

## Product Data Sheet

# Metco LFS 400 Gravimetric Liquid Suspension Feed System for Thermal Spray

**The Metco LFS 400 accurately and continuously feeds suspension feedstock materials for thermal spray processes in production environments.**

Feeding of extremely fine, sub-micron and nanostructured powders is problematic for conventional thermal spray powder feeders based on powder conveyance using carrier gases. Nonetheless, feeding of such materials is vital to achieve some of the advanced coating structures needed by today's industries.

It is important to be able to feed these liquids without pulsation while ensuring that the powder particles remain suspended for consistent, reliable coating results.

The Metco LFS 400 suspension feeder provides pulse-free operation and maintains a consistent suspension without sedimentation. It can be used with a variety of mediums as the liquid phase, such as water, ethanol, methanol and precursors. It can feed solid phase powders of almost any composition, including ceramics, metals, alloys and carbides.

The Metco LFS 400 suspension feeder is designed for quick and simple maintenance and trouble-free operation. The built-in cleaning system prevents clogging of the suspension injectors.

As a standalone feeder, the Metco LFS 400 can be operated with any existing atmospheric plasma spray system.

The Metco LFS 400 can feed continuously, making it the ideal suspension feeder for R&D, prototyping and production operations.



Metco LFS 400 Liquid Suspension Feeder

## 1 General Description

The Metco LFS 400 employs pneumatic pressure to deliver the suspension through the feed line and to the spray gun. This ensures pulse-free operation. The operating pressure can be specified by the user, thereby allowing for a range of solutions with different solid loadings and viscosities to be used as the feedstock.

The Metco LFS 400 will feed at rates of 10 to 80 g/min (1.3 to 10.6 lb/h). Generally, the practical maximum loading of solid phase to liquid phase is 30 wt. %; however, customers may be able to achieve higher loading depending on the mobile and solid phases employed.

Operating pressures of 2 to 6 bar (30 to 90 psi) are typical for most parameters, with a maximum operating pressure of 6.9 bar (100 psi). Pressurization is achieved with argon to prevent a reaction of the pressurization gas with the solution.

### 1.1 Dual Canister Design

The dual canister design allows feeding from one canister while the other is being filled. When one canister is empty, the feeder automatically switches to the second canister, thus achieving continuous operation. Each canister holds up to 2 l (0.53 gal) of suspension. A fill port is provided on each canister for easy refilling. In addition, the cover is lightweight and easily removed for cleaning of the canisters.

The canisters employ a unique vibrostirrer designed to ensure thorough agitation that maintains the suspension while the feeder is in operation. The vibrostirrer prevents the centrifuge effect that can occur with traditional stirrer mechanisms or settling that can occur with traditional vibrator mechanisms.

### 1.2 Operator Interface

All operations for the feeder are performed via a hand-held industrial tablet that is cabled to the feeder. Using the tablet, the operator can enter feed parameters, start/stop feeding and monitor the feed operations.

The tablet communicates with the feeder PLC (programmable logic controller) that monitors and controls the feeder.

The feeder E-stop on the operator interface can be integrated into the thermal spray system E-stop circuit via a connection on the feeder electrical panel.

### 1.3 Modes of Operation

Each canister is equipped with an independent load cell for accurate feed rates. The Metco LFS 400 feeder can be operated in two different modes:

- **Open Loop, Feed Pressure Set Point:** The feed rate is calculated from the load cell weight measurements. In this mode, the feed rate is dependent on the injector orifice diameter, feed hose length and suspension properties.

- **Closed Loop, Feed Rate Set Point:** In this mode, the canister pressure will automatically adjust to achieve the desired feed rate based on load cell weight measurements.

