

Polymet

PRODUCT
BROCHURE

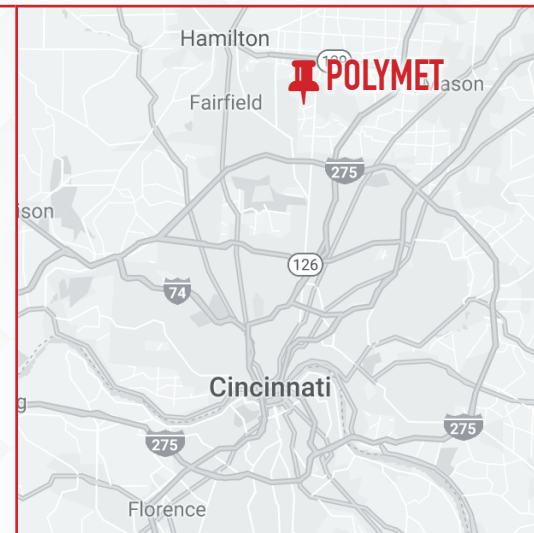


ABOUT US



Polymet Corporation is a globally recognized manufacturer of hardfacing and welding consumables. Our innovative path to problem solving allows us to offer a wide range of both solid and cored wires for welding, hardfacing, and thermal spray applications.

Based in Cincinnati, Ohio, Polymet has built its reputation on a strong commitment to quality, a passionate team of employees, and dedication to the customers they serve.





PROCESSES

Our wire manufacturing processes allow for production of the highest quality products in the industry.

The exceptional quality of our products is the result of highly specialized and carefully thought out manufacturing processes. Every step has been refined to ensure you receive only the highest quality product.

From purchasing to packaging and everything in between – our goal is to manufacture products unsurpassed in quality that our customers can rely on.



HOT EXTRUDED WIRE

Our patented hot extruded manufacturing process produces wire that is unsurpassed in quality. This process technology allows us to manufacture small diameter welding wire from alloys with extremely limited ductility.

The process begins with heating and drawing rod down to small diameter solid wire. From here the wire can be further processed to reach final size and finish requirements. These alloys can either be cut to length or spooled.



ROLLED, DRAWN AND ABRADED WIRE

Multi-die machines and strand annealing furnaces are among the tools used to produce clean, quality wire from traditionally hard, brittle alloys. We can start with rod stock as large as .250" (6.4mm) and reduce it down to diameters as small as .030" (.8mm).



ALLOY CORED WIRE


Metal cored wires are classified under the same specifications as solid MIG wires by the American Welding Association (AWS). They combine the best properties of both solid wires and flux cored wires. The basic composition of metal cored wire is a tubular electrode comprised of another metal sheath with a core of powdered materials.

During the manufacturing process, a metal strip enters a mill, forming the metal sheath to house the powder. Using a specialized feeding process, the powder is fed into the sheath. The wire is then rolled into tubular shape, and finally drawn down to final size. Typical processes that use these wires include gas metal arc welding (GMAW), submerged arc welding (SMAW), and wire arc spray/thermal spray.



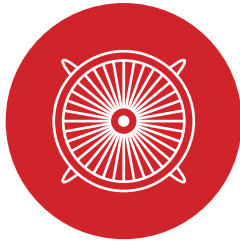
SPECIAL WIRE PROCESSING

The benefit of using Polymet as your specialty alloy supplier is that we are able to use a wide variety of wire processing services. In addition to manufacturing, we provide straightening, cutting, spooling, coiling, cleaning, flag tagging, color coding, and our proprietary abrading service. These services can be provided independently of each other or combined in any way to create a truly customized product.



Our premium consumables can be broken down into one of the following three distinct product lines: solid superalloy (gas turbine) wire, industrial hardfacing wire, or thermal spray wire and powder.

