

Product Data Sheet Single Pro Powder Feeder

Oerlikon Metco's Single Pro is our disk version powder feeder with precise feeding accuracy that can be used for all atmospheric thermal spray processes using powder as the feedstock.

Consistent powder feed rate contributes directly to consistent coating quality and thickness. The Oerlikon Metco Single Pro incorporates our proven disk feeding technology, combined with highly accurate digital mass flow meters, to deliver accurate feed rates.

Oerlikon Metco's Single Pro powder feeders are designed for use with our advanced thermal spray platforms:

Platform	Operator Control Via	Feeders per system (max)	Enclosure Style
MultiCoat Pro	Clarity User Interface	8	Cabinet
Surface One	Interface	4	Frame

The operator has complete accessibility and control of all feed parameters through the Clarity user interface, which communicates directly with the Single Pro. Multiple Single Pro powder feeders can be operated independently or simultaneously.

Customers can choose:

- **Volumetric technology:** Measurement of powder via disk cross-sectional area per unit of time
- **Gravimetric technology:** Closed-loop feed rate control of powder weight per unit of time

There is no need to change the powder feeder for different thermal spray processes as all Single Pro feeders can be used for:

- Atmospheric Plasma Spray
- HVOF Liquid Fuel
- HVOF Gas Fuel
- Combustion Powder Spray

Hoppers designed for the Single Pro feeder employ a unique RFID system that recognizes the type of hopper, thus ensuring the correct hopper for the thermal spray process.

The Single Pro powder feeder is equipped with a new, high-torque stirrer motor that improves the stirrer function for densely-packed and/or high-density powders.



Single Pro Powder Feeder
(Frame Version)

Single Pro Powder Feeder
(Cabinet Version)

Single Pro feeders use standard Oerlikon Metco powder feeder components, including suction/spreader bars, stirrers and disks. The wide range of options available allow customers to configure their feeder for their specific spray application.

1 Principle of Operation

The powder feed system is based on a rotating powder disk with an annular groove. The disk speed controls the powder feed rate, adjusted such that the powder fills the disk. A spreader bar ensures the powder does not over fill the groove. A suction bar ensures the powder is efficiently and completely exhausted into the powder feed line for conveyance by the carrier gas to the point of process injection. The powder feed rate is proportional to the rotational speed of the powder disk and can be infinitely varied to any desired value within the feed range. A PID controller is used to accurately control the disk speed. A stirrer in the powder hopper can be optionally used to maintain powder flow into the disk. To discharge any potential static that may build up in the feeder, the hopper is grounded.

All parameters to operate the Single Pro feeder are accessible via the Clarity user interface and can be stored as part of the spray recipe at the controller:

- Switching the metering disk on or off
- Setting the rotational speed of the metering disk
- Switching the stirrer on or off
- Setting the rotational speed of the stirrer
- Preselecting the carrier gas (argon or nitrogen)
- Switching the carrier gas on or off
- Setting the carrier gas flow
- With gravimetric models: switching the feed rate control on or off and setting the feed rate.
- With heater option: switching the heater on or off and setting the temperature

In addition, the spray controller monitors the feedback communications received from the powder feeder via the PLC:

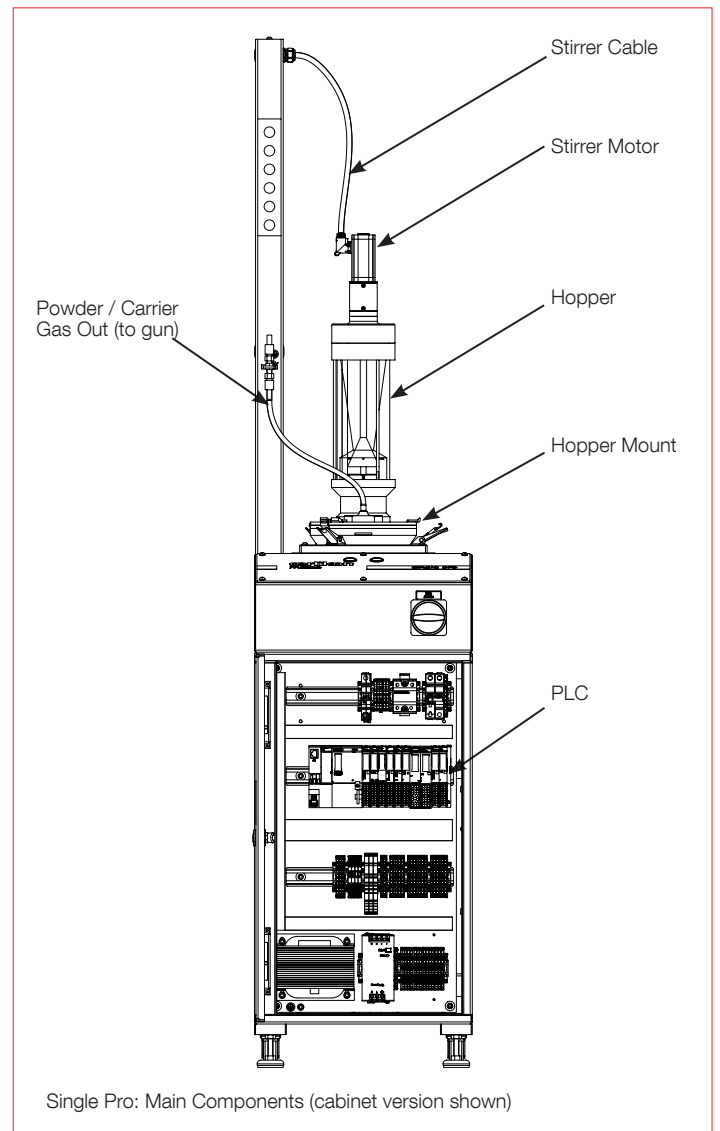
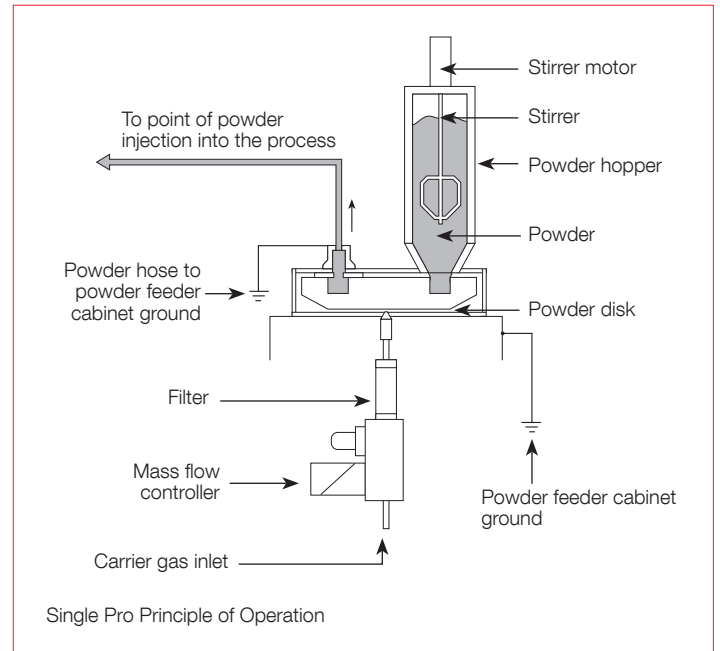
- Metering disc rotational speed
- Stirrer rotational speed
- Carrier gas flow
- Hopper pressure
- Feed rate (with gravimetric models)
- Heater temperature (with heater option)

1.1 Gravimetric Models

Gravimetric models of the Single Pro feeders use a load cell to control the feed rate by weight per unit of time. Gravimetric models can operate in the user's choice of 2 different modes:

- **Open Loop:** The powder feed rate is controlled by the speed of the disk, which is the same as non-gravimetric Single Pro feeders
- **Closed Loop:** The powder feed rate is controlled by weight per unit of time. This is predicated upon the feed rate setting in the parameter and is controlled by a PLC (programmable logic controller) based on feedback received from the feeder load cell. The PLC automatically adjusts the disk speed to maintain the proper feed rate setting.

The choice of operating mode is available in the parameter setup via the system user interface.

