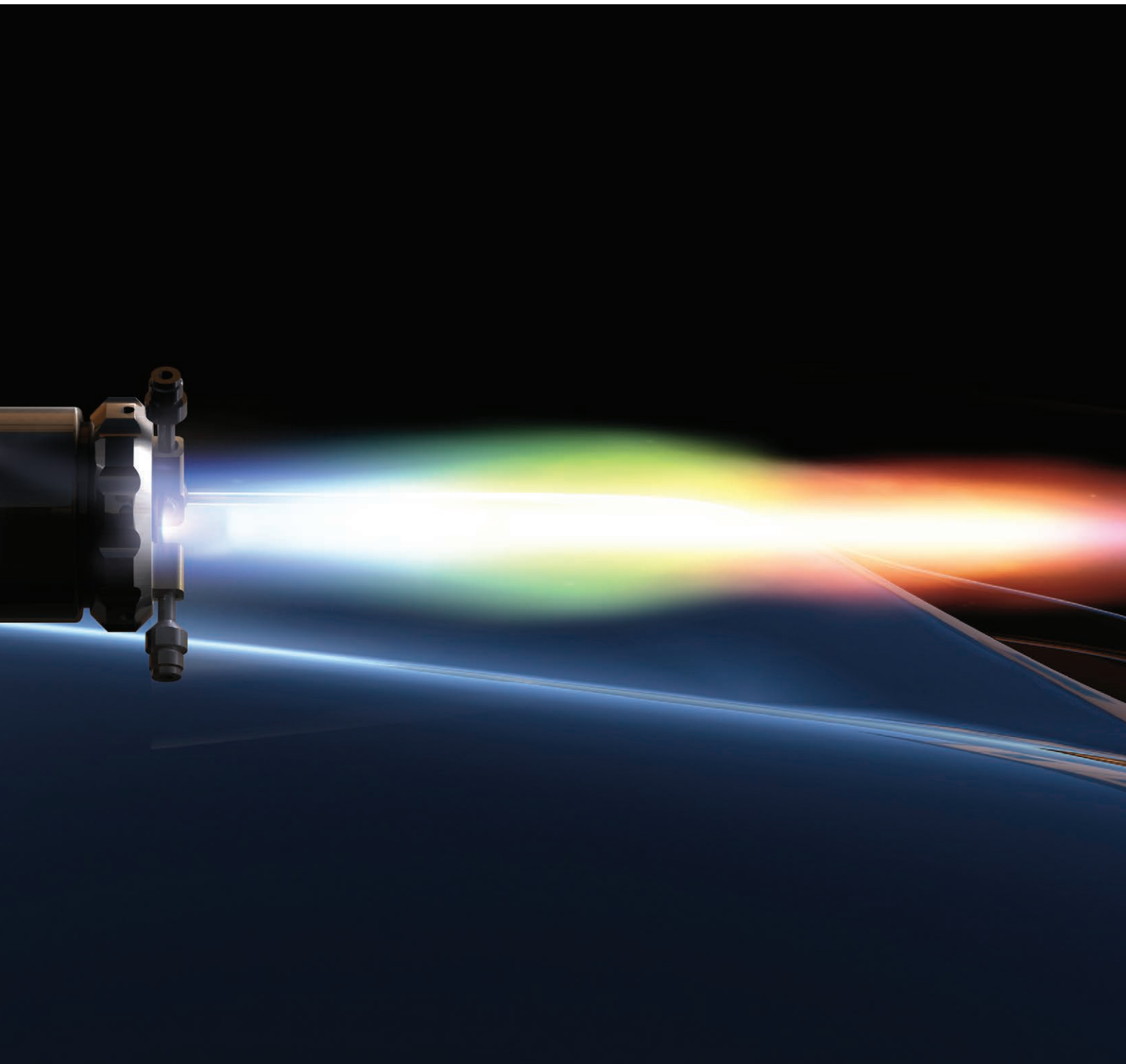


Thermal spray equipment guide

Issue 11 – October 2014



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Please note:

Throughout this brochure, dark blue labels indicate non-CE components

Introduction

Thermal spray equipment

Only Oerlikon Metco can offer equipment solutions for all thermal spray processes. And with such a broad selection, we have just what you need for your application. Proven and reliable, Oerlikon Metco has the largest base of installed equipment around the world.

Our focus is on our customer's specific need. Through on-site analysis and customer consultation, our Engineering teams design coating application systems that combine advanced technologies with the broadest line of thermal spray coating products available; that includes advanced robotics and microprocessor controls. The result is the most productive and cost-effective solution for virtually any coating application and budget.

Thermal spray systems are self-contained manufacturing facilities that can be designed for use as individual production units or for integration into manufacturing lines. The subcomponents of a thermal spray system are:

Core components

Core elements are required for all thermal spray solutions. These include the coating material to be applied, a material feed delivery system, the atmospheric plasma spray gun to apply the coating material and propel it to the workpiece, and a control system that accurately controls the processing media and utilities. Depending on the spray process used, a power supply that

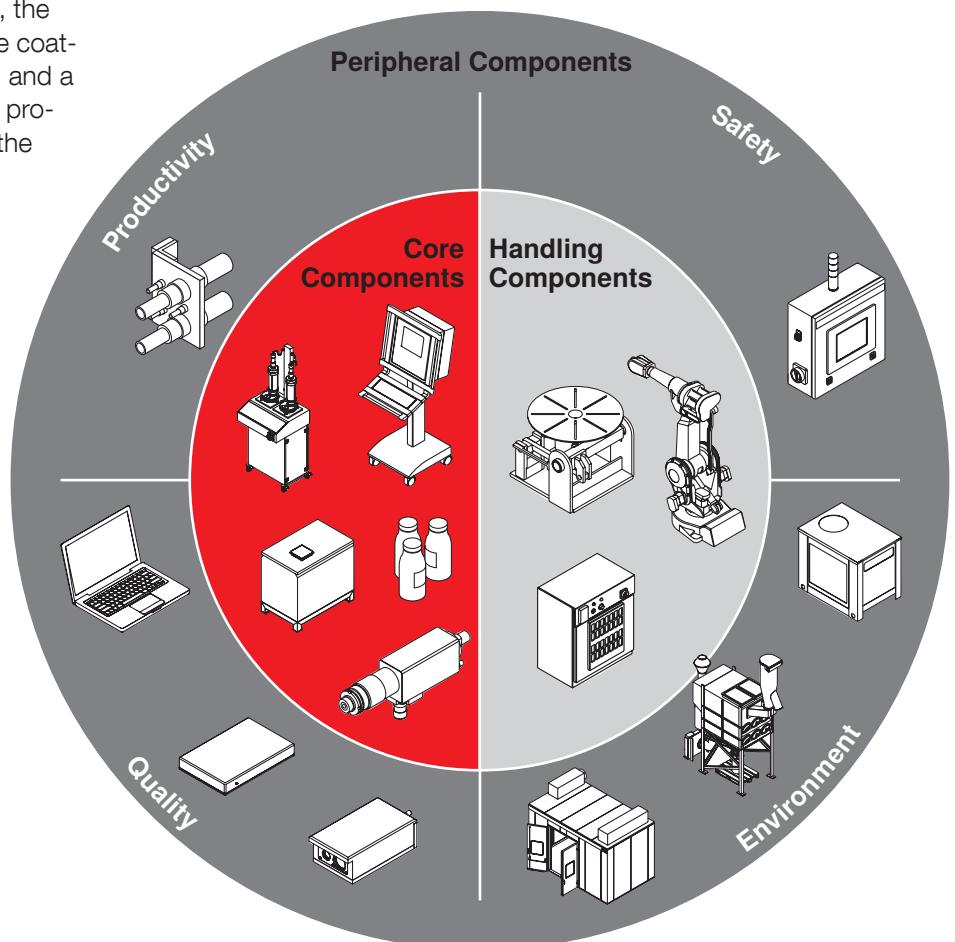
converts AC power to DC power may be required. Some thermal spray processes require a heat exchanger to cool the spray gun; other spray processes may require heaters.

Handling components

Handling equipment precisely controls the movement of the spray gun and workpiece, and their relative position to one another.

Peripheral components

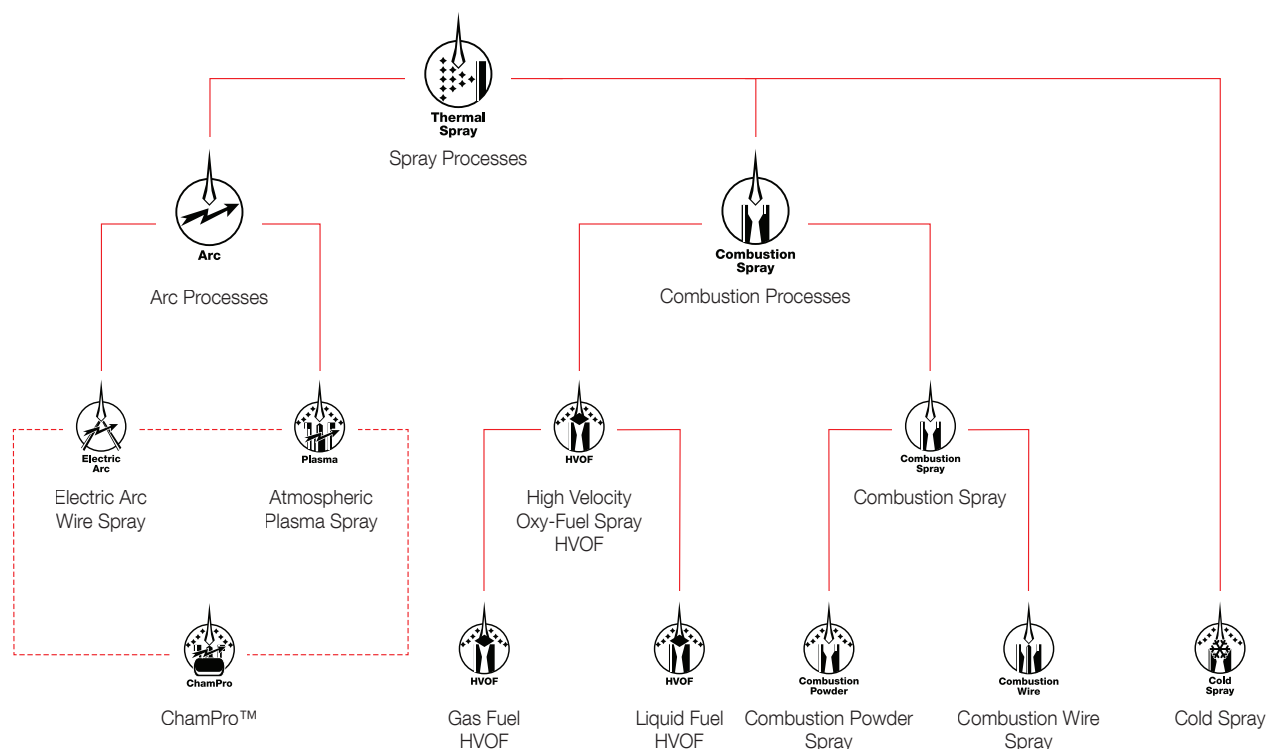
The peripheral components can be divided into four categories: Safety components like gas monitoring and warning devices; environmental components like a soundproof cabin, as well as an air filter and exhaust system to protect both personnel and the environment; quality components such as spray plume monitoring and diagnostics for the most advanced process control; and productivity components like software packages for workpiece management, parameter reporting and many others.



Introduction

Spray processes

Oerlikon Metco's comprehensive portfolio of equipment assures we can deliver systems for every thermal spray application and budget requirement.



Arc processes

Electric arc wire spray

Electric arc wire spray uses two electrically charged feedstock wires, of opposite polarity, that are brought together at a controlled rate to form an arc. This arc melts the wire feedstock and an air stream propels the molten material to the substrate. Electric arc wire is commonly used to apply bond coat materials, salvage and restoration coatings and a wide range of corrosion coatings on large structures. As the coolest of all thermal spray processes, it can be used to coat many substrates, including metals and plastics.

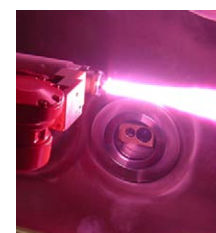
Atmospheric plasma spray

Atmospheric plasma spray is the most versatile of all thermal spray processes. Using an electric arc to ionize flowing Process gases, the hot gas stream can be controlled to melt a very wide range of powder feedstock materials to apply high-quality coatings of metals, metallic alloys, carbides, cermets and oxide ceramics. Atmospheric plasma spray coatings are used for many different applications, just a few of which include bond coats, corrosion coatings for many

different service environments and temperatures, wear coatings, restoration coatings, and thermal barrier materials.