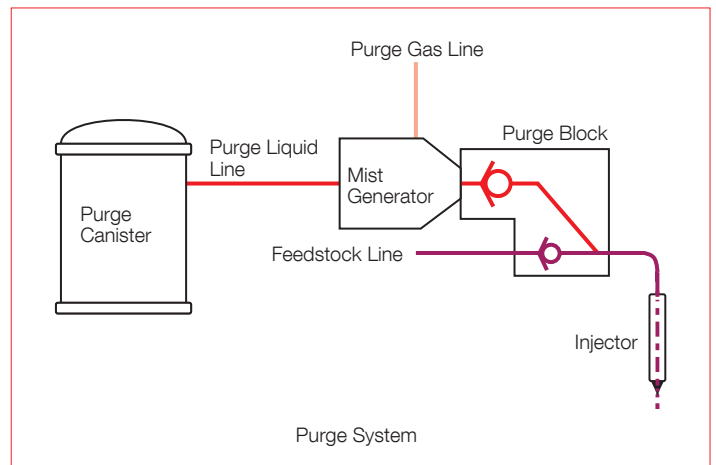
### 1.4 Purge System

Metco LFS 400 feeders are equipped with a patented purge system designed to clean the gun injectors. This prevents sedimentation and conglomeration of the solid phase that would otherwise clog the injector.

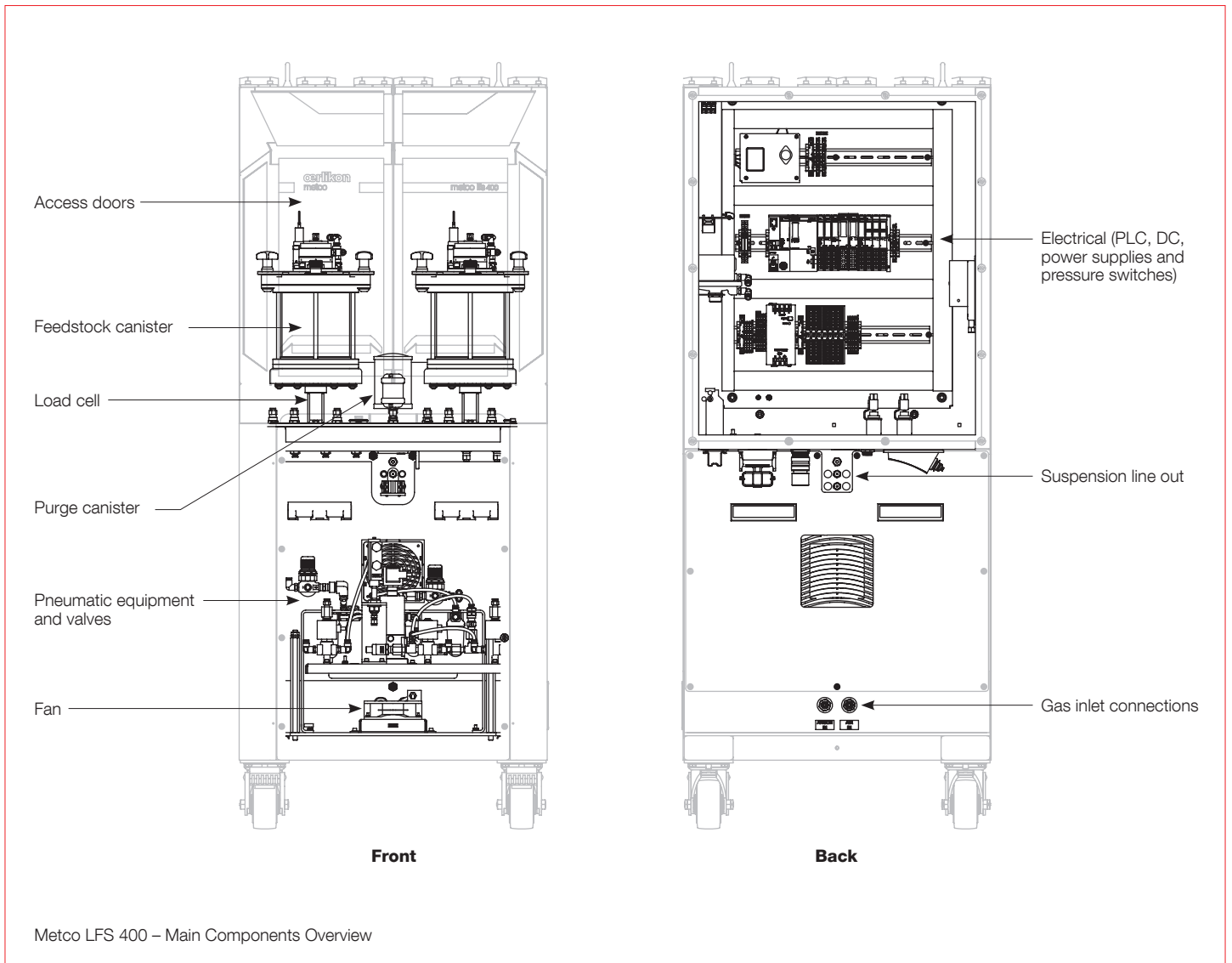
An auxiliary purge canister stores the cleaning fluid (e.g., water, ethanol, methanol, etc.). After feed stop, a patented purge system automatically mists the cleaning fluid under pressure through the injectors.