PRODUCTS



**SUPERALLOY
GAS TURBINE WIRE**



**INDUSTRIAL
HARDFACING WIRE**



**THERMAL SPRAY
WIRE AND POWDER**



SUPERALLOY GAS TURBINE WIRE

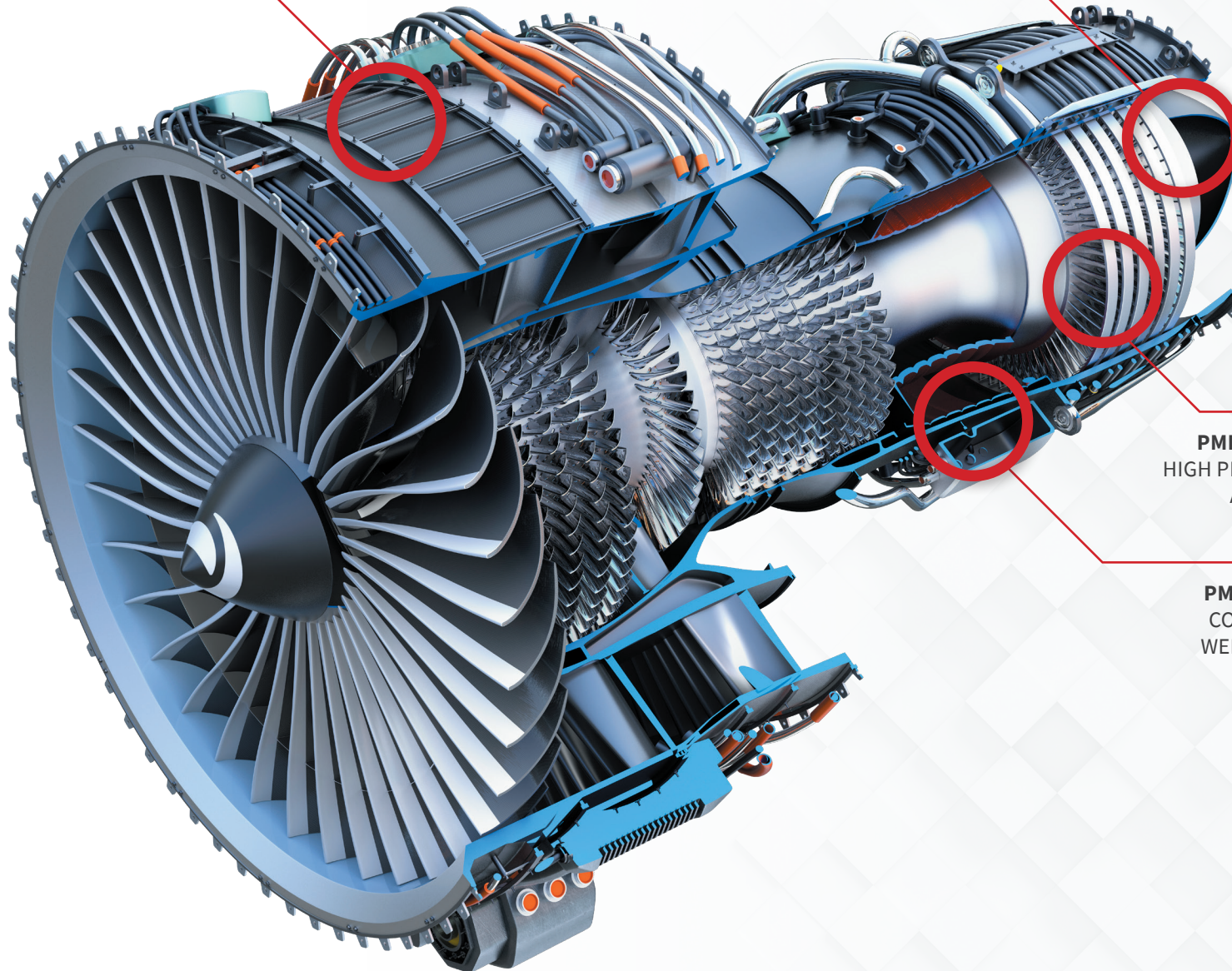
At the core of Polymet is a group of alloys that helped us become the globally recognized industry leader we are today. Our superalloy hardfacing and welding wire product line offers small diameter hardfacing wires once thought impossible to produce.

These nickel and cobalt based alloys are held to the highest quality standard of specifications in a variety of industries. Though primarily used in critical aerospace applications, these alloys are also becoming a product of choice in industries such as oil & gas, nuclear, and lumber.