ChamPro™ controlled atmosphere spray

ChamPro refers to plasma spray or electric arc wire spray coatings applied in a chamber at low pressure or near vacuum conditions. ChamPro processes apply superior coatings characterized by high densities or very controlled porosities with extremely low contamination. Systems can be designed for many applications, including the application of refractory metals, thin layers and ceramic structures that cannot be achieved using any other thermal spray process.



Combustion processes

High Velocity Oxy-Fuel (HVOF) spray

HVOF uses high-pressure combustion as the heat source to create a high-velocity gas stream that both melts and propels a powder feedstock material to the substrate. HVOF coatings generally exhibit fine homogeneous microstructures, low in oxide and porosity content, that are tenaciously bonded to the substrate.

Gas fuel HVOF

Uses gases such as propane, propylene, hydrogen or methane (natural gas) as the fuel source.

Liquid fuel HVOF

Uses kerosene as the fuel source.

Combustion spray

As the name implies, combustion spray uses the combustion of a fuel gas and oxygen to create a heat source, but at lower pressures than HVOF. Combustion spray is an economical choice for the application of quality coatings.

Combustion powder spray

Uses metals, metallic alloys or fine ceramics as the feedstock material in powder form. It is often the process of choice for the application of certain abrasion-resistant coatings, particularly to avoid volatilization of a fugitive phase during the spray process.

Combustion wire spray

Uses metals or metallic alloys as the feedstock material in wire form. It is often used for the application of hard coatings for salvage and restoration and is well-known for the application of corrosion coatings, even on very large structures.

Cold spray

Cold spray uses kinetic and thermal energy. The spray material is accelerated to more than 1000 m/s (3280 ft/s) using a high-speed gas jet. The gas (nitrogen or helium) is preheated up to 1000 °C (1832 °F) and conveyed through a convergent/divergent nozzle. The heated gas expands through the divergent side of the nozzle, thus accelerating the gas flow, reducing the gas temperature and increasing the available kinetic energy. The powder particles are injected into the high-speed gas stream where they are barely heated prior to deposition onto the substrate. The reduced thermal energy and the increased particle velocity result in nearly oxide-free coatings with chemistries that are virtually unchanged from the original feedstock material.


















Thermal spray equipment



Core components – Plasma

Compatibility chart

Spray Gun				
				
SM-F1	SM-F100 CONNEX	SM-F210	SM-F300	
Performance	25 kW	20 kW	15 kW	9 kW
Minimum internal diameter	80 mm (3.1 in)	100 mm (4 in)	60 mm (2.4 in)	40 mm (1.6 in)
Plasma gas	Ar, H ₂ , He			
Connection angle ⁴	90°			
Spray angle ⁵	90° / 45°	180° / 90° / 45°	90° / 20°	90°
Spray length	500 mm (19.6 in)	140/280/560 mm (5.5/11/22 in)	250/450/650 mm (9.8/17.7/25.6 in)	250/450 mm (9.8/17.7 in)
Controller				
				
		UniCoat or MultiCoat		
JAMBox				
				
		JAM-1020 JAM-1030		
Material Feeder				
				
5MPE		9MP 9MP-CL20	9MPE 9MPE-CL20	Single-120-A Twin-120-A
				
				Single-220-A
Please note: Throughout this brochure, dark blue labels indicate non-CE components				
Power Supply				
				
		PT3X IPS-500	PT3X IPS-1000	PT-Type
Gas Management Center				
				
		GMC Plasma		

¹ JAM-1020 used with UniCoat/MultiCoat and PT-type power source only
JAM-1030 used with UniCoat/MultiCoat and PT3X-type power source only
² Spray length 50 mm (2 in) for external coating applications
³ 5MPE requires 5MPA Interface for operation with 9MC


























⁴ Connection angle is the angle between supply hoses and gun axis
⁵ Spray angle is the angle between spray plume and gun axis

Thermal spray equipment



Core components – Plasma

Compatibility chart

Spray Gun				
				
F4MB-XL		F4MB90-XL		3MBM
3MBH		3MBTD		
Performance		55 kW		
Minimum internal diameter		40 kW		
Plasma gas		Ar, H ₂ , He		
Connection angle		Ar, H ₂ , He, N ₂		
Spray angle		0°		
Spray length		610/864 mm (24/34 in)		
Controller				
				
9MC		9MCE		UniCoat or MultiCoat
JAMBox				
				
JAM-1010		JAM-1020		9MCD
JAM-1030		JAM-1030		
Material Feeder				
				
Twin-10-C		5MPE		9MP
9MP-CL20		9MPE-CL20		Single-120-A
Power Supply				
				
10MR		PT-Type		PT3X IPS-500
PT3X IPS-1000				
Gas Management Center				
				
GMC Plasma				

¹ JAM-1010 used with 9MCE controller only
JAM-1020 used with UniCoat/MultiCoat and PT-type power source only
JAM-1030 used with UniCoat/MultiCoat and PT3X-type power source only
² 9MCD used with 9MC controller only










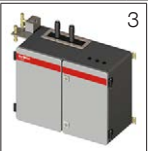
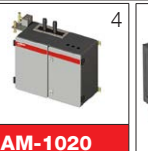



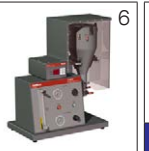










³ 5MPE requires 5MPA Interface for operation with 9MC
⁴ 9MC used with 10MR power supply only, 9MCE used with PT-1110E power supply only
⁵ Twin-10-C used with 9MC/9MCE, interface box required

Thermal spray equipment



Core components – Plasma

Compatibility chart

Spray Gun						
						
9MBH	9MBM	7MT-2	7MST-2	11MB	iPro-90	
Performance		80 kW	38 kW ; 25 kW	25 kW	30 kW	95 kW
Minimum internal diameter		–	75 mm (3 in)	51 mm (2 in)	55 mm (2.2 in)	152 mm (6 in)
Plasma gas		Ar, H ₂ , He, N ₂	H ₂ , N ₂ , Ar, H ₂		Ar, H ₂ , He	Ar, H ₂ , He, N ₂
Connection angle		90°	180°	180°	90°	90°
Spray angle		0°	65°	45°	90°	90°
Spray length			457 mm (18 in)	406 mm (16 in)	610 mm (24 in)	1010 mm (39.8 in)
Controller						
						
9MC		9MCE	UniCoat or MultiCoat			
JAMBox						
						
JAM-1010		JAM-1020	JAM-1030	9MCD		
Material Feeder						
						
Twin-10-C	5MPE	9MP	9MPE	Single-120-A	Single-220-A	
		9MP-CL20	9MPE-CL20			
Power Supply						
						
PT-Type	10MR	PT3X IPS-500	PT3X IPS-1000	10 MR		
				PT-Type		
Gas Management Center						
						
GMC Plasma						

¹ 7MT-2, 7MST-2 are extensions for the 9MB gun

7MT-2, 7MST-2: N₂, H₂ standard set-up, Ar, H₂ optional

² 11MB requires voltage booster kit when used with 9MCE and PT power supply

³ JAM-1010 used with 9MCE controller only

⁴ JAM-1020 used with UniCoat/MultiCoat and PT-type power source only
JAM-1030 used with UniCoat/MultiCoat and PT3X-type power source only

⁵ 9MCD used with 9MC controller only

⁶ 5MPE requires 5MPA Interface for operation with 9MC

⁷ 9MC used with 10MR power supply only, 9MCE used with PT-1110E power supply only


























⁸ Twin-10-C used with 9MC/9MCE, interface box required

Thermal spray equipment



Core components – Plasma

Compatibility chart

Spray Gun (cascading arc)		<div><div>1</div></div> <div>SinplexPro-90</div>	<div><div>1</div></div> <div>SinplexPro-180</div>	<div><div>1</div></div> <div>TriplexPro-210</div>				
Performance		60 kW		65 – 100 kW				
Minimum internal iameter		–		–				
Plasma gas		Ar, H ₂ , He, N ₂		Ar, H ₂ , He, N ₂				
Connection angle		90°	180°	90°				
Spray angle		0°	0°	0°				
Controller		<div><div>2</div></div> <div>9MC</div>	<div><div>2</div></div> <div>9MCE</div>	<div><div>1</div></div> <div>UniCoat or MultiCoat</div>				
JAMBox		<div><div>3</div></div> <div>JAM-1010</div>	<div><div>3</div></div> <div>JAM-1020</div>	<div><div>1</div></div> <div>9MCD</div>				
		<div><div>3</div></div> <div>JAM-1030</div>		<div><div>4</div></div> <div>JAM-T630</div>				
Material Feeder		<div><div>5</div></div> <div>Twin-10-C</div>	<div><div>1</div></div> <div>5MPE</div>	<div><div>1</div></div> <div>9MPE</div>	<div><div>1</div></div> <div>9MPE-CL20</div>	<div><div>1</div></div> <div>Single-120-A</div>	<div><div>1</div></div> <div>Twin-120-A</div>	<div><div>1</div></div> <div>Single-220-A</div>
Power Supply		<div><div>1</div></div> <div>PT-Type</div>	<div><div>1</div></div> <div>10MR</div>	<div><div>1</div></div> <div>PT3X IPS-500</div>	<div><div>1</div></div> <div>PT3X IPS-1000</div>	<div><div>1</div></div> <div>PT3X IPS-500</div>		
Gas Management Center		<div><div>1</div></div> <div>GMC Plasma</div>		<div><div>1</div></div> <div>GMC Plasma</div>				

¹ SinplexPro used with 9MC or 9MCE requires CPI-500 Ignition Control Unit

² 9MC used with 10MR power supply, 9MCE used with PT-1110E power supply

³ JAM-1010 used with 9MCE controller only

JAM-1020 used with UniCoat/MultiCoat and PT-type power source only
JAM-1030 used with UniCoat/MultiCoat and PT3X-type power source only; CPI-500 required

⁴ JAM-T630 used with UniCoat/MultiCoat and PT3X-type power source only

















⁵ Twin-10-C used with 9MC/9MCE, interface box required

Thermal spray equipment



Core components – HVOF Gas Fuel

Compatibility chart

Spray Gun		1					
							
		8ADJH	9ADJH	1050ADJH	2600DJH	2700DJH	2700DJH-NG
		2					
							
		8ADJHE	9ADJHE	1050ADJHE	2600DJHE	2700DJHE	2700DJHE-NG
Performance		113 kW					
Minimum internal diameter		—					
Fuel gases		H ₂	Propane, propylene	Propane	H ₂	Propane, propylene	Methane (natural gas)
Connection angle		180°					
Spray angle		0°					
Controller							
		DJF			DJF		
JAMBox		—					
					DJFEW		
Material Feeder							
		5MPE-HP	9MP-DJ	9MPE-DJ			
Gas Management Center		—					

¹ DiamondJet gas fuel HVOF spray guns




















² The hand-held DiamondJet "E" series guns are CE conformant only when used with safety handle SH/SHA

Thermal spray equipment



Core components – HVOF Gas Fuel

Compatibility chart

Spray Gun							1				
											
8ADJM		9ADJM		1050ADJM		2600DJM		2700DJM		3600DJM	
Performance							113 kW				
Minimum internal diameter							—				
Fuel gases		H ₂		Propane, propylene		Propane		H ₂		Methane, ethylene, propane, propylene	
Connection angle							180°				
Spray angle							0°				
Controller							2				
											
DJC		DJCEH				MultiCoat					
JAMBox											
											
DJC 2600		DJCE 2600				JAM-GF					
						JAM-GLF					
Material Feeder							3				
											
5MPE-HP		9MP-DJ		9MPE-DJ		Single-120-H		Twin-120-H		Single-220-H	
Gas Management Center											
											