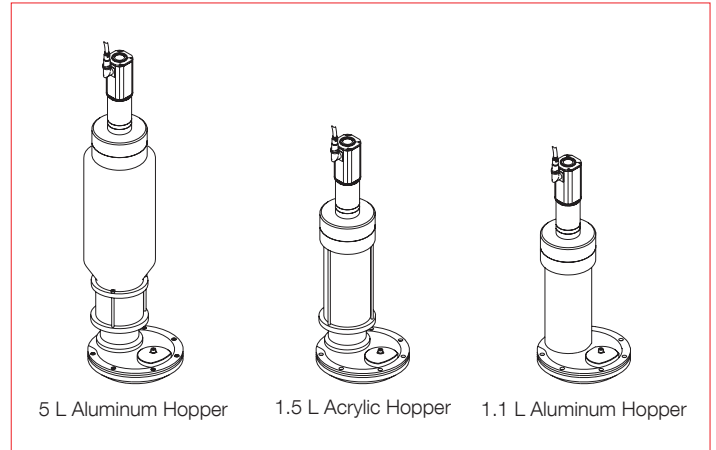


1.2 Hoppers

The Single Pro requires specialized hoppers that have RFID functionality. Hoppers are not included with the feeder so that customers can choose the hopper(s) best suited for their needs. Hoppers are available in 3 sizes (5 l, 1.5 l and 1.1 l). Each size is available in 2 versions:

- **Standard:** For atmospheric plasma spray and combustion powder spray
- **High Pressure:** For all powder-fed atmospheric processes including HVOF-LF and HVOF-GF

When HVOF parameters are chosen, the system validates that the high pressure hopper is installed using both the RFID chip on the hopper and an induction module. The system will not start if the proper hopper is not installed.



1.3 Available SinglePro Models

Customers can choose from the factory-configured SinglePro feeder models shown in the table below. Gas flow

module and heater option can be field retrofitted at a later date, if necessary, however factory-configuration is recommended.

Model	Technology	Enclosure Style ^a	Gas Flow Module ^b	Heater ^c
SinglePro C	Volumetric	Cabinet	Standard	None
SinglePro C-HT				230 volt version
SinglePro C-HT-115				115 volt version
SinglePro C-MHF			High	None
SinglePro C-MHF-HT				230 volt version
SinglePro C-MHF-HT-115				115 volt version
SinglePro F	Gravimetric	Frame	Standard	None
SinglePro F-HT				Standard
SinglePro F-MHF			High	None
SinglePro F-MHF-HT				Standard
SinglePro G C	Gravimetric	Cabinet	Standard	None
SinglePro G C-HT				230 volt version
SinglePro G C-HT-115				115 volt version
SinglePro G C-MHF			High	None
SinglePro G C-MHF-HT				230 volt version
SinglePro G C-MHF-HT-115				115 volt version
SinglePro G F	Gravimetric	Frame	Standard	None
SinglePro G F-HT				Standard
SinglePro G F-MHF			High	None
SinglePro G F-MHF-HT				Standard

^a **Cabinet:** standalone version appropriate for MultiCoat Pro systems; **Frame-Mount:** framework version appropriate for Surface One systems

^b **Standard:** carrier gas flows up to 20 NLPM (45 SCFH); **High:** carrier gas flows up to 50 NLPM (114 SCFH) for high feed rate applications.

^c Choose the voltage appropriate for your electrical requirements and is the voltage necessary to operate the heater option only. Heater option does not include heater jackets or hoppers, which must be ordered separately. For frame-mount version it is not necessary to specify a heater voltage as this is supplied from the system.

2 Features and Benefits

- Excellent powder feed accuracy and repeatability based on proven rotating disk technology
- Closed-loop feed rate control with gravimetric models
- Accuracy is maintained throughout the spray run, even for extended spray campaigns
- Feed rate is independent of the height of the powder in the hopper or temperature
- Two-way communication with the controller maintains the powder feed recipe settings
- Digital mass flow controlled carrier gas for stable gas flow across a wide range of operating parameters
- All powder feeder functions are controlled, set and monitored at the platform user interface, simplifying operation and spray parameter setup

3 Accessories and Options

Oerlikon Metco offers a wide variety of accessories and options for Single Pro powder feeder to suit specific spray requirements. These include:

- Metering disks of different groove sizes and substrate materials
- Suction and spreader bars of different widths, heights and angles
- Stirrer configurations

For a complete list of optional parts and spare parts please refer to the parts list for the Single Pro.

3.1 Heater Option

The heater option is recommended when using hygroscopic powders to prevent the powder from absorbing moisture. When the heater option is installed, the heaters are controlled through the system user interface. Single Pro feeders can be purchased with the heater option factory installed or field-retrofitted at a later date.