For a complete list of gas turbine alloys, see pages 16-17.

PMET 818, 838, & 860
TURBINE ENGINE FRAMES
AND CASINGS WELDING
AND REPAIR

PMET 994 & 980
LOW PRESSURE TURBINE AREA
HARDFACING AND REPAIR



PMET 842, 880, & 972
HIGH PRESSURE TURBINE
AREA HARDFACING
AND REPAIR

PMET 860, 875 & 988
COMBUSTOR CASING
WELDING AND REPAIR

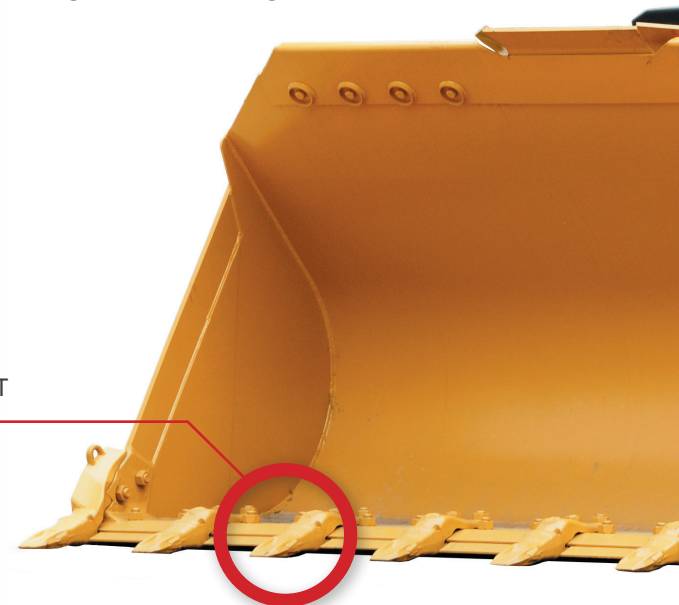


INDUSTRIAL HARDFACING WIRE

Polymet's industrial hardfacing line is comprised of alloys used for build-up and hardfacing of machine components that encounter extreme wear. Our PolyStel product line of cobalt consumables are widely used in the oil and gas industry, and our PolyTung tungsten carbide wire provides excellent protection for mining and construction equipment.

For a complete list of industrial hardfacing alloys, see page 17.