				GMC HVOF							

¹ DiamondJet gas fuel HVOF spray guns

² Modified DJC required to run air-cooled guns


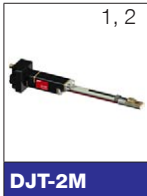





³ 5MPE-HP requires 5MPA interface for operation with DJC

Thermal spray equipment



Core components – HVOF Gas Fuel

Compatibility chart

Spray Gun		<div><div>1</div><div></div><div>DJT-2</div></div>	<div><div>1, 2</div><div></div><div>DJT-2M</div></div>			
Performance		113 kW				
Minimum internal diameter		4	5			
Fuel gases		uses front gun hardware from customer's existing DiamondJet gun				
Connection angle		180°				
Spray angle		3	90°/60°/45°			
Spray length		700 mm (27.6 in)				
Controller		depending on front gun hardware				
JAMBox		depending on front gun hardware				
Material Feeder		<div><div>6</div><div></div><div>5MPE-HP</div></div>	<div><div></div><div>9MP-DJ</div></div>	<div><div></div><div>9MPE-DJ</div><div>9MPE-DJ-CL20</div></div>	<div><div></div><div>Single-120-H</div><div>Twin-120-H</div></div>	<div><div></div><div>Single-220-H</div></div>
Gas Management Center		depending on front gun hardware				

¹ DJT-2, DJT-2M are extensions for DiamondJet guns

² DJT-2M used with with DJC controller only

³ Standard Spray angle for DJT-2 and DJT-2M is 90°. Spray angle of 60° or 45° requires a 60° or 45° spray head, respectively

⁴ DJT-2 90°: 230 mm (9 in) used with air-cooled hardware; 400 mm (16 in) used with water-cooled hardware

DJT-2 45°: 180 mm (7 in) used with air-cooled hardware; 280 mm (11 in) used with water-cooled hardware

⁵ DJT-2M 90°: 230 mm (9 in) used with air-cooled hardware; 400 mm (16 in) used with water-cooled hardware

DJT-2M 45°: 180 mm (7 in) used with air-cooled hardware; 280 mm (11 in) used with water-cooled hardware














⁶ 5MPE-HP requires 5MPA interface for operation with DJC

Thermal spray equipment



Core components – HVOF Liquid Fuel

Compatibility chart

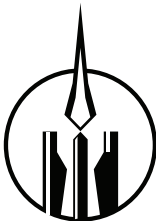
Spray Gun				
				
WokaJet-410		WokaJet-410-S		WokaStar-610
				WokaStar-610-S
Performance		293 kW		
Ignition type	Hydrogen	Spark plug	Hydrogen	Spark plug
Minimum internal diameter		–		
Fuel		Kerosene		
Connection angle		90°		
Spray angle		0°		
Controller				
				
MultiCoat		UniCoatPro-LF		
JAMBox				
				
		JAM-LF		
		JAM-GLF		
Material Feeder				
				
5MPE-HP		9MPE-DJ		Single-220-H
9MPE-DJ-CL20		Twin-120-H		Twin-140-H
Gas Management Center				
				
		LMC		
		GLMC		

¹ No JAMBox and no Gas Management Center is required when using the UniCoatPro LF controller

² Twin-140-H with UniCoatPro LF controller only

³ In conjunction with 9MPE-DJ and 5MPE-HP powder feeders, UniCoatPro LF controller offers start/stop functionality only















Thermal spray equipment



Combustion
Wire

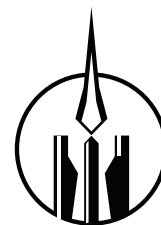
Core components – Combustion Wire

Compatibility chart

Spray Gun					
<div><div>1</div><div>16E</div></div>	<div><div>1</div><div>16E-H</div></div>	<div><div>1</div><div>16E-P</div></div>	<div><div>1</div><div>16E-HT</div></div>	<div><div>5K</div></div>	<div><div>5K-6C</div></div>
				<div><div>5KE</div></div>	<div><div>5K-6CE</div></div>
Performance			30 kW		
Minimum internal diameter			—		
Fuel gases		Acetylene, hydrogen, MPS, MAPP, methane, propane		Propylene, propane	Acetylene, hydrogen, MPS, MAPP, methane, propane
Connection angle			90°		180°
Spray angle			0°		
Controller					
	<div><div>3AF</div></div>	<div><div>3GF</div></div>	<div><div>Roadrunner</div></div>	<div><div>6C</div></div>	<div><div>6CEW</div></div>
JAMBox					
Material Feeder					
			<div><div>2W</div></div>		
Gas Management Center					

¹ Optional gun hardware available for different fuel gases


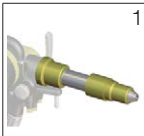

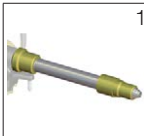
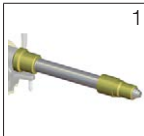



Thermal spray equipment



**Combustion
Wire**

Core components – Combustion Wire

Compatibility chart

Spray Gun		 <div>EGD-K</div>	 <div>5XT-6</div>	 <div>3XT-1</div>	 <div>3XT-2</div>	 <div>3XT-3</div>
Performance		30 kW				
Minimum internal diameter		—	100 mm (4 in)			
Fuel gases		Acetylene, hydrogen, MPS, MAPP, methane, propane	Acetylene	Acetylene, hydrogen, MPS, MAPP, methane, propane		
Connection angle		180°	Depends on gun hardware			
Spray angle		0°	0° / 45° <div>2</div>			
Controller		 <div>MultiCoat</div>	Controller depends on gun hardware			
JAMBox		 <div>JAM-F</div>				
Material Feeder		 <div>2W</div>				
Gas Management Center		—				

¹ 5XT-1 and 3XT-1, -2, -3 are extensions for both 16E type and 5K type guns

² Optional angular air cap required to spray at an angle of 45°








Thermal spray equipment



**Combustion
Powder**

Core components – Combustion Powder

Compatibility chart

Spray Gun			
			
5P-II	5PT-II-1	5PT-II-2	5PT-II-3
Performance		35 kW	
Minimum internal diameter	–	168 mm	
Fuel gases		Acetylene, hydrogen	
Connection angle			
Spray angle	0°	80° / 0°	
Spray length	–	305 mm (1 ft)	915 mm (3 ft)
Controller			
			
		3AF	3GF
			Roadrunner
JAMBox		–	
Material Feeder		built-in	
Gas Management Center		–	

¹ 5P-II is CE conformant with the safety handle SHA

² 5PT-II-1, -2, -3 are extensions for the 5P-II gun

³ Depending on specific application, Spray angle and material applied

⁴ Standard Spray angle is 80°; optional hardware required to spray at an angle of 0°





















Thermal spray equipment



**Combustion
Powder**

Core components – Combustion Powder

Compatibility chart

Spray Gun		 6P-II-H	 6P-II-HE	 6P-II	 6P-II-A	
Performance		35 kW				
Minimum internal diameter		—				
Fuel gases		Acetylene, Hydrogen				
Connection angle		180°				
Spray angle		0°				
Controller		 3AF	 3GF	 6C	 6CE	 MultiCoat
JAMBox		—			 JAM-F	
Material Feeder		 5MPE	 5MPE	 5MPE	 Single-120-A	 Twin-120-A
		 9MP	 9MPE	 9MPE 9MP	 Single-220-A	 9MPE-CL20
Gas Management Center		—			 GMC Flame	

¹ 6P-II-HE is CE conformant only together with the safety handle SHA



² JAM-F required for MultiCoat only

Thermal spray equipment



Core components – Combustion Powder

Compatibility chart

Spray Gun			
		6PT-II-1	6PT-II-2
Performance	35 kW		
Minimum internal diameter	168 mm	2	
Fuel gases	Acetylene, Hydrogen		
Connection angle			
Spray angle	80° / 45°	3	
Controller	Depends on hand-held or machine-mount configuration		
JAMBox	Depends on hand-held or machine-mount configuration		
Material Feeder	Depends on controller or configuration		
Gas Management Center	Depends on controller		








¹ 6PT-II-1, -2 are extensions for the 6P-II gun
² Depending on specific application, Spray angle and material applied
³ Standard Spray angle is 80°; optional hardware required to spray at an angle of 45°

Thermal spray equipment



Core components – Electric Arc

Compatibility chart

Spray Gun				
				
PPG	PPGH	PPGH-E	PPGT-190	PPGT-290
Melting capacity		32 kg/h		2
Minimum internal diameter		–		
Wire diameters		1.6 – 2.3 mm		
Connection angle		180°		
Spray angle		0°	90°	90°
Spray length		–		
Controller / Power Supply				
		SmartArc	VisuArc 350	
Material Feeder				
		Push 4		














¹ Using zinc wires
² ECO ARC 350 for use with 2.3 mm (11 ga) and 2.5 mm wires only
³ ECO ARC 600 for use with 2.5 mm wires only
⁴ FLEXI ARC 300 can also be used with LD/U3
⁵ For use with FLEXI ARC 300 only

Thermal spray equipment



Core components – Electric Arc

Compatibility chart

Spray Gun			
			
	LD/U3	LD/U2	LD/Schub 5
Melting capacity	25 – 60 kg/h ¹	20 – 30 kg/h ¹	30 – 35 kg/h ¹
Minimum internal diameter	–		
Wire diameters	2/2.5 mm	1.6 – 2.5 mm	1.6 – 2.5 mm
Connection angle	180°		
Spray angle	0°		
Controller / Power Supply			
	 2		
	ECO ARC 350	FLEXI ARC 200	CAP 300
	 3	 4	
	ECO ARC 600	FLEXI ARC 300	TUBE 300
			
			VisuArc 350
Material Feeder			
		 5	
	Push 4	Push 1	Push 6

¹ Using zinc wires

² ECO ARC 350 for use with 2.3 mm (11 ga) and 2.5 mm wires only

³ ECO ARC 600 for use with 2.5 mm wires only

⁴ FLEXI ARC 300 can also be used with LD/U3



⁵ For use with FLEXI ARC 300 only

Thermal spray equipment



Core components – Electric Arc

Compatibility chart

Spray Gun		<div> 1 Extension 300 mm</div>	<div> Extension 500 mm</div>
Melting capacity		Depends on gun hardware and power supply	
Minimum internal diameter		100 mm (4 in)	
Standard wire diameter		Depends on gun hardware	
Connection angle		180°	
Spray angle		70°	
Spray length		300 mm (11.8 in)	500 mm (19.7 in)
Controller / Power Source		Depends on gun hardware	
Material Feeder		Depends on gun hardware	


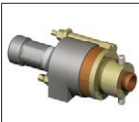










¹ These extensions are used with the LD/U2, LD/U3 and LD/Schub 5 guns
Adapter needed between spray gun and extension
Customized lengths available on request

Thermal spray equipment



Core components – ChamPro™

Compatibility chart








Spray Gun	<div></div> <div>F4-VB</div>	<div></div> <div>03CP</div>	<div></div> <div>PPG</div>	<div></div> <div>PPGT</div>
Performance	45 kW	120 kW	–	
Melting capacity	–		32 kg/h	
Minimum internal diameter	–			70 mm (2.8 in)
Wire diameters	–		1.6 – 2.3 mm	
Connection angle	180°			
Spray angle	0°		0°	90°
Spray length	–			
Controller	<div></div> <div>MultiCoat</div>		<div></div> <div>SmartArc</div>	
JAMBox	<div></div> <div>JAM-2030</div> <div>JAM-3030</div>		–	
Material Feeder	<div></div> <div>Single-120-V</div> <div>Twin-120-V</div>	<div></div> <div>60CD</div>	Integrated within gun and controller hardware	
Power Supply	<div></div> <div>PT3X IPS-2000 / 3000</div>		<div></div> <div>SmartArc 350RU</div>	
Gas Management Center	<div></div> <div>GMC Plasma</div>		–	

Thermal spray equipment



Core components – Cold Spray

Compatibility chart

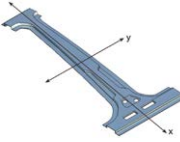
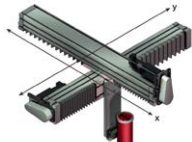

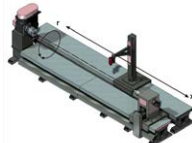
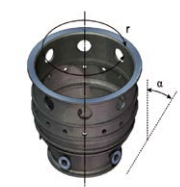
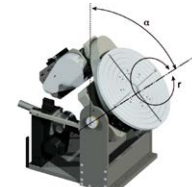



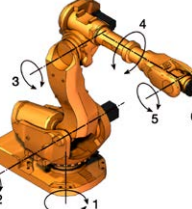
Spray Gun			
			
Kinetiks 4000		Kinetiks 8000	
Performance	47 kW	82 kW	
Minimum internal diameter	—		
Process gas	N ₂ , He	1	N ₂ , He 2
Connection angle	180°		
Spray angle	0°		
Controller			
			