The heater option provides the software and hardware interface to control the heater temperature and turn the heater on and off.

Neither hoppers nor heater jackets are included with the heater option and must be ordered separately. Heater jackets can only be used with aluminum hoppers and must be chosen for the size of the hopper (1.1 or 5.0 liter).

The heater option is available in two voltages for cabinet versions of the Single Pro feeder. Customers should choose the voltage option appropriate for their electrical requirements. The voltage designated is for operation of the heater jackets, not the Single Pro Feeder:

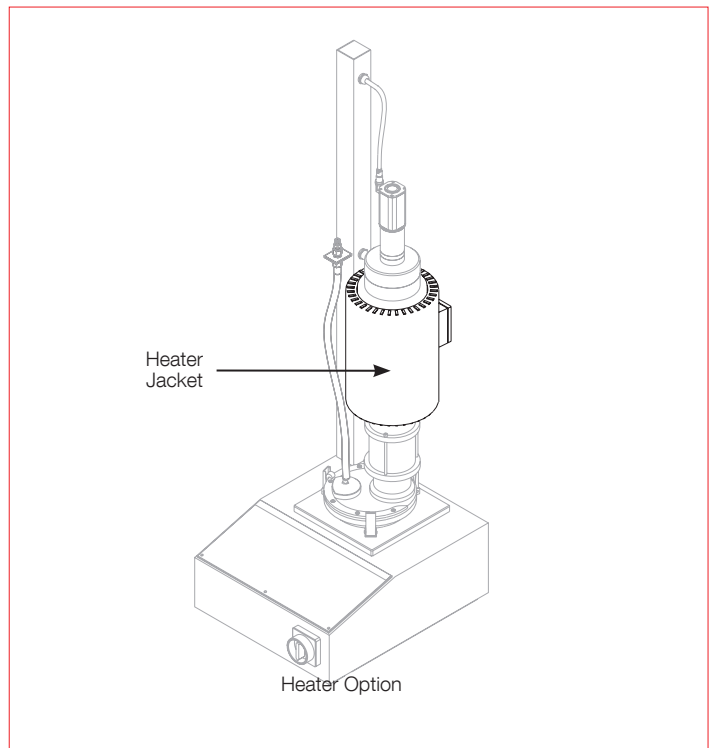
- 230 V
- 115V

- Feeds all types thermal spray powders, from very coarse through very fine particle sizes (5 µm to 200 µm)
- Highly configurable to the spray application requirements using the wide range of available optional components
- Simple, robust construction requires little maintenance and provides years of trouble-free service
- Designed for very safe operation, including HVOF
- RFID hopper recognition ensures correct hopper is used for the spray process
- Writable RFID can be used to identify hoppers dedicated to specific feedstock materials
- Improved high-torque stirrer motor
- Industry 4.0 ready with connection via OPC UA interface

For frame versions of the Single Pro feeder, the voltage is controlled by the system, therefore, only the heater option need be specified.

3.2 Powder Hoppers

The SinglePro does not come with powder hoppers and customers must choose a hopper for their SinglePro feeder. Please see Section 1.2 for available hoppers. Additional hoppers, of any type, can be added at any time. Hoppers also make ideal powder storage containers and additional hoppers can be ordered and use by customers who switch powders



frequently but would like to have commonly used materials ready to go using a dedicated hopper for that material.