PolyTung NiBWC BUCKET TEETH AND
OTHER GROUND ENGAGING EQUIPMENT





PolyStel 1 & PolyStel 12
BAND SAW BLADES



PolyStel 6 & PolyStel 21
VALVE SEATS

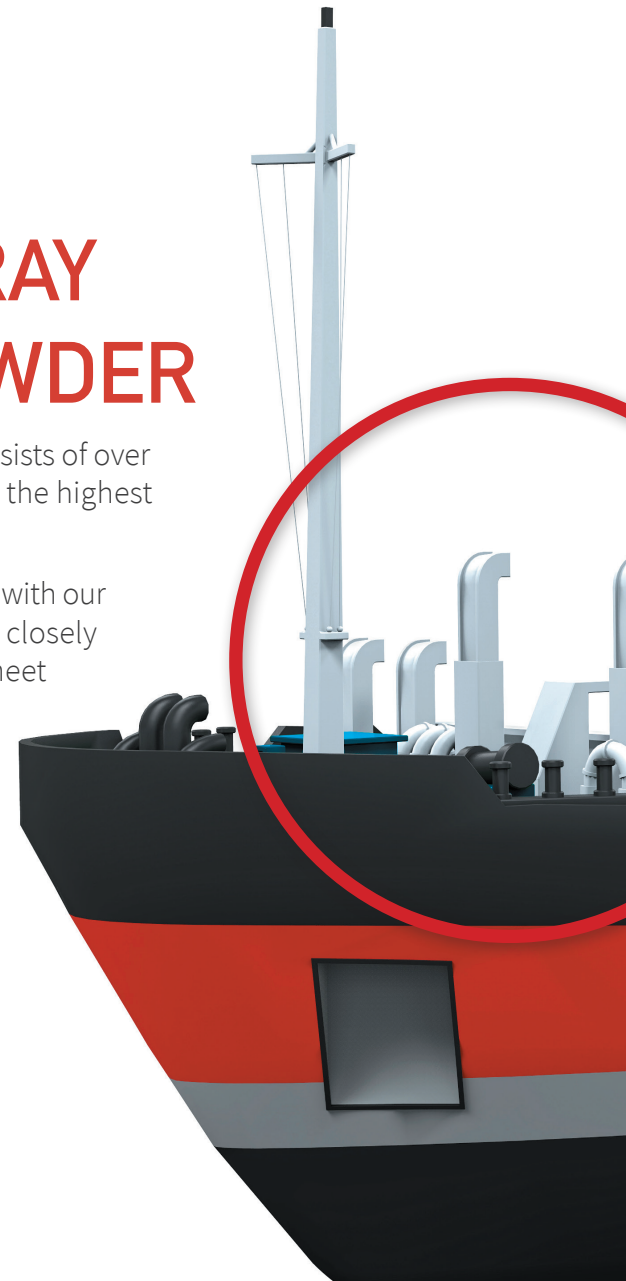


THERMAL SPRAY WIRE AND POWDER

Polymet's thermal spray product line consists of over 35 alloys engineered to provide you with the highest quality coating possible.

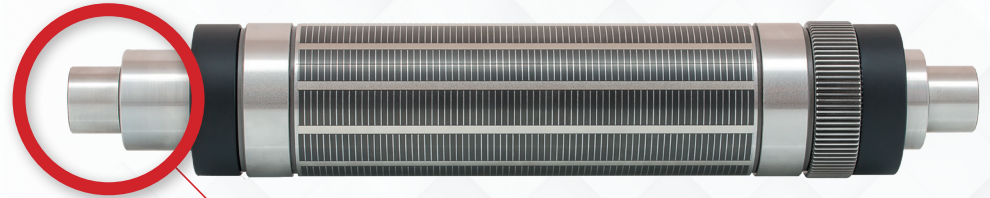
Our unique processing capabilities paired with our extensive R&D resources allow us to work closely with our customers to develop wire to meet their exact needs.

For a complete list of thermal spray alloys, see page 18.