		Kinetiks HT300/30	
Pre-Heating Unit 3			
			
Kinetiks HT300/17		Kinetiks HT300/30	Kinetiks HT300/30
Material Feeder			
			
		Kinetiks PF4000	

¹ Kinetiks 4000 systems configured for dual Process gases require at least one pre-heating unit
² Kinetiks 8000 systems configured for dual Process gases cannot be used with two pre-heating units
³ Kinetiks 4000 systems can be configured without pre-heating unit, using the integrated heating unit of the Kinetiks 4000 spray gun
⁴ Only one pre-heating unit can be used with a Kinetiks 4000 system
⁵ Kinetiks 8000 systems can be configured with two pre-heating units
⁶ All Kinetiks systems can be used with two Kinetiks PF 4000 powder feeders

Thermal spray equipment

Handling components

Overview



Workpiece geometry		Handling			Oerlikon Metco component
Workpiece geometry		Gun manipulator	Workpiece manipulator		
	Flat geometry requires moving the spray gun in two directions	XY CN handling with two axes	None, workpiece fixed		
	For cylindrical workpieces, the gun is moved linearly along the workpiece axis while the workpiece is rotated on a lathe	CN linear handling with one axis	Lathe		LPro series lathes
	For rotationally symmetrical workpieces, the gun moves in one direction while rotation is accomplished using a turntable. Use of a tilting turntable enables changing the angle of the workpiece relative to the gun	Fixed or linear handling with one axis	Turntable Rotating and tilting table Rotating and tilting table with positionable axes		UT series tables Series Robax turntables 9H series turntables
	For workpieces that are not rotationally symmetrical or too large to rotate, the gun can be continuously rotated and also moved in a direction perpendicular to the workpiece	Continuously rotating gun	None, workpiece fixed		Rotaplasma
	Workpieces with complex geometries require the gun to be manipulated freely in space. Additional workpiece manipulation may also be required	6 axes robot	Depending on the geometry an additional tilting turntable		

Oerlikon Metco can design and seamlessly integrate any type of handling component into a thermal spray coating system, safely and with excellent performance.

Thermal spray equipment

Handling components


Overview

Turntables		
		
	9H-series	Robax-series
Loading weight	200 kg 440 lb	250 – 1000 kg 550 – 2200 lb
Max. rotation	300 rpm	300 rpm
Faceplate tilting	0 – 90°	0 – 90° / -45° – 45°

Oerlikon Metco standard 9H-series and Robax-series turntables are being offered with configurations specified to customer's needs; e.g. automated or manual tilting axes, various load capacities, rotary speeds, tilt ranges and other specialized functionalities.

Lathes	
	
	LPro
Max. loading weight	6000 kg 13,000 lb
Max. workpiece length	7000 mm 23 ft

¹ The LPro type lathes are available in three versions; one as a pure lathe, one with an integrated linear gun handling and one with an integrated linear robot handling (robot not included)

RotaPlasma™	
	
	RotaPlasma
Rotation	30 – 200 rpm
Spray gun	SM-F210 SM-F300
Internal diameter	40 – 500 mm 1.57 – 19.68 in
Spray controller	MultiCoat

Robots



Upon request, Oerlikon Metco is capable of integrating any type of robot for gun manipulation into a coating system.




Other gun manipulators




Oerlikon Metco offers a wide range of customized gun handling devices to meet customer-specific requirements.




Thermal spray equipment

Peripheral components

Safety components	<div><p>GSM-II</p></div>	<div><p>Signal Lamps</p></div>
Description	GSM-II monitors potentially dangerous concentrations of flammable or explosive gases and shuts them off before critical levels are reached.	Signal lamps inform and alert the operator acoustically and visually on the state of the system.

Environmental control components	<div><p>Heat Exchanger</p></div>	<div><p>Filter</p></div>	<div><p>Spray Booth</p></div>
Description	Heat exchangers and water chillers are specifically designed for thermal spray processes and chosen based on cooling capacity required.	Filters and complete exhaust systems protect the operator and the environment from overspray waste. Various options and capacities are available based on spray processes, materials and application rates used.	The spray booth isolates the thermal spray process and protects personnel and the environment from noise, emissions and motion hazards associated with thermal spray processes. Booth design based on processing requirements.

Quality components	<div><p>Accuraspray</p></div>	<div><p>ScheduleIt</p></div>	<div><p>SelectIt</p></div>
Description	Accuraspray provides precise, real-time measurement of the intensity, position and geometry of the thermal spray plume, and measures spray particle temperature and velocity.	MultiCoat software add-on to display the maintenance status of the system components and upcoming maintenance schedules; supports ISO certifications.	MultiCoat software add on that stores all spray parameter and handling routines for a specific workpiece, and creates a complete quality dossier for the workpiece through the collection of all spray processing data.

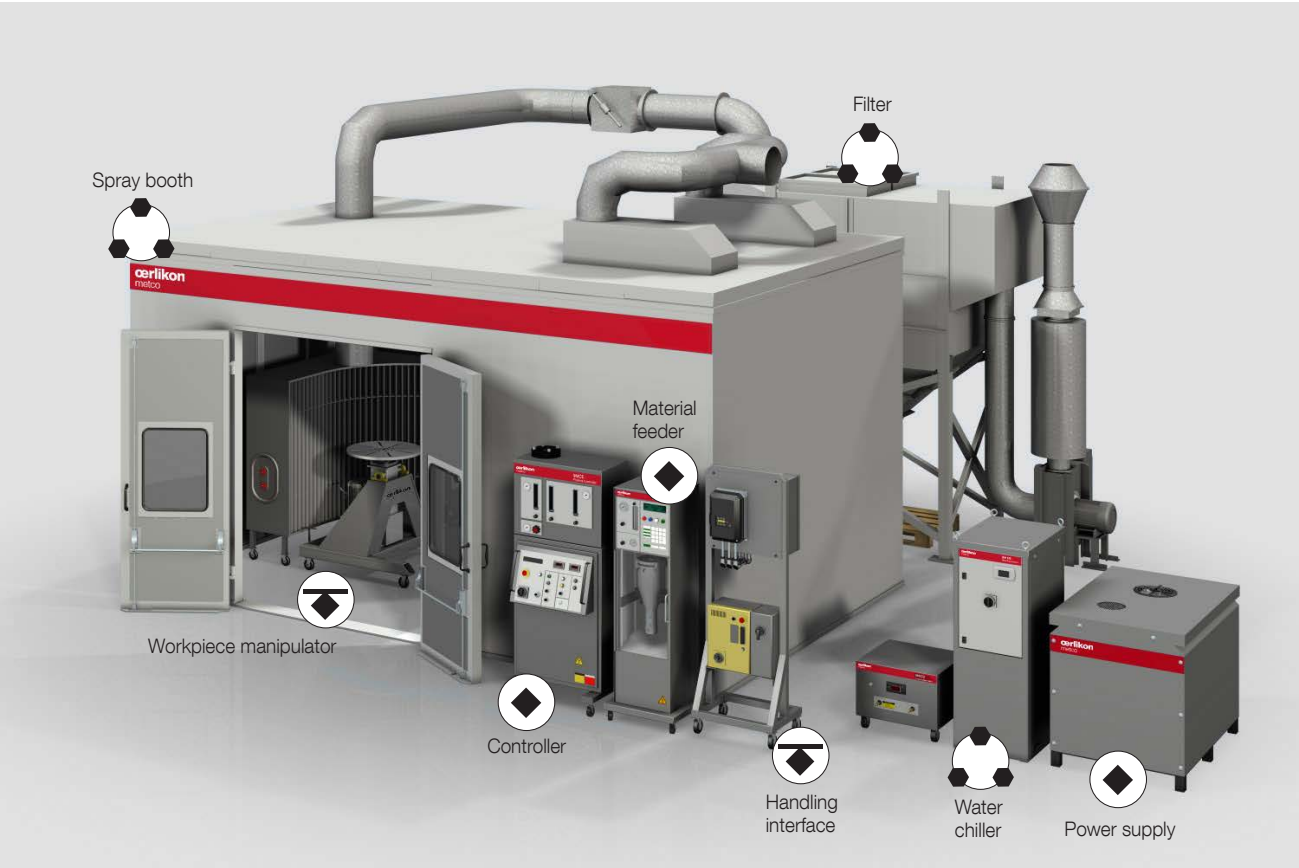
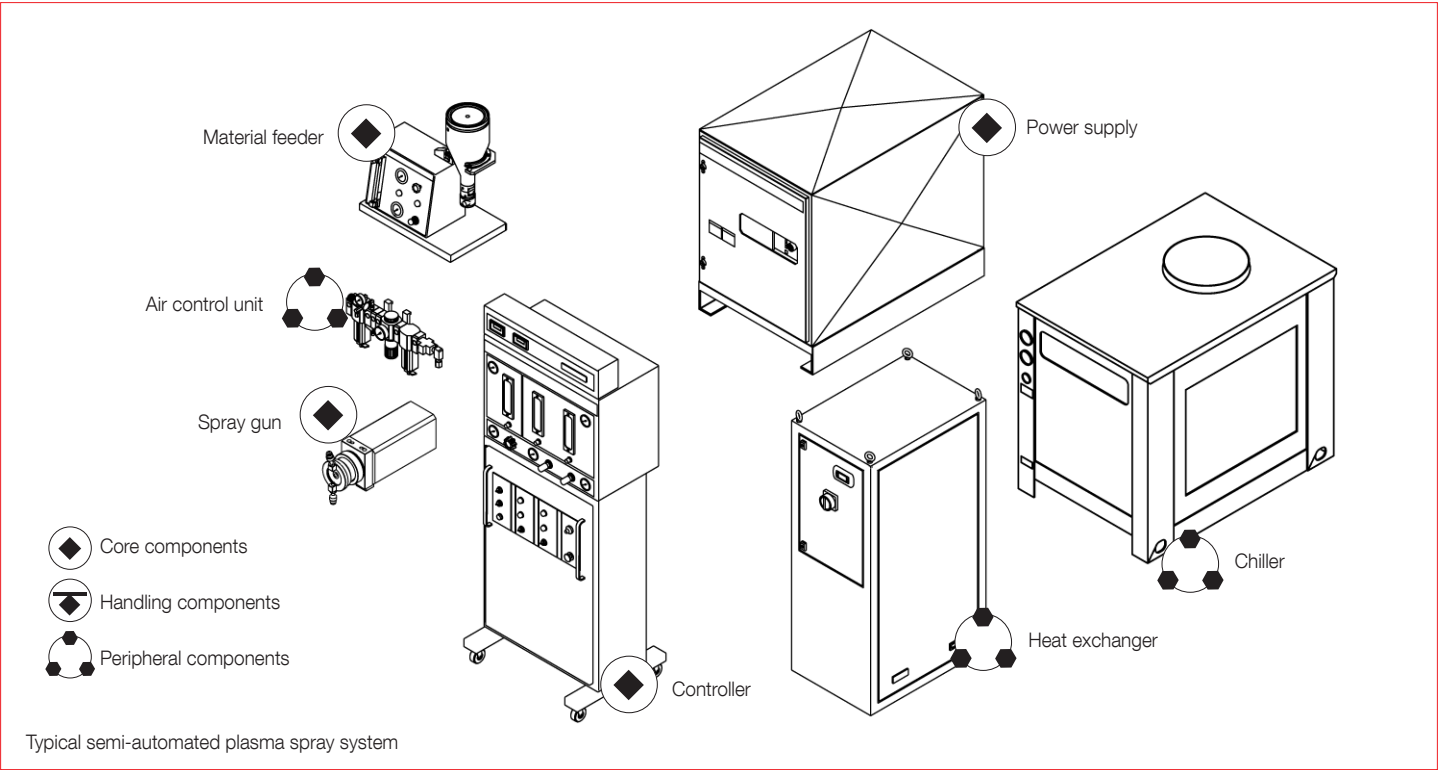
Productivity components	<div><p>SumIt</p></div>	<div><p>IO Status Page</p></div>	<div><p>QuikSwap</p></div>
Description	MultiCoat software add on to monitor and record the usage of all spray processing media and consumables, providing accurate processing costing information.	MultiCoat software add-on to speed up the fault finding process by displaying the input/output ports of the PLC.	QuikSwap greatly reduces the time required for plasma gun changeover.

