

VERSALLOY® NICKEL BRAZING ALLOYS

PMA VERSAlloy rods are self-fluxing on conventional base metals. They are made from the highest purity sintered powder and are not contaminated with fillers and binders. Nickel is tougher, harder, and more durable than iron-based steel alloys. Cast iron, mild steel and stainless steel parts overlaid with nickel alloys last up to ten times longer than untreated parts.

PMA VERSAlloy Nickel Brazing Alloys applications:

Oil & Gas, Power Generation, Nuclear Energy, Petrochemicals, Automotive/Rail/Diesel Transportation, Aerospace, Dental Solder/Surgical Tools/Medical Devices in Healthcare, Pulp and Paper, Consumer Products with Heating Elements, Food Processing Machinery

PMA – Protective Metal Alloys is Broco Rankin's specialty alloys division for the design, formulation, and manufacture of nickel-based build-up and hardfacing products. PMA nickel-based electrodes and powders provide excellent resistance against the effects of corrosion, erosion, abrasion, and high temperature oxidation, and metal-to-metal wear.

All PMA products are custom made-to-order in a wide range of diameters. Brazing preforms, coated electrodes, customer conversion of powders are available.



PMA processes for manufacturing PMA products are ISO 9001:2015 certified.

	Rankin PMA Product	Mechanical Properties and Characteristics	Uses
▶ For severe Metal-to-Metal Wear with low impact	VERSAlloy® 60 AWS A5.13, NiCr-A	Typical Rc Hardness: 57 – 61 Melting Temp: 1900°F Non-machinable	Cams, shafts, bushings, valve seats, cement pumps
▶ For medium impact and severe abrasion	VERSAlloy® 50 AWS A5.13, NiCr-B	Typical Rc Hardness: 48 – 52 Melting Temp: 1950°F Non-machinable, Check Free Deposits	Mining bits, agriculture implements, pulp knives, cutting bars
▶ For high impact, high temperature and low to medium abrasion	VERSAlloy® 40 AWS A5.13, NiCr-A	Typical Rc Hardness: 38 – 42 Melting Temp: 2000°F Non-machinable	Rock bits, impact hammers, dies, molds, plungers, valve slides
▶ For joining high cobalt materials, low diffusions into base metals	BCo-1 AMS 4783	High elevated temperature strength	Dental, cobalt jet engine parts, brazing repairs
▶ For joining super alloys, good corrosion and oxidation resistance	BNi-4 AMS 4779	Low carbon alloy, good chemical corrosion resistance	Dental, jet engine parts, joining stainless assemblies

Rankin PMA VERSAlloy® rods are available in 18" lengths with diameters of 3/64", 3/32", 1/8", 5/32", 3/16", 1/4", 5/16" and 7/16". Coated electrodes can be special ordered upon request.

For more information call **800.845.7259**, visit broco-rankin.com/PMA, or email sales@rankin.com.

Toll-free: 800.845.7259
P: 909.483.3222
F: 909.483.3233
sales@brocoinc.com

www.Broco-Rankin.com

DIAMOND CARBIDE

PMA Diamond Carbide Hardfacing Rods are a special blend of tungsten carbide sintered with nickel, chromium, and boron powder. The nickel alloy matrix offers the ultimate in extreme wear protection, and has a lower melting point than iron-based products. Tungsten carbide is available in multiple sizes to address usage needs.

Industries for PMA Diamond Carbide applications:

Aerospace, Power Generation, Mining/Minerals, Petroleum Refining, Drilling, Chemicals/Plastics, Construction/Heavy Machinery, Agriculture, Machinery/Process Equipment, Wood/Pulp & Paper, Rolling Mills, Concrete/Aggregate, and Recycling.



PMA – Protective Metal Alloys is Broco Rankin's specialty alloys division for the design, formulation, and manufacture of nickel-based build-up and hardfacing products. PMA nickel-based electrodes and powders provide excellent resistance against the effects of corrosion, erosion, abrasion, and high temperature oxidation, and metal-to-metal wear.

All PMA products are custom made-to-order in a wide range of diameters. Brazing preforms, coated electrodes, customer conversion of powders are available.



PMA processes for manufacturing PMA products are ISO 9001:2015 certified.

	Rankin PMA Product	Mechanical Properties and Characteristics	Uses
▶ For extreme metal-to-metal wear with low impact	Diamond Carbide 60	Typical Rc Hardness: 57 – 61 Melting Temp: 1900°F Non-machinable	Drill stabilizers, cutting and shredding blades, digging tool blades, wood gripping tools
▶ For moderate impact, high corrosion needing good impact resistance	Diamond Carbide 55	Typical Rc Hardness: 53 – 57 Melting Temp: 1925°F Non-machinable	Feed screws, rebuilding of extrusion screws and cast barrels
▶ For extreme metal-to-metal wear and low impact resistance	Diamond Carbide 50	Typical Rc Hardness: 48 – 52 Melting Temp: 1950°F Non-machinable, Check Free Deposits	Drill bits, mining tools, stabilizers, stainless type augers
▶ For severe metal-to-metal wear and high impact resistance	Diamond Carbide 40	Typical Rc Hardness: 38 – 42 Melting Temp: 2000°F Non-machinable	Pulp chippers, debarkers, mill hammers

Rankin PMA VERSAlloy® Diamond Carbide hardfacing rods are available in 18" lengths with diameters of 3/32", 1/8", 5/32", 3/16", 1/4", 5/16", and 7/16". Custom powder conversions and cladding are available upon request.

For more information call **800.845.7259**, visit broco-rankin.com/PMA, or email sales@rankin.com.

Toll-free: 800.845.7259
P: 909.483.3222
F: 909.483.3233
sales@brocoinc.com
www.Broco-Rankin.com