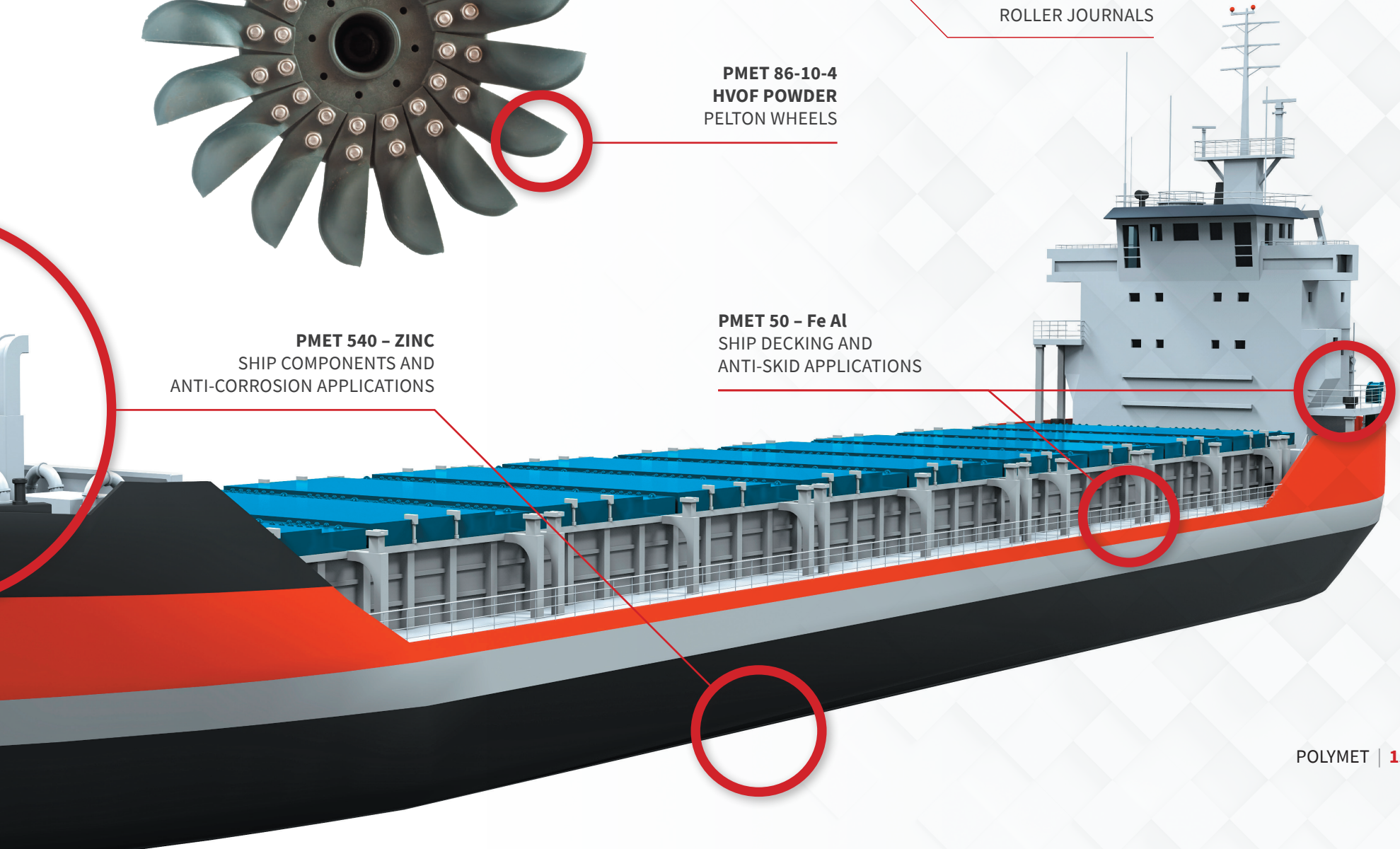




**PMET 86-10-4
HVOF POWDER
PELTON WHEELS**



**PMET 730-316 SS
ROLLER JOURNALS**



**PMET 540 - ZINC
SHIP COMPONENTS AND
ANTI-CORROSION APPLICATIONS**

**PMET 50 - Fe Al
SHIP DECKING AND
ANTI-SKID APPLICATIONS**

SUPERALLOY GAS TURBINE WIRE

POLYMET ALLOY	DESC	SPECS				NOMINAL COMPOSITION															APPLICATIONS
		Pratt & Whitney	AMS	GE	Other	Ni	Co	Fe	Cr	W	Mo	Al	Si	Mn	Nb	Ti	Ta	Zr	C	Other	
NICKEL BASED ALLOYS																					
PMET 811	GTD 111			50A880																	Gas turbine engine components
PMET 818	Inconel 718		5832		A5.14 ERNiFeCr-2 PCC 1-59-02.061	BAL		17	19		3	0.6			5.1	0.9					Gas turbine engine frames & casings
PMET 820	René 220			B50TF239		BAL	12		19		3.2	0.5			5.3	1	3.3		0.03		Gas turbine engine structural components
PMET 823	GTD 222			B50A940, B50TF311																	Gas turbine engine combustors
PMET 838	Inconel 738			B50TF191		BAL	8.5		16	2.6	1.8	3.4			0.9	3.4	1.8	0.1	0.17		Gas turbine engine blades and vanes
PMET 839	Inconel 939	PWA1495		B50TF250		BAL	19		22.5	2		1.9			1	3.7	1.4	0.1	0.15		Gas turbine engine blades and vanes
PMET 842	René 142			B50TF274	MSRR 9500/247	BAL	12		6.8	4.9	1.5	6.1					6.3		0.12	2.8 Re, 1.2 Hf	Gas turbine engine blades
PMET 845	C 242				MSRR 9500/17	BAL	10		20		10.3		0.3	0.3					0.3		Gas turbine engine vanes
PMET 847	Mar M 247				EMS 55447	BAL	10		8.2	10	0.7	5.5				1	3		0.16	1.5 Hf	Gas turbine engine vanes
PMET 860	Inconel 625		5837		A5.14 ERNiCrMo-3	BAL			21.5		9				3.6						Gas turbine engine blades
PMET 863	Hastelloy C-263		5966	B50A783		BAL	20		20		5.8	0.5				2.1			0.06		Gas turbine engine frames & casings
PMET 865	Waspaloy		5828		MSRR 9500/202	BAL	13.5	5.5	19.5		4.2	1.4				3.1			0.06	0.007 B	Gas turbine engine casings
PMET 870	Hastelloy W		5786		A5.14 ERNiMo-3	BAL		18.5	5		24.5										Gas turbine engine hot section components
PMET 875	Hastelloy X		5798		A5.14 ERNiCrMo-2	BAL	1.5		21.8	0.6	9								0.1		Gas turbine engine combustors
PMET 880	René 80			B50TF259		BAL	9.5		14	4	4	3				5			0.17		Gas turbine engine blades