¹ For MultiCoat only

Thermal spray equipment



Examples of thermal spray coating systems – Plasma

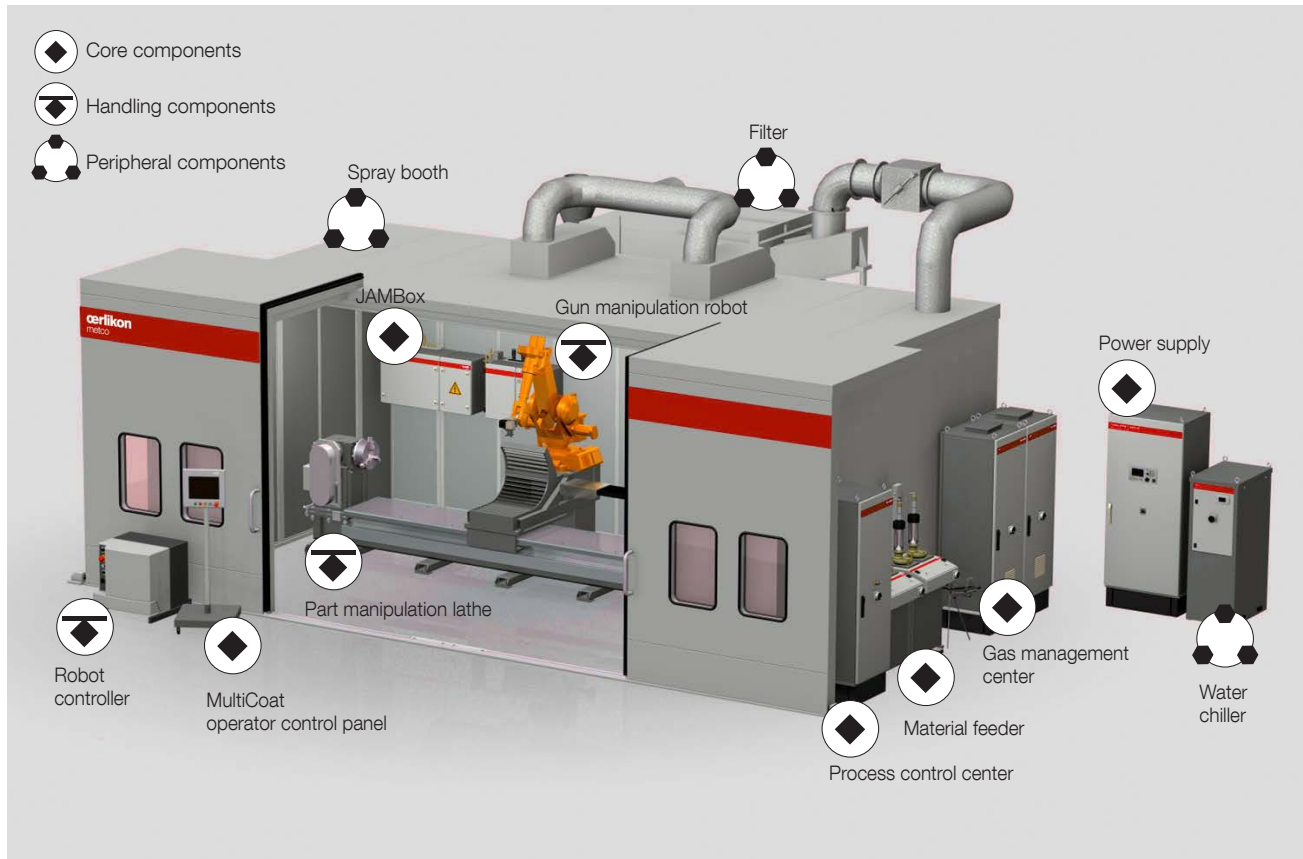


Mid-range plasma spray system with automated handling

Thermal spray equipment



Examples of thermal spray coating systems – Plasma

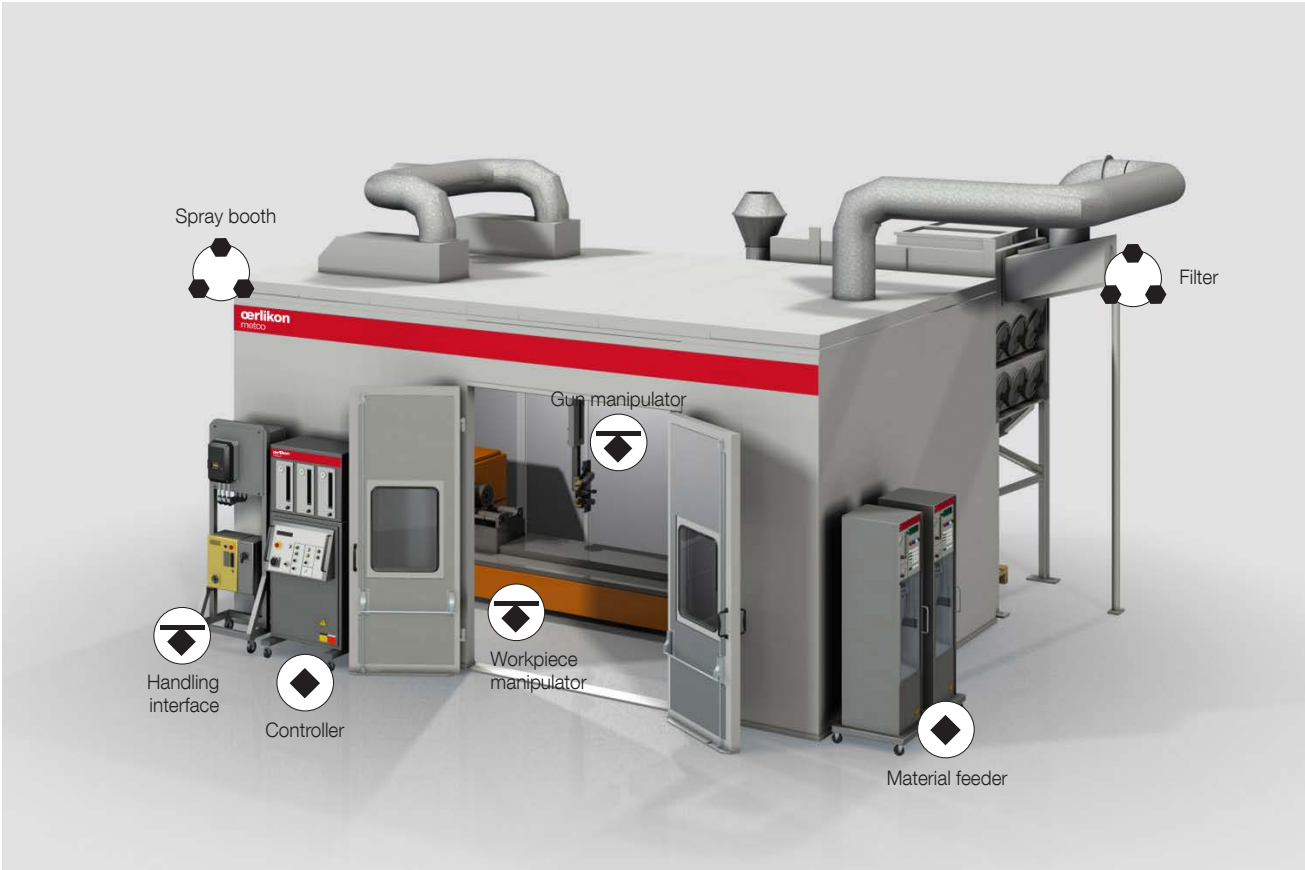
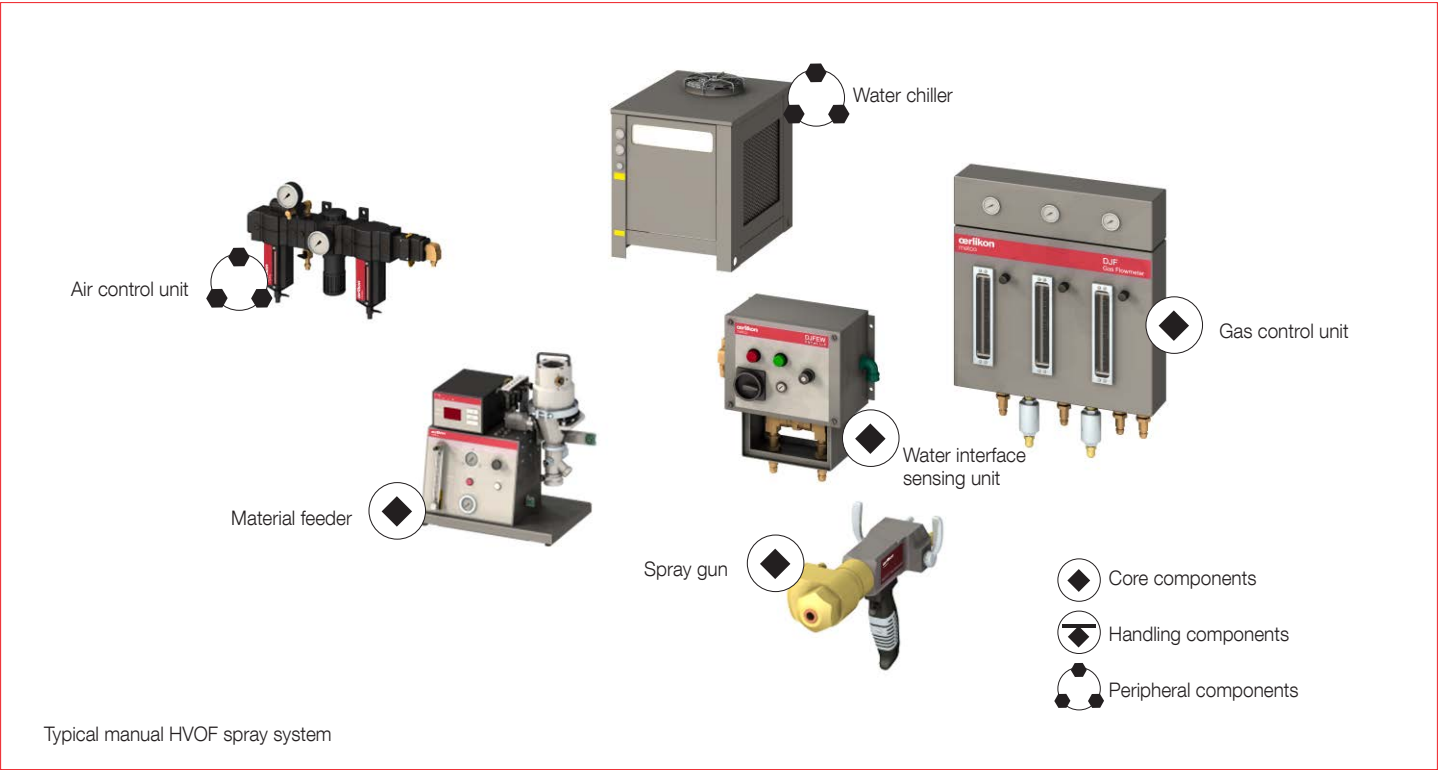


