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Product Data Sheet
iPro-90

A high power, high voltage and high enthalpy plasma spray gun, robustly designed for long spray campaigns to coat deep internal geometries.

The Metco iPro™-90 offers the ultimate in power and robustness, even in the most challenging environments, with operation of up to 95 kW. The advanced design features of the iPro-90, unavailable on any other dedicated thermal spray extension gun, set new standards for effectiveness and efficiency.

iPro-90 is a machine-mounted, single cathode, plasma spray extension gun developed for applications where high power is required. The iPro-90 has been designed to coat internal bores as small as 152 mm (6 in) and as deep as 1,010 mm (37.5 in).

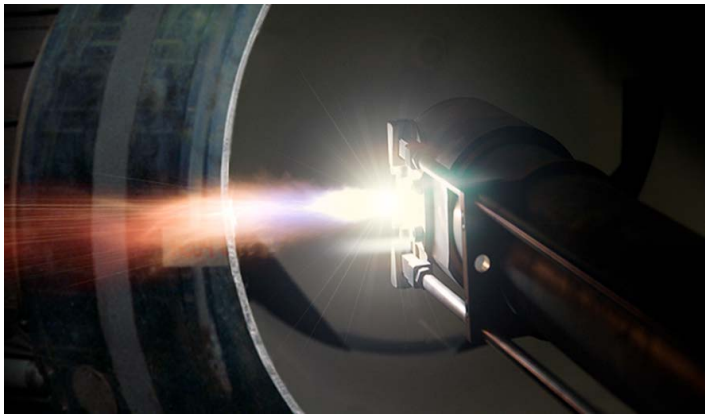
The high energy capability of the gun makes it the ideal tool to spray dense ceramic materials, such as thermal barrier coatings on combustion liners and transition ducts, as well as other materials where additional energy is needed to achieve the required coating quality. The hardened construction of iPro-90 shields it from the high heat environment of long spray runs in internal geometries. The iPro-90 will operate reliably at high energy conditions (95 kW) for up to 20 hours without the need to replace consumable components.

1 General Description

The iPro-90 is a complete plasma spray extension gun that can operate at power levels up to 95 kW. It employs argon as a primary process gas, which can be used in combination with nitrogen, hydrogen or helium as a secondary gas. The spray angle is 90 °.

Cooling water, gun cooling air, gas and power easily connect at the rear of the gun and are routed to the gun body through a protective shaft to the gun body. The gun cooling air is integrated and designed to prevent powder build up on the nozzle face and powder ports.

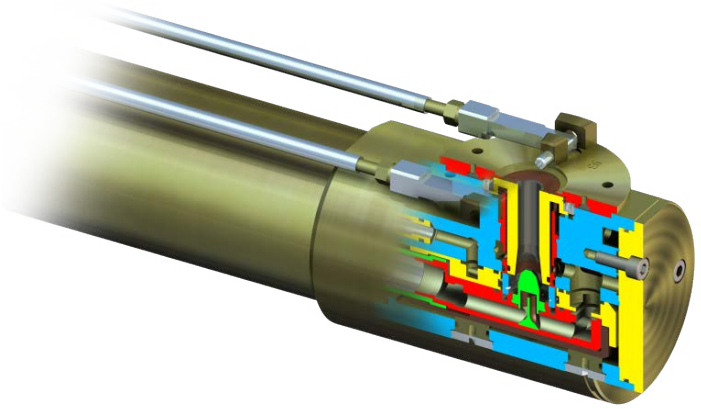
Powder tube assemblies are snugly fitted to the outside of the gun through a channel clamp. The gun is supplied with two powder injector holders that permit orientation of the powder ports either perpendicular or parallel to the gun axis, using the appropriate powder tube assemblies (also provided).



iPro-90 Plasma Spray Gun

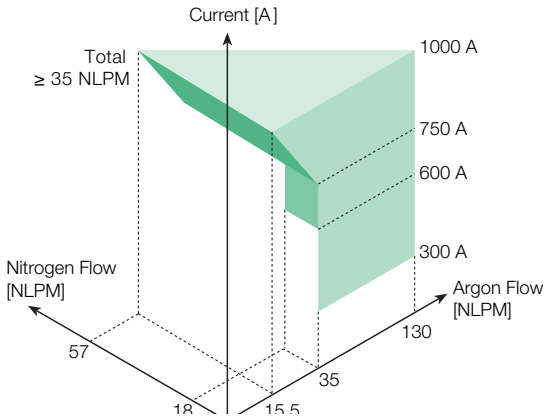
Two sets of powder injectors are also supplied. The standard injectors, #4, are suitable for most parameters. A slightly shorter set of injectors, #8, can be used when spray conditions bring the plasma flame too close to the powder injector. Either set of injectors can be used with either injector holder.