Operator Interface



Purge System



## 2 Features and Benefits

- Pulse-free consistent feed of suspensions
- Can be used with a variety of liquid phases and precursors
- Gravimetric design for precision feeding
- Pneumatic-controlled system can be programmed for different feed rates
- Hand-held industrial tablet for the user interface controls all aspects of the feeder
- Standalone suspension feeder can be used with any plasma spray system
- Feeds sub-micron and nano-sized powders of almost any composition
- Dual canister design with automatic switching between canisters allows for continuous operation
- Unique vibrostirrer prevents sedimentation or separation of the solution during operation
- Fill port allows easy filling of canister
- Lightweight canister lid simplifies cleaning the canisters
- Built-in automatic purge system to prevent caking of the solid phase in the injectors

### 3 Accessories and Options

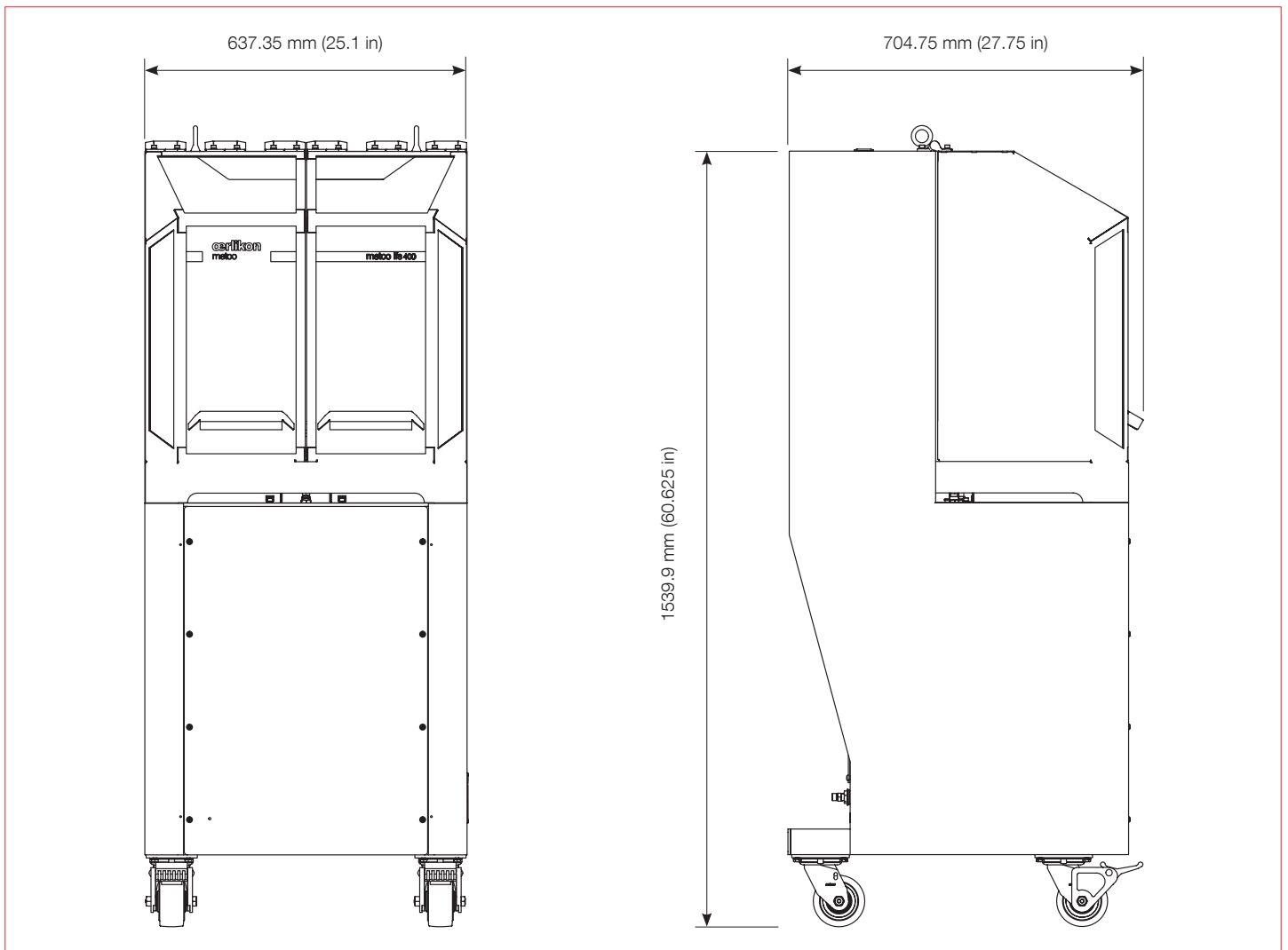
Oerlikon Metco offers injectors designed for liquid suspension feeding for the following plasma spray guns:

- TriplexPro-210
- SinplexPro series
- F4MB-XL
- Metco 9MBM

In addition, gas supply and feeder hoses are available in a number of lengths. Please contact your Oerlikon Metco account representative for further information.