High-end MultiCoat plasma spray system with fully automated handling

Thermal spray equipment



Examples of thermal spray coating systems – HVOF

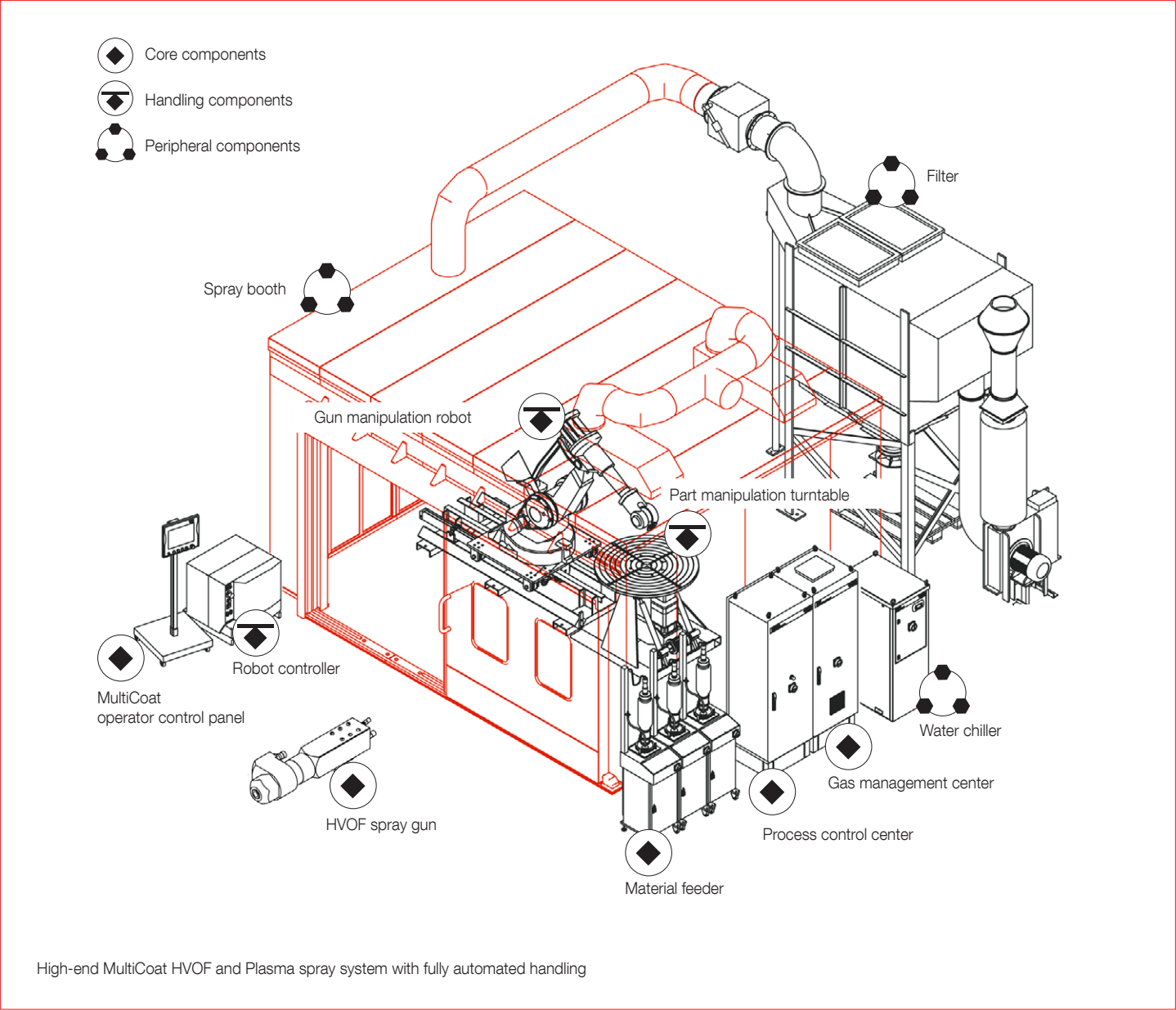


Mid-range HVOF spray system with automated handling

Thermal spray equipment

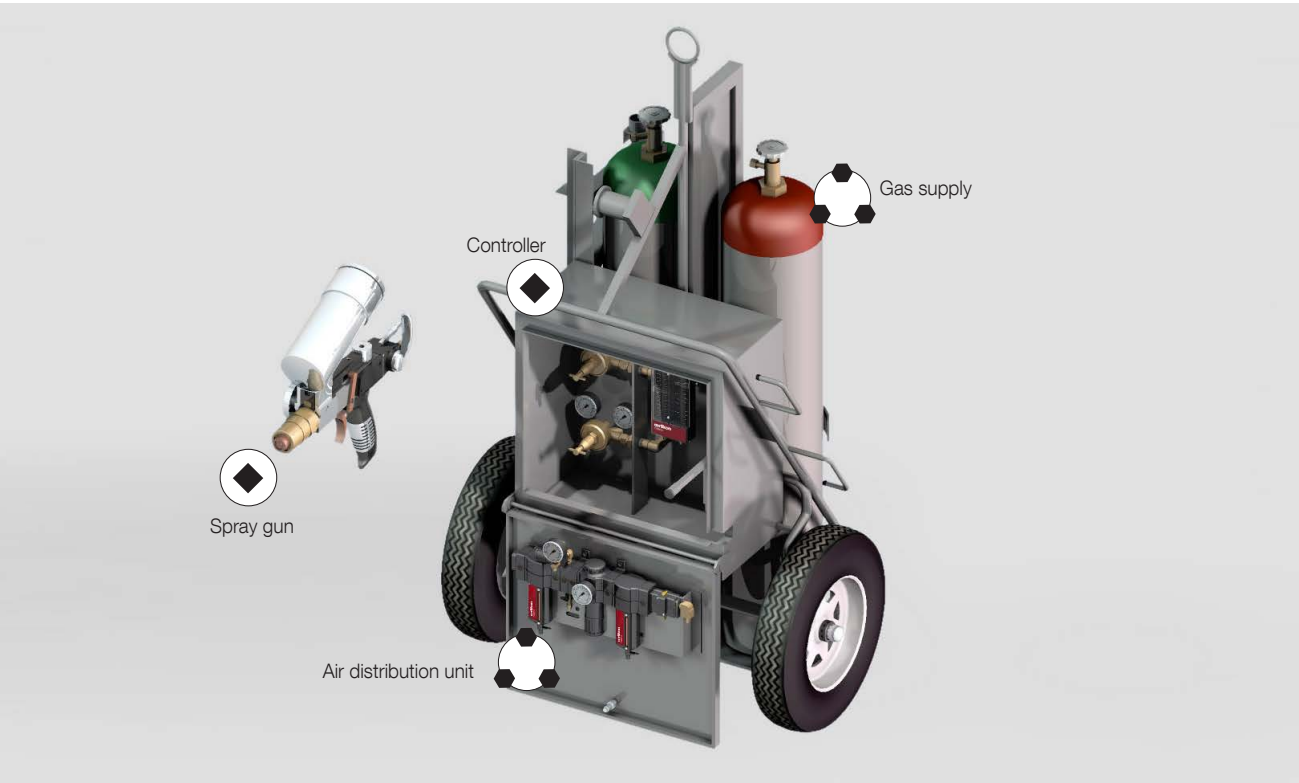
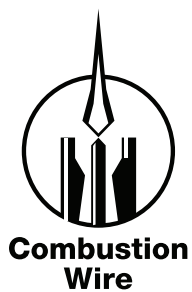
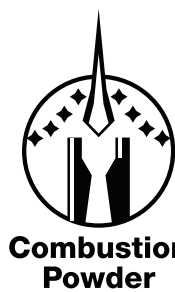


Examples of thermal spray coating systems – HVOF

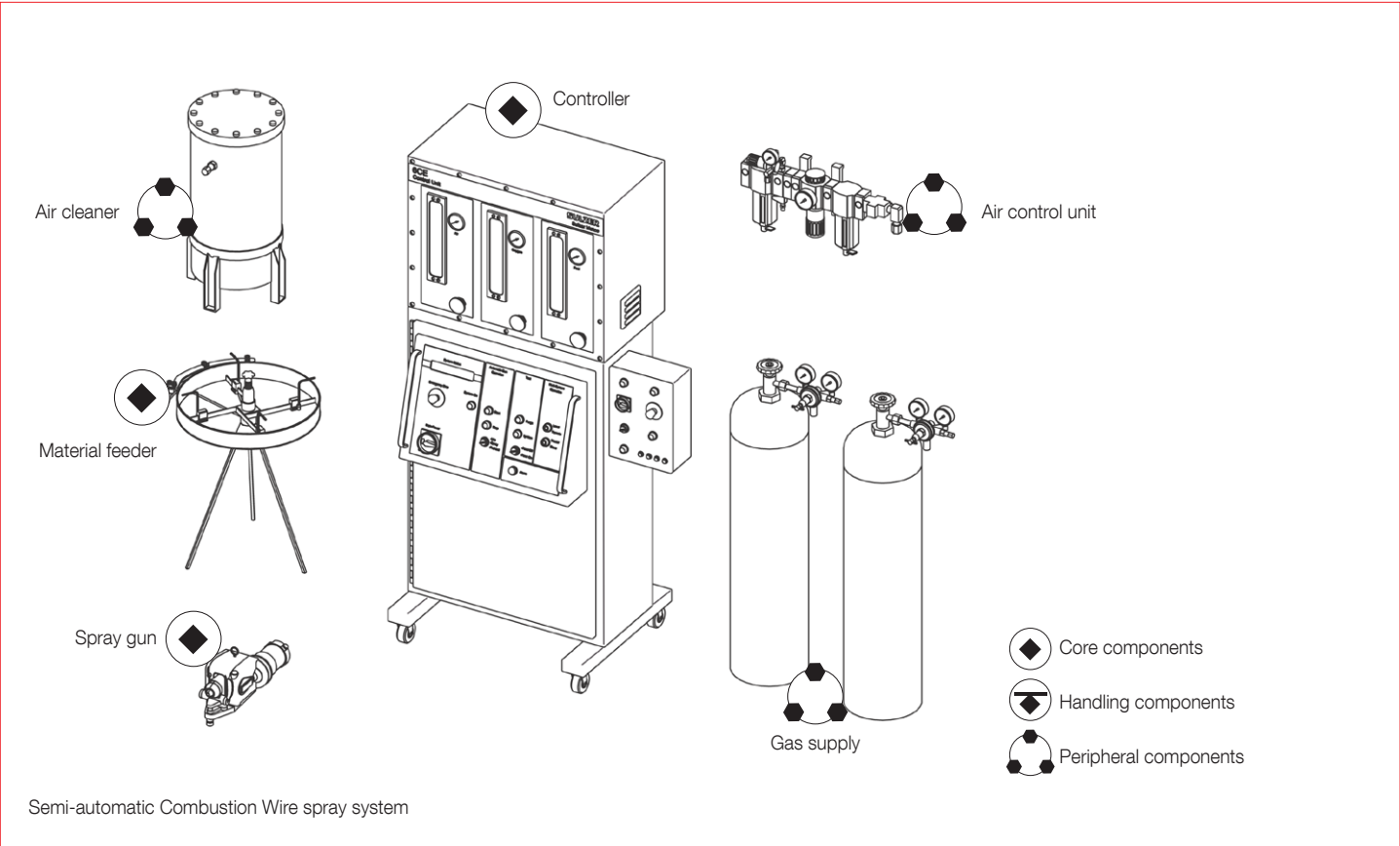


Thermal spray equipment

Examples of thermal spray coating systems – Combustion Powder and Combustion Wire

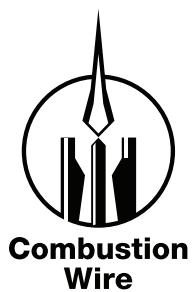
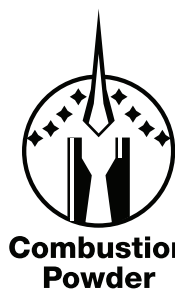


Typical manual Combustion Powder system



Thermal spray equipment

Examples of thermal spray coating systems – Combustion Powder and Combustion Wire