3.3 High Flow Rate Carrier Gas Option

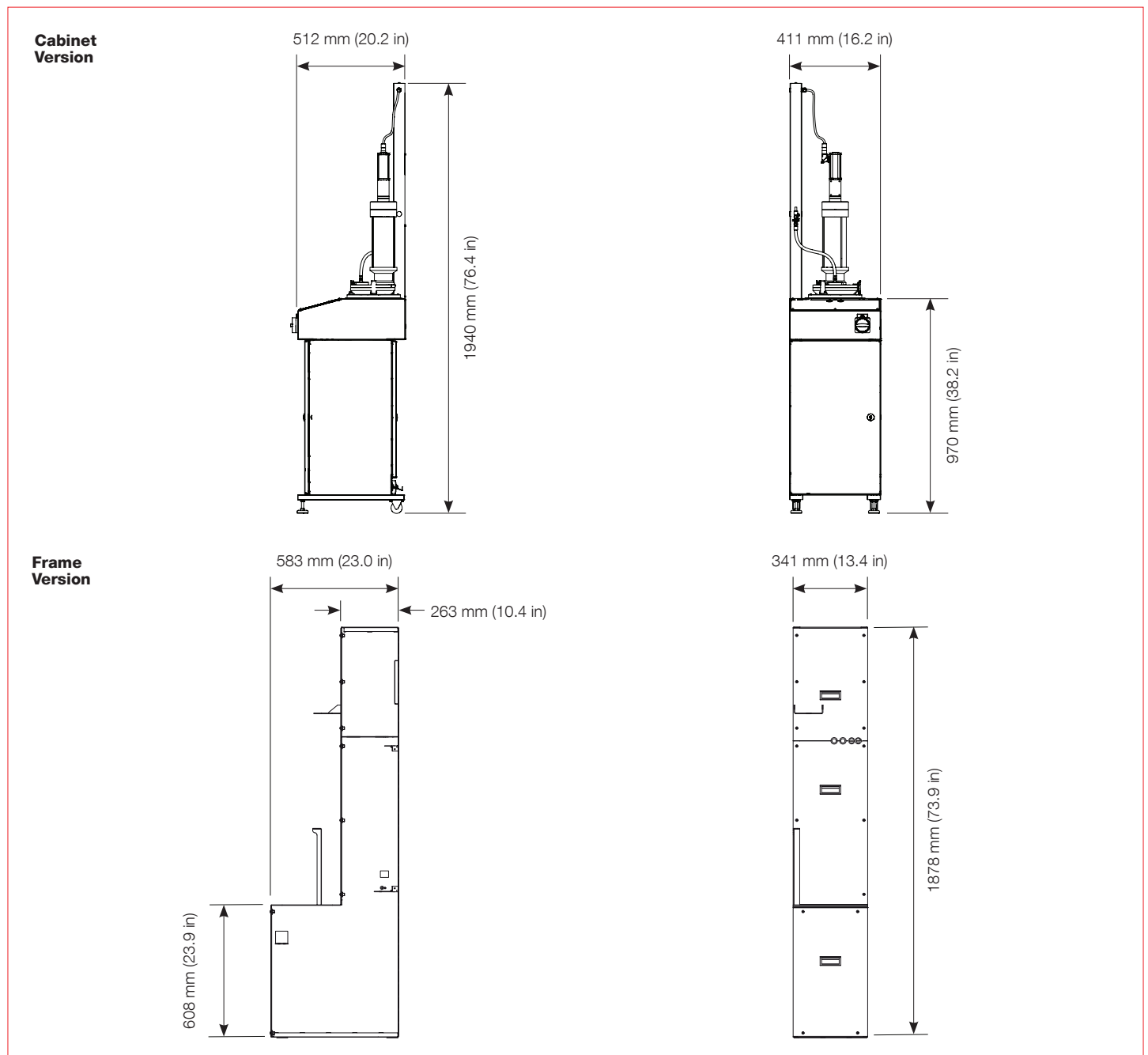
The high flow rate option increases the maximum carrier gas flow from the standard 20 NLPM (45 SCFH) to 50 NLPM (114 SCFH) for very high spray rates through the installation of a second mass flow controller (MFC). The software automatically switches to the MFC with the best accuracy with no

intervention required by the operator. Single Pro feeders can be purchased with the high flow rate carrier gas option factory installed or field-retrofitted at a later date.

Note: Standard carrier gas flow is appropriate for most feed parameters, including HVOF. The high flow rate option is only required for very high carrier gas flows. Contact your Oerlikon Metco Account Manager for more information.