COBALT BASED ALLOYS																					
PMET 905	L605, Alloy 25		5796		MSRR 9500/23	10	BAL		20	15				1.5					0.1		Gas turbine engine hot section components
PMET 906	Alloy 6		5788		MSRR 9500/19 & A5.21 ERCoCr-A		BAL		27	4									1		Valve seats, pump shafts & sleeves
PMET 909	Mar M 509	PWA 1185		B50TF89		10	BAL		23.5	7						0.2	3.5	0.4	0.6		Gas turbine engine blades and vanes
PMET 911	RMD 6000																				Gas turbine engine vane brazing
PMET 912	Alloy 12				MSRR 9500/228 & A5.21 ERCoCr-B		BAL	2.5	29	8									1.5		Lumber saw blades & cutting tools
PMET 913	Alloy 12 HC				MSRR 9500/15		BAL	2.5	29	9									1.9		Gas turbine components
PMET 914	FSX 414			B50A823		11	BAL		29.5	7									0.25		Gas turbine engine vanes
PMET 918	Mar M 918		5814	B50A824		20	BAL		20								7.5		0.06		Gas turbine engine vanes
PMET 921	Alloy 21		5835		MSRR 9500/25 & A5.21 ERCoCr-E		BAL		28		5								0.2		Gas turbine components

SUPERALLOY GAS TURBINE WIRE (CONT'D)

POLYMET ALLOY	DESC	SPECS				NOMINAL COMPOSITION															APPLICATIONS
		Pratt & Whitney	AMS	GE	Other	Ni	Co	Fe	Cr	W	Mo	Al	Si	Mn	Nb	Ti	Ta	Zr	C	Other	
COBALT BASED ALLOYS (CONT'D)																					
PMET 931	Alloy 31		5789		MSRR 9500/25	11	BAL		25	7.5			0.7	0.7					0.51		Gas turbine engine blades
PMET 972	Merl 72	PWA795			MSRR 9500/248	15	BAL		20	9		4.4				0.2	3		0.35	1 Hf, 0.45 Y	Gas turbine engine blades
PMET 980	T800			B59TF193	DMR 34.071		BAL		17.5		29		3.5						0.04		Gas turbine engine blades
PMET 988	HS 188		5801			22	BAL		22	14.5			0.4						0.1	0.075 La	Gas turbine engine hot section components
PMET 994	CM 64	PWA 694		B50TF55	MSRR 9500/226 & DMR 34.070	5	BAL		28	20									0.9	1 V	Gas turbine engine blades

WIRE FORMS AND WELDING PROCESSES

0.012" – 0.125" (0.3mm – 3.2mm) x Spool and Cut Length
Suitable for Laser Welding, GTAW, Plasma, HotWire TIG, GMAW

René® is a registered trademark of General Electric Co.
Hastelloy® is a registered trademark of Haynes International
Inconel® is a registered trademark of Special Metals Corporation