High-end Combustion Wire spray system with fully automated handling

Thermal spray equipment

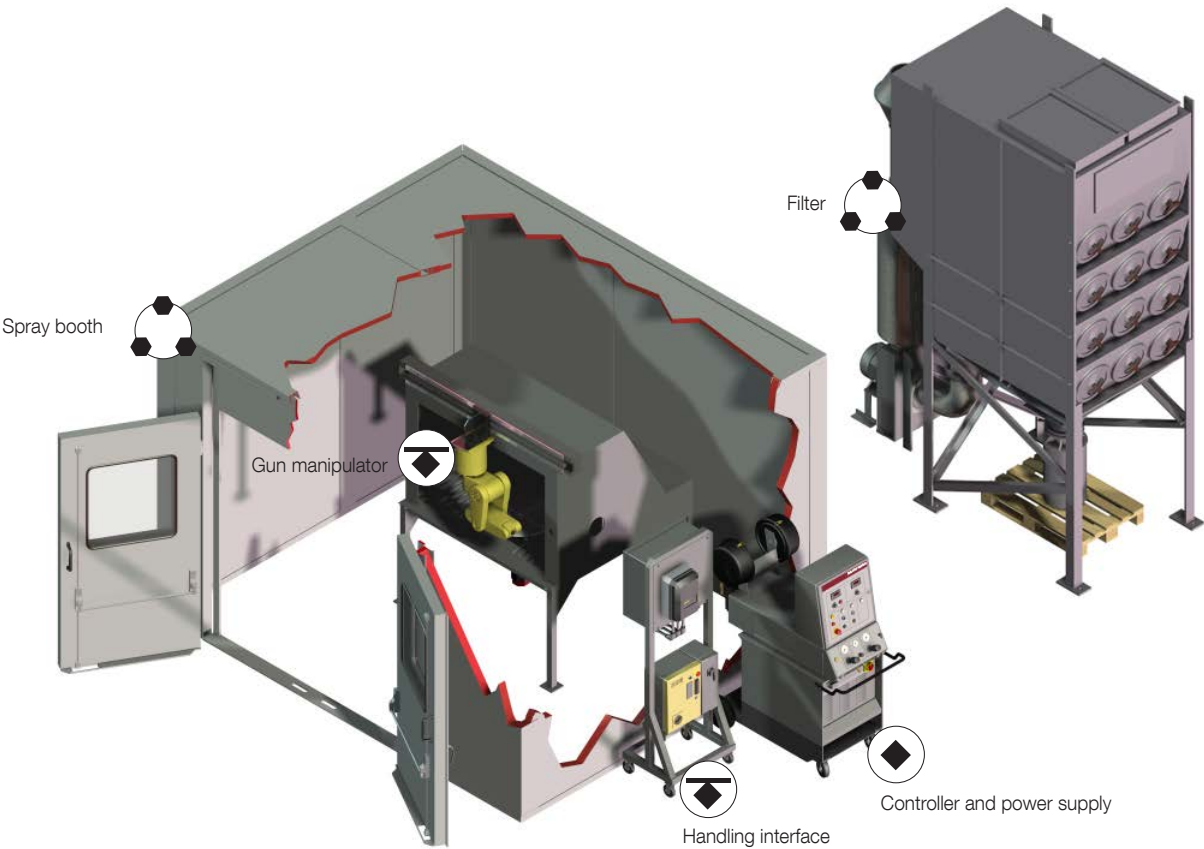


Examples of thermal spray coating systems – Electric Arc

- Core components
- Handling components
- Peripheral components

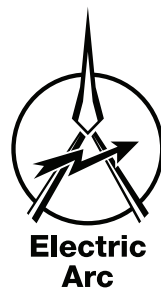


Typical manual Electric Arc system

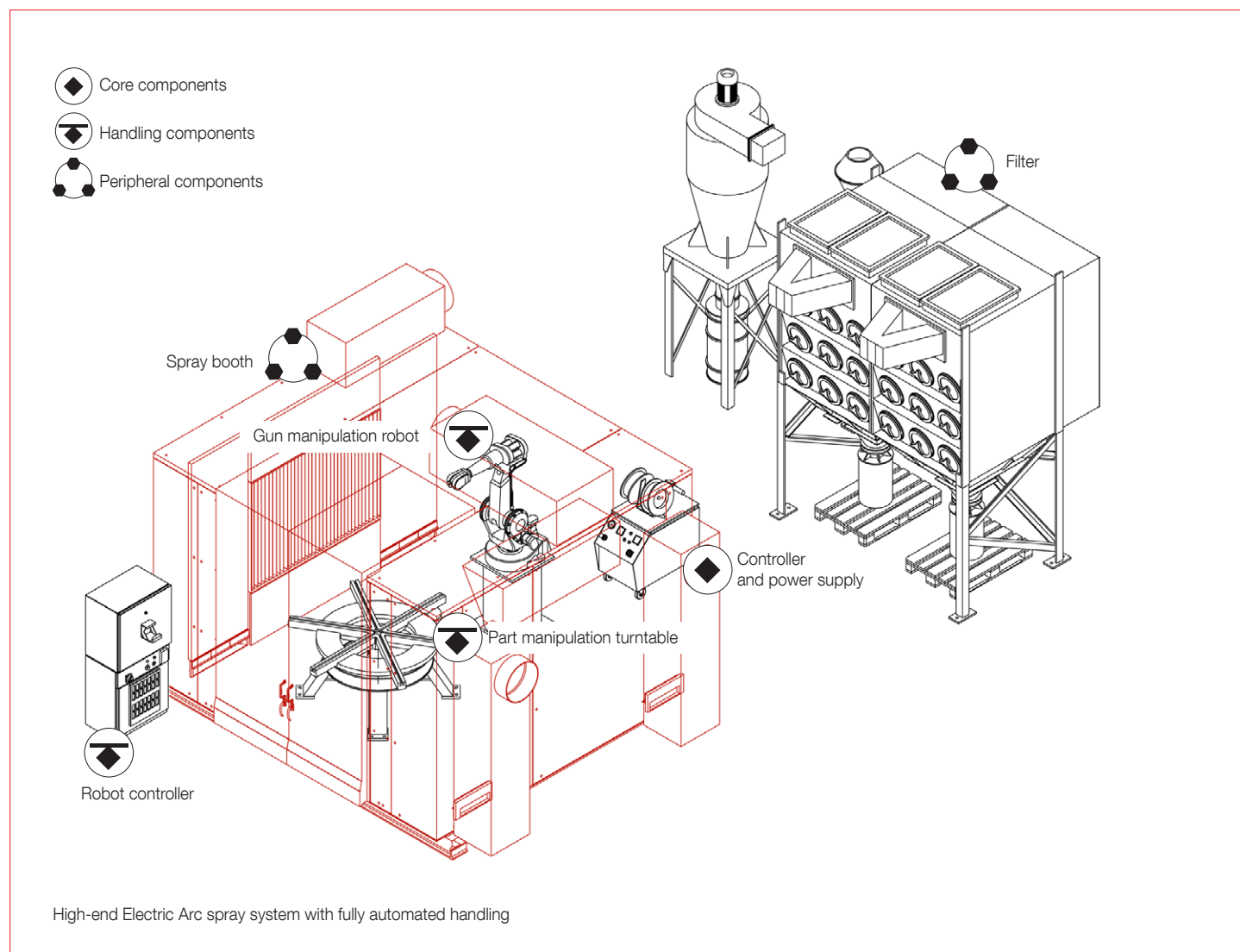


Semi-automatic Electric Arc spray system

Thermal spray equipment



Examples of thermal spray coating systems – Electric Arc



Thermal spray equipment

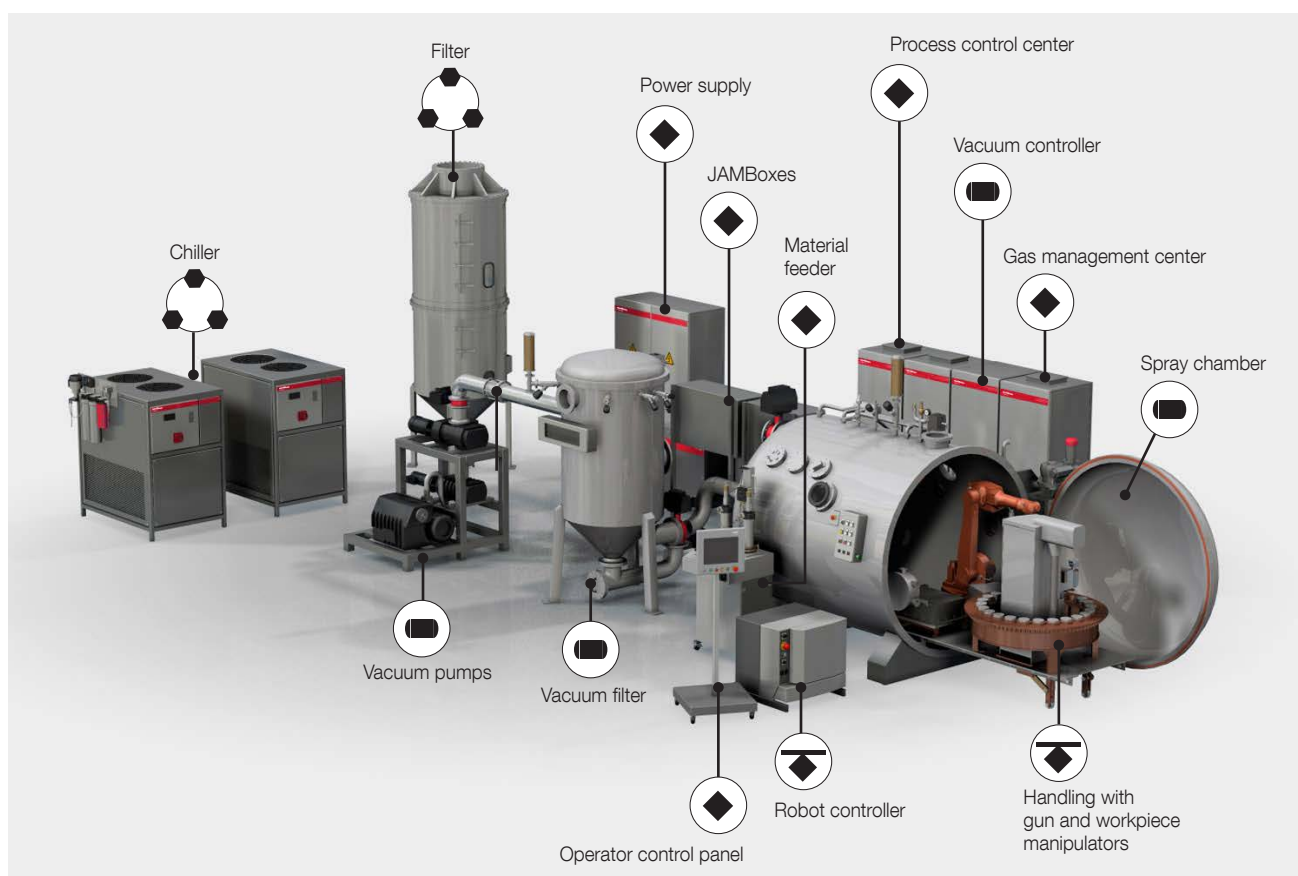


Examples of thermal spray coating systems – ChamPro™





In the ChamPro plasma or wire arc spray systems, the spray process runs under a controlled atmosphere. This environment is chemically inert and at a low pressure condition of approx. 50 mbar. This prevents unwanted oxidation of the spray material.

A ChamPro system typically consists of modified plasma or wire arc system components, equipment needed to create and maintain the controlled atmosphere, and specialized handling and peripheral components. All ChamPro plasma systems can be delivered with reverse transferred-arc part cleaning.

ChamPro™ – VPS System



VPS is a batch-processing system. Once a batch of parts has been loaded, the chamber is pumped down and back-filled with argon. The parts are then coated, followed by a cool-down cycle and back-fill with air to ambient pressure. The parts are then unloaded and the cycle is repeated with the next batch of parts.

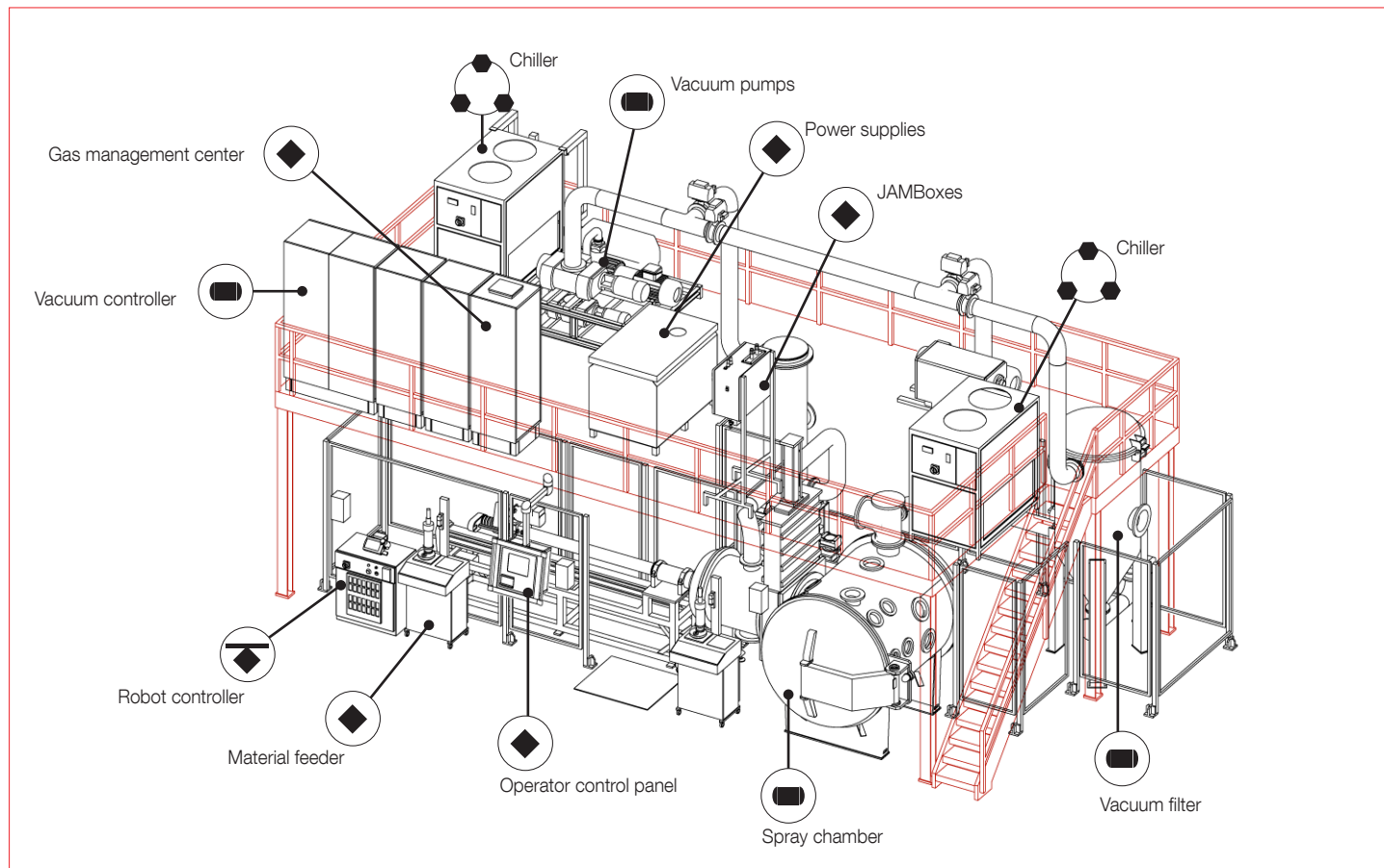
-  Core components
-  Handling components
-  Peripheral components
-  ChamPro components