4 Technical Data

4.1 Dimensions



4.2 Specifications

Power Requirements			
Voltage	without heaters	100 to 120 / 200 to 240 VAC ($\pm 2\%$)	
	with heaters	100 to 120 VAC (with Heating 115), 200 to 240 VAC (with Heating 230)	
Frequency		50/60 Hz	
Power Consumption	without heaters	0.3 kW	
	with heaters	0.8 kW	
Fusing		16 A (per CE)	20 A (per UL)
Carrier Gas			
Type		argon or nitrogen	
Connection		3/8 in Swagelok	
Supply Pressure	minimum	APS: 5 bar; HVOF: 10 bar	APS: 72.5 psi; HVOF: 145 psi
	maximum	12 bar	174 psi
Output flow (max) ^a	standard flow (Ar or N ₂)	20 NLPM $\pm 2\%$ full scale	45 SCFH $\pm 2\%$ full scale
	high flow (Ar or N ₂)	20 NLPM $\pm 2\%$ full scale; 50 NLPM $\pm 2\%$ full scale	45 SCFH $\pm 2\%$ full scale; 114 SCFH $\pm 2\%$ full scale
Powder Feeding^b			
Conveyed Quantity ^c		20 to 150 g/m	2.6 to 19.8 lb/h
Feed Rate Accuracy		± 2 g @ 40 to 60 g/min	± 0.26 lb @ 5.3 to 7.9 lb/h
Metering Disk	power output	65 W at 4A	
	accuracy	$\pm 0.08\%$	
	time to reach nominal speed	≤ 6 s	
	speed control range	0.25 to 10 rpm (corresponds to 2.5 to 100% of disk speed)	
Load Cell Loading ^d	max	50 kg	110 lb
Weight			
Without Hoppers	Single Pro	78 kg	168 lb
	Single Pro G	85 kg	187 lb
Operating Environment			
Temperature		+10 to +40 °C	+50 to +104 °F
Humidity		< 75%, non-condensing	
Housing Protection Class		IP 54	IEC 60529
Compatibility			
System Platform		MultiCoat Pro, Surface One	
Spray Gun ^e		All Oerlikon Metco Spray Guns except 5P-II and ChamPro spray guns	

^a Standard flow or high flow may be used for all atmospheric powder fed processes

^b With correct hopper, feeder hardware and parameters

^c May vary depending on powder density, morphology and feeder hardware used

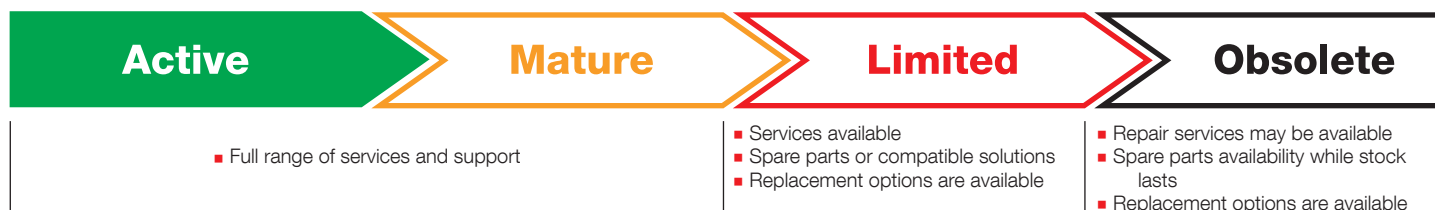
^d Applies only to Single Pro G models

^e Thermal spray guns using powder as the feedstock material

Information is subject to change without prior notice.

5 Life Cycle Status and Support Options

Our four-phase life cycle model keeps you informed about available services and support options throughout the life span of your equipment.



5.1 Single Pro Powder Feeder's Status

- Current Life-Cycle Status: Active
- Inception Date: February 2020

During the Active phase, you have our full support and range of services. Using our life-cycle services will keep your equipment in the best operating condition.

5.2 Keeping You Informed

We will notify you early and transparently about your options as your equipment enters into the next life-cycle phase, providing your equipment is registered with Oerlikon Metco.

5.2.1 Life-Cycle Notification

Provides early information about the upcoming life-cycle phase change and how your equipment can be best supported.

5.2.2 Life-Cycle Status Statement

Provides information about the current life-cycle status and all available options and services to maintain your equipment in best condition.

5.3 The Oerlikon Metco Difference

Benefit from our selection of comprehensive services designed to ensure:

- Consistent spray quality, with little to no parameter shift
- Compliance with your ISO quality requirements
- Maximized equipment uptime
- Extended overall equipment lifetime
- Fast availability of spare parts

5.4 Your Best Value for Peak Performance

Choose from our broad portfolio of services to keep your equipment in top condition now and in the future.

- Calibrations
- Preventive maintenance
- Breakdown support
- Spare parts
- Remote diagnostics
- Health / safety checks and consultancy
- Customer training
- Update, upgrade or modification projects

Take advantage of an Oerlikon Metco Service Agreement tailored to your specific needs.

For more information on your service and support options, please contact your Oerlikon Metco Account Manager.