INDUSTRIAL HARDFACING WIRE

POLYMET ALLOY	COMPETITOR'S EQUIVALENT	NOMINAL COMPOSITION								ROCKWELL HARDNESS	PRODUCT FORMS		APPLICATIONS
		BAL	Cr	W	B	Si	C	Fe	Mo		GMAW	GTAW	
NICKEL BASED ALLOYS													
PolyWear 50	COLMONOY® 5	Ni	13		2.5	3.7	0.6	3.5		45-56 C	1/16" (1.6mm)		Wear & corrosion
PolyWear 60	COLMONOY® 6	Ni	14		3	4	0.7	4.5		55-60 C	1/16" (1.6mm)		Wear & corrosion, draw blocks, impeller screws, slurry pipes
PolyTung NiBWC	DURMAT® NIFD	Ni		40-45	3	4				54-62 C	1/16" (1.6mm)		Dredge cutter heads & teeth, ID elbows & pipes, oil tool bits, bucket teeth
PolyTung NiCrBWC	DURMAT® NICRW	Ni	10	40-45	1.6	3				59-67 C	1/16" (1.6mm)		Dredge cutter heads &teeth, ID elbows & pipes, oil tool bits
COBALT BASE ALLOYS													
PolyStel 1	STELLITE® 1	Co	30	12		0.8	2.4			50-60 C	0.45" (1.2mm), 1/16" (1.6mm)	0.03" - 0.187" (0.8mm - 4.8mm)	Screw components, hydropulper, pump sleeves
PolyStel 6	STELLITE® 6	Co	27	4			1			40-44 C	0.45" (1.2mm), 1/16" (1.6mm)	0.03" - 0.312" (0.8mm - 7.9mm)	Valve seats, gates, dies, extrusion screws
PolyStel 12	STELLITE® 12	Co	29	8			1.5			43-47 C	0.45" (1.2mm), 1/16" (1.6mm)	0.03" - 0.312" (0.8mm - 7.9mm)	Saw teeth, chain saw bars, valve plugs & seats, bearing areas
PolyStel 21	STELLITE® 21	Co	28				0.2		5	30-35 C	0.45" (1.2mm), 1/16" (1.6mm)	0.03" - 0.187" (0.8mm - 4.8mm)	Steam valves, hot shears, chemical & petrochemical valves, dies

STELLITE® is a registered trademark of Kennametal
DURMAT® is a registered trademark of Durum
COLMONOY® is a registered trademark of Wall Colmonoy Corporation

THERMAL SPRAY

POLYMET ALLOY	DESC	COMPETITOR'S EQUIVALENT		NOMINAL COMPOSITION													ROCKWELL HARDNESS	DIAMETER		APPLICATIONS
		TAFA	Metco & Other	Ni	Fe	Cr	W	Mo	Al	Si	Mn	Sn	Cu	B	C	Other		1/16" (1.6mm)	1/8" (3.2mm)	
IRON BASE HARDFACING ALLOYS																				
PMET 50	Fe Al	35MXC			BAL				5		1				2		30-35 C	✓		Bond coat, anti-skid, traction rolls
PMET 223	LCr Carbide	98 MXC		3	BAL	26				2	2				2		35-40 C	✓		Good corrosion & wear, machinable
PMET 226	HCr Carbide		8222		BAL	28				1					5		55-60 C	✓		Abrasion resistance, aggregate handling
PMET 270	Amorphous Alloy	90MXC			BAL	23		4		1				2			45-50 C	✓		Boiler tubes, wear resistance
PMET 273	Fe Cr B Si	95MXC	Armacor-M		BAL	29				1				4			55-60 C	✓		Abrasion resistance, rolls, boiler tubes
PMET 296	Fe Cr Ni B	96MXC	Armacor 16	6	BAL	23		4		2			2	3			50-55 C	✓		Abrasion resistance, boiler tubes
PMET 297	Tungsten Carbide	97MXC	Duocor	6	BAL	13				1				2		26 WC, 6 TiC	60-65 C	✓		Abrasion resistance, rolls, boiler tubes
COPPER BASE ALLOYS																				
PMET 590	Al Bronze	10T	Sprbronz AA						7				BAL				62-68 B	✓	✓	Housings, bearings, shafts, bond coats
PMET 599	Copper	05T										0.7	98				35-40 B	✓		High conductivity, electrical components
ALUMINUM BASE ALLOYS																				
PMET 692	Al 6Si	01S	Metco SF						BAL	5							70-75 B	✓		Turbine engine, dimensional buildup
PMET 699	Aluminum	01T	Metco Al						99.5								60-65 B	✓	✓	Corrosion resistance, electric conductivity
IRON BASE ALLOYS																				
PMET 709	LC Steel	30T			BAL										0.15		95-105 B	✓		Economical, bearings, seating surfaces
PMET 710	304 SS	80T		9	BAL	19											90-100 B	✓		Corrosion resistance, print rolls, restoration
PMET 714	HC Steel	38T	Spraysteel 80		BAL										0.8		20-25 C	✓		Low shrink, shafts, housing, pistons, fans
PMET 718	Low Shrink Steel		Spraysteel LS	4	BAL	2		1							0.03		30-35 C		✓	Dimensional restoration
PMET 720	420 SS	60T	Metcoloy 2		BAL	13									0.3		40-45 C	✓	✓	Wear resistance, machine elements
PMET 723	18 5 SS	55T	Metcoloy 5	5	BAL	18											90-96 B	✓	✓	Thick coatings, rams, rollers
PMET 730	316 SS	88T	Metcoloy 4	12	BAL	17		2.5									90-100 B	✓		Corrosion resistance, shafts, print rolls
PMET 731	Fe Cr Al	Alcro			BAL	23			5								85-90 B	✓		Boiler tubes, dimension restoration