Thermal spray equipment



Examples of thermal spray coating systems – ChamPro™

ChamPro™ – SVPS System



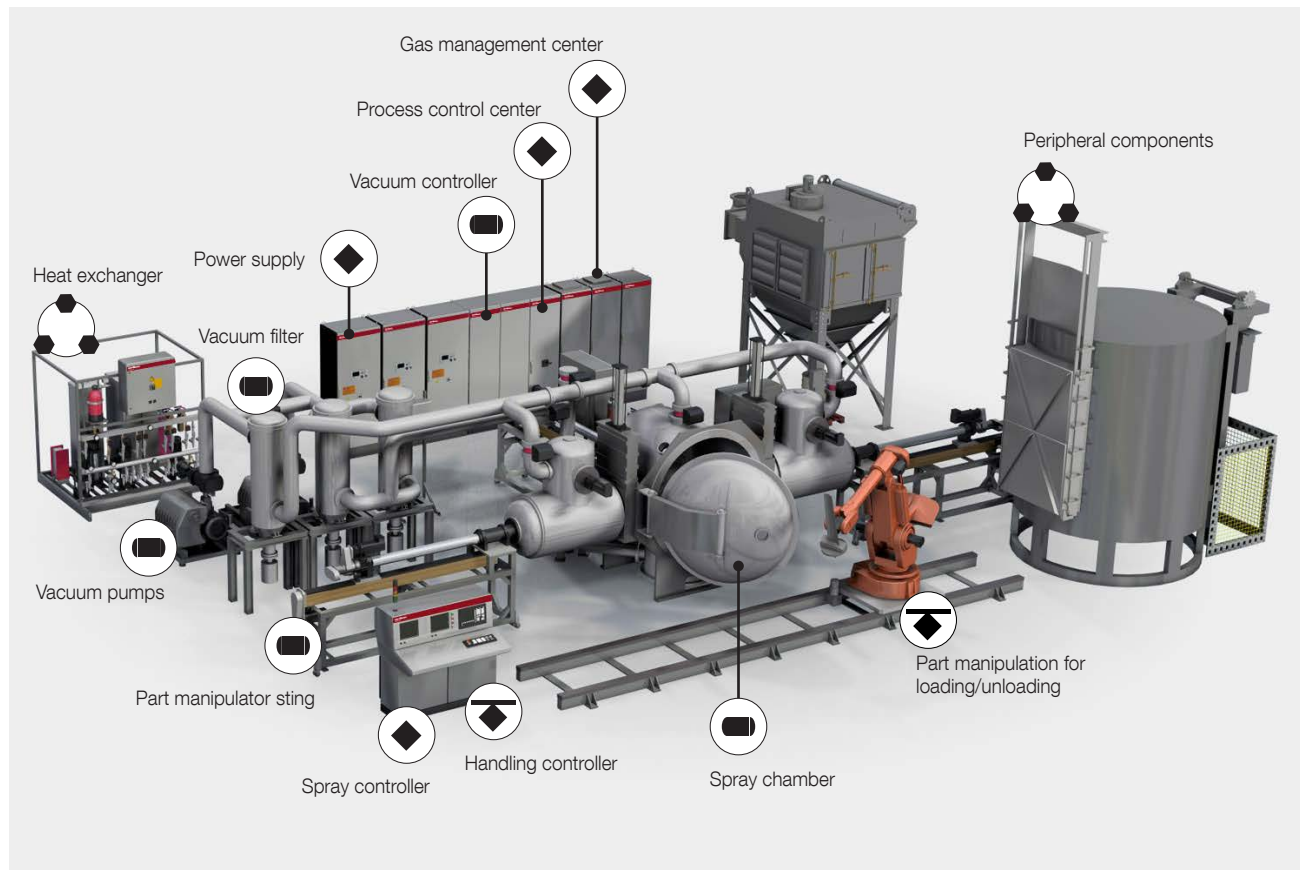
The SVPS System is equipped with a preheating chamber and a loading mechanism containing the part manipulator. This allows the chamber to be maintained under a constant, controlled atmosphere for continuous processing.

Thermal spray equipment







Examples of thermal spray coating systems – ChamPro™

ChamPro™ – HC-LVPS System



The HC-LVPS System is equipped with one or two loading mechanisms and preheating chambers. This allows for the continuous coating of parts; the spray chamber is maintained under a constant, controlled spray atmosphere. A robot loads and unloads the parts.

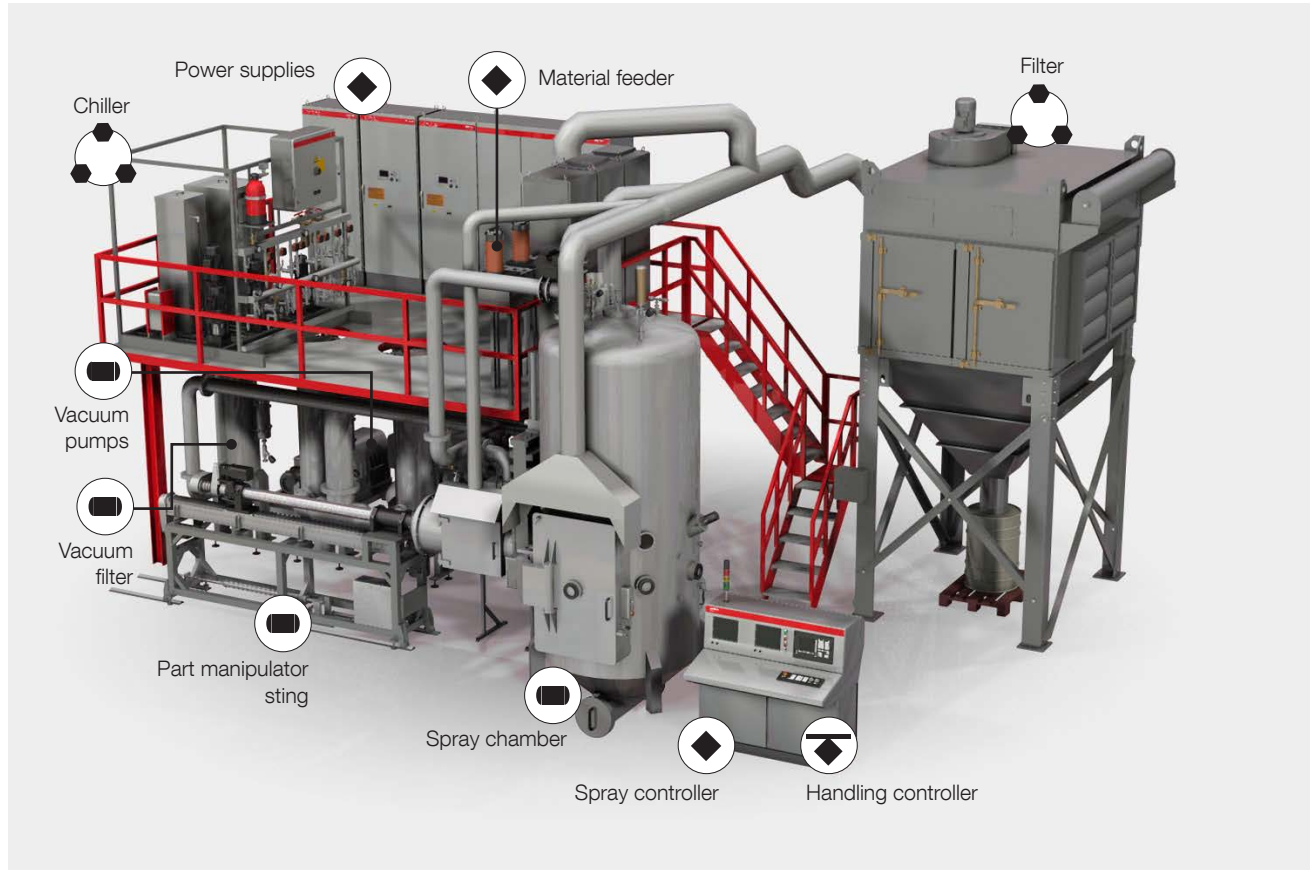
-  Core components
-  Handling components
-  Peripheral components
-  ChamPro components

Thermal spray equipment







Examples of thermal spray coating systems – ChamPro™

ChamPro™ – LPPS-Hybrid System



LPPS-Hybrid represents a family of processes applied in near vacuum conditions (approx. 1 mbar or less) to produce unique, high performance functional surfaces that are quickly applied. Depending on the feedstock material, the state of deposit (liquid or vapor) and the operating parameters, the produced coatings may be thin and dense, or thick with unique microstructures.

-  Core components
-  Handling components
-  Peripheral components
-  ChamPro components

Thermal spray equipment






Examples of thermal spray coating systems – Cold Spray



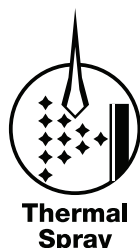
High-end Cold Spray system with fully automated handling

Unlike other thermal spray processes, cold spray does not use either combustion or an arc to melt the feedstock powders. Instead, the system relies on heaters (onboard the spray gun as well as auxiliary heaters) to soften the spray particles slightly and very high kinetic energy to apply metallic coatings with chemistries that are virtually unchanged from the original feedstock material. Very thick coatings, often with properties similar to their bulk material counterparts, can be applied at very high deposit efficiencies.

-  Core components
-  Handling components
-  Peripheral components

Thermal spray equipment

Advanced Technology Solutions and Services



Perfect solutions through optimum materials and innovative technologies

Oerlikon Metco is a global leader in surface engineering solutions and services offering:

- A broad range of thermal spray, thin film, laser cladding and other advanced surface technology equipment and materials
- Integrated systems
- Specialized coating and surface enhancement services
- Manufactured components for the turbine, automotive and other industries
- Customer support services

Oerlikon Metco provides a comprehensive manufacturing, distribution and service network, catering to aviation, power generation, automotive and other strategic growth industries.

To take control of your surface engineering challenges, contact your Oerlikon Metco sales office, visit our web site at www.oerlikon.com/metco or e-mail us at info.metco@oerlikon.com.

About Oerlikon Metco

Oerlikon Metco enhances surfaces that bring benefits to customers through a uniquely broad range of surface technologies, equipment, materials, services, specialized machining services and components. The surface technologies such as Thermal Spray, Thin Film, Plasma Heat Treatment and Laser Cladding improve the performance and increase efficiency and reliability. Oerlikon Metco serves industries such as aviation, power generation, automotive, oil & gas, industrial and other specialized markets and operates a dynamically growing network of more than 50 sites in EMEA, Americas and Asia Pacific. Oerlikon Metco, together with Oerlikon Balzers, belongs to the Surface Solutions Segment of the Switzerland-based Oerlikon Group.

Information is subject to change without prior notice.