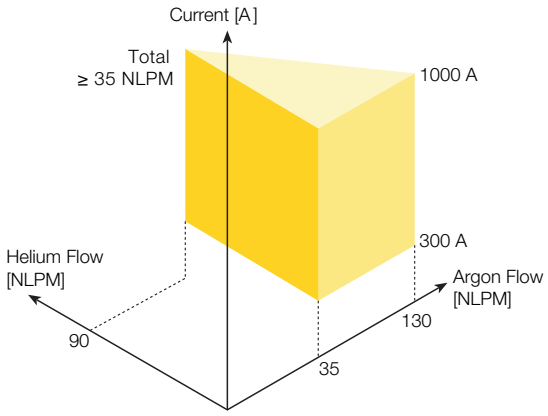
The iPro-90 is also supplied with a bracket that simplifies mounting of the gun to robotic or other manipulation equipment. Its extra-rigid shaft eliminates whipping and oscillation, ensuring accurate positioning even at accelerations of two g's.

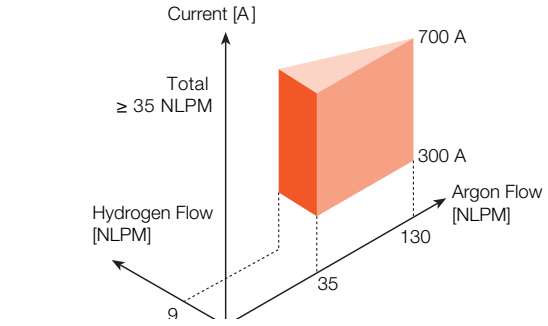


Detail of gun head shown with powder injectors oriented perpendicular to the gun axis.

1.1 Process Gas Combinations







Argon / Nitrogen Operation		
Process Gas	NLPM	SCFH
Argon	15.5 to 130	35 to 297
Nitrogen	0 to 57	0 to 80
Argon + Nitrogen	≥ 35	≥ 80

Argon / Helium Operation		
Process Gas	NLPM	SCFH
Argon	35 to 130	80 to 297
Helium	0 to 90	0 to 205
Argon + Helium	≥ 35	≥ 80

Argon / Hydrogen Operation		
Process Gas	NLPM	SCFH
Argon	35 to 130	80 to 297
Hydrogen	0 to 9	0 to 20.5
Argon + Hydrogen	≥ 35	≥ 80

2 Benefits

Effective:

- High power (95 kW) in a small envelope.
- Applies high quality TBC ceramics and associated bond coats.
- Coats internal geometries as small as 152 mm (6 in) and 1,010 mm (37.5 in) deep.
- Designed for spray environment sustained temperatures up to 540 °C (1000 °F).
- Fully cooled, rigid shaft eliminates whipping and oscillation to ensure accurate positioning, even at accelerations of up to 2 g's.
- Air-assisted face plate reduces powder build up on powder injectors and nozzle face.
- Internal air jets keep coated surfaces clean.
- Gun power cables are threaded differently to prevent improper cable connection.
- Spray angle of 90 °.

Efficient:

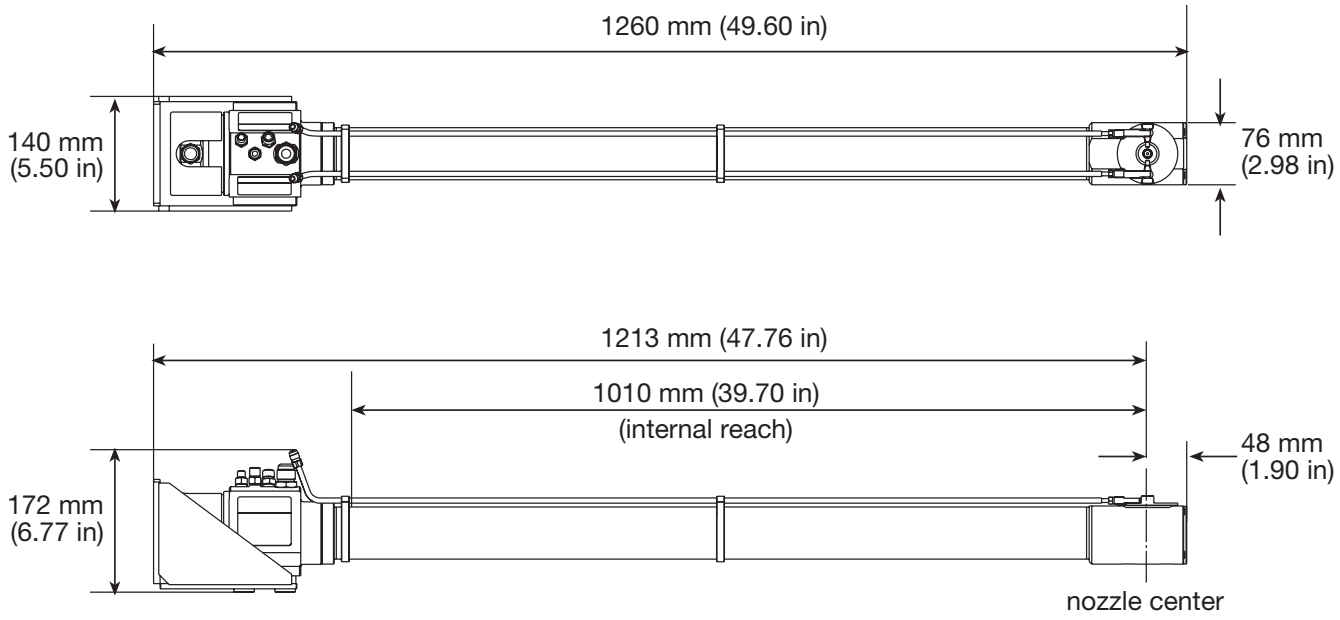
- High power applies coatings 2 to 3 times faster than other extension guns, saving processing time.
- Operates for long periods of up to 20 hours without replacement of consumable components.
- Water-cooled shaft keeps gun cool for long spray campaigns.
- High deposition efficiencies and spray rates.

Economical:

- Uses low-cost nitrogen as a secondary gas to achieve the highest power parameters.
- Nozzles are quickly changed for minimal downtime.
- Low operating cost per hour.

3 Technical Data

3.1 Dimensions



3.2 Specifications

Power Rating			
Power (measured at gun)	max.	95 kW	
Amperage	min. to max.	300 to 1000 A	
Argon / Nitrogen operation		600 to 1000 A	
Argon / Hydrogen operation		300 to 700 A	
Argon / Helium operation		300 to 1000 A	
Gas Quality			
Argon – Ar			
Minimum requirements		99.95 %	
European standard		99.998 %	
Helium – He			
Minimum requirements		99.995 %	
European standard		99.998 %	
Nitrogen – N_2			
Minimum requirements		99.7 %	
European standard		99.996 %	
Air Requirements			
Cooling air		5.2 bar	75 psi
Nozzle face air		0.7 bar	10 psi
Cooling Water Requirements			
Inlet temperature	max.	18 °C	65 °F
Inlet pressure		13.8 to 17 bar	200 to 250 psi
Flow	min.	34 l/min	9 gal/min
Conductivity	max.	5 µS	
Dissolved oxygen	max.	10 ppm	
Workpiece Geometry			
Diameter or width	min.	152 mm	6 in
Depth or reach [a]	max.	1010 mm	39.7 in
Spray distance	min.	64 mm	2.5 in
Weight			
With mounting bracket / without hoses and cables		18.6 kg	41.0 lb
Compatibility			
Controller		9MC [b], 9MCE [b], MultiCoat™, UniCoatPro™ Plasma	
Powder feeder		5MPE, 9MP Series, Twin 120-A, Twin 220-A	
Power supply		10MR-0x [c] (up to 80 kW), 10MR-10x [c] (up to 100 kW) PT-1320	
Water Chiller		OM-HE Reinforced Plus (with high capacity pump)	
Manipulator payload	min.	45 kg	100 lb

[a] Can be extended by manipulator arm
[b] Requires replacement of the helium flow tube with a second argon / nitrogen flow tube for high energy parameters
[c] Where “x” is a numeric value between 1 and 7 that defines the exact power supply model number

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