THERMAL SPRAY (CONT'D)

POLYMET ALLOY	DESC	COMPETITOR'S EQUIVALENT		NOMINAL COMPOSITION													ROCKWELL HARDNESS	DIAMETER		APPLICATIONS
		TAFA	Metco & Other	Ni	Fe	Cr	W	Mo	Al	Si	Mn	Sn	Cu	B	C	Other		1/16" (1.6mm)	1/8" (3.2mm)	
NICKEL BASE ALLOYS																				
PMET 806	Nickel	06T		99													55-60 B	✓		Corrosion resistance, impellers, sleeves
PMET 818	Alloy 718	78T	8718	BAL	17	19		3								5.1 Cb+Ta	25-30 C	✓		Oxidation resistance, turbine engines
PMET 821	Ni 20Cr	06C		BAL		20				1							85-95 B	✓		Oxidation resistance, machinable coatings
PMET 860	Alloy 625	71T	8625	BAL	5	21		9								3.6 Cb+Ta	90-95 B	✓		Oxidation resistance, corrosion, digestors
PMET 876	Alloy C-276	77T	8276	BAL	5	15	4	16									30-40 C	✓		Resistance to reducing/oxidizing corrosives
PMET 877	Monel	70T		BAL	2								31				80-85 B	✓	✓	Restoration, rolls, sea water service
PMET 884	Ni 20Al	79B	405	BAL					20								60-80 B	✓	✓	Bond coats
PMET 885	Ni 5Al	75B	8400	BAL					5								65-85 B	✓		Bond coat, turbine engine part buildup
PMET 886	Ni Cr Al	73MXC	8443	BAL		19			7								75-85 B	✓		Oxidation resistance, high temp. Bond coats
PMET 887	Ni Cr Al Y	76MXC		BAL		22			10							1Y	75-85 B	✓		Oxidation resistance, ceramic undercoat
PMET 888	Ni Mo Al	74MXC	8447	BAL				5	5								75-85 B	✓		Wear resistance, buildup of steels
PMET 889	Ni Cr Ti	45CT		BAL		43										1Ti	30-35 C	✓		Corrosion resistance, boiler tubes
OTHER ALLOYS																				
PMET 540	Zinc	02Z														99.99Zn	65-70 B	✓	✓	Corrosion resistance, electrical conductivity
PMET 542	Babbitt	04T	Sprababbitt									90	3			7Sb	65-70 B	0.078	✓	Bearings, solderable connections
PMET 549	Tin	02W										99.9					65-70 B	0.078	✓	Electrical conductivity
PMET 899	Molybdenum	13T	Sprabond					99.95									15-35 C	✓	✓	Corrosion & wear, piston rings

HVOF POWDER

POLYMET ALLOY	DESC	PARTICLE SIZING
PMET 86-10-4	WC-10Co-4Cr	-45/+15 MICRONS
PMET 88-12	WC-12Co	-45/+15 MICRONS
PMET 83-17	WC-17Co	-45/+15 MICRONS
PMET 90-10	WC-10Ni	-45/+15 MICRONS



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