Ni	Others					
with Tungsten Carbide[1]														
7541-55	0.8	3.0	3.4 55% Tungsten Carbide	1.5		1.5	50	Bal		52 (nominal)		Composite Powder	Fusewelder	A tough nickel-chrome-boron matrix, slightly softer than 705 for improved crack resistance. Higher volume of tungsten carbide particles for increased abrasion resistance. Typical applications include oil industry stabilisers, drill bits, reamers and hole openers. Conveyers, extruders and mixer parts. Finish by grinding.
705	1.5	2.2	7.0 50% Tungsten Carbide	2.0		2.3	48.1	Bal		56-63	1025 °C 1875 °F	Composite Powder	Fusewelder	A tough nickel-chromium-boron matrix alloy holds extremely hard tungsten-carbide particles used for protection from severe sliding abrasion. Used on screw conveyors and augers. Finished by grinding.
75	1.4	2.5	7.5 50% Tungsten Carbide	2.5		2.4	47.5	Bal	Co: 0.25	57-63	1065 °C 1950 °F	Composite Powder	Spraywelder, DS8000 / RoToTeC 80	A nickel-chromium-boron matrix alloy holds extremely hard tungsten-carbide particles. Used primarily for protection from severe sliding abrasion. Finished by grinding.
730	1.8	2.4	10.4 35% Tungsten Carbide	2.5		2.4	39.8	Bal	Co: 4.1	57-64	1060 °C 1940 °F	Composite Powder	Spraywelder, DS8000 / RoToTeC 80	A tough nickel-chromium-tungsten matrix alloy holds extremely hard tungsten-carbide particles. Finer mesh tungsten carbide than Colmonoy 750. Used on pump plungers and sleeves for protection from fine-particulate abrasive conditions. Minimises packing wear. Finished by grinding.
750	1.4	3.0	6.8 50% Tungsten Carbide	2.0		1.8	48.0	Bal	Co: 6.0	57-64	1070 °C 1960 °F	Composite Powder	Spraywelder, DS8000 / RoToTeC 80	A tough nickel-chromium-tungsten matrix alloy is used to hold extremely hard tungsten-carbide particles. Best used for the most severe abrasive conditions. Finished by grinding.

WALLEX®
(cobalt-based)

42	1.7	0.9	18.5	2.5		3.0	8.0	13.5	Co: Bal	45-50	1140 °C 2080 °F	Atomised Powder, Ingot	Spraywelder, DS8000 / RoToTeC 80, Fusewelder	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.
50	3.7	0.8	19.0	2.5		2.8	10.0	18.0	Co: Bal	56-61	1095 °C 2000 °F	Atomised Powder, Ingot	Spraywelder, DS8000 / RoToTeC 80, Fusewelder	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.
55	2.1	2.4	12.3 35% Tungsten Carbide	1.2		1.8	35.0	11.0	Co: Bal	58 min	1110 °C 2030 °F	Composite Powder	Spraywelder, DS8000 / RoToTeC 80	Uses a cobalt-nickel matrix alloy to hold extremely hard tungsten-carbide particles. Primarily to protect surfaces against severe sliding abrasion. Finished by grinding.

1 Contains tungsten-carbide particles (hardness 2400 HV)
2 U.S. Patent 5,234,510
3 European Patent 0498989