### 4 Technical Data

#### 4.1 Dimensions



## 4.2 Specifications

### Power Requirements

Voltage	100 to 120 / 200 to 240 VAC ( $\pm 2\%$ )		
Frequency	50/60 Hz		
Power Consumption	120 W		
Fusing	15 A		

### Pressurizing Gas

Type	argon or nitrogen		
Connection	3/8-24 in Swagelok		
Supply Pressure	minimum	5.17 bar	75 psi
	maximum	7.24 bar	105 psi

### Air Requirements

	for vibrostirrer		
Pressure	maximum	7.24 bar	100 psi
Quality	Clean, dry, oil free		

### Feeding Characteristics

Feed Rate	10 to 80 g/min		1.3 to 10.6 lb/h
Feed Pressure	maximum	6.9 bar	100 psi
Canister Volume	per canister	2 l	0.53 gal
Feed Rate Accuracy	$\pm 2.5$ g/min		$\pm 0.33$ lb/h
Time to Reach Nominal Feed Rate <sup>a</sup>	$\leq 90$ s		
Load Cell Loading	maximum	50 kg	110 lb

### Weight

Without Hoses, Cables or HMI	240 kg	530 lb
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### Operating Environment

Temperature	+10 to +40 °C	+50 to +104 °F
Humidity	< 75%, non-condensing	

### Housing Protection Class

	NEMA 12X/IP65	
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### Compatibility

Suspension Liquid Phase <sup>b</sup>	Water, Ethanol, Methanol, Precursors		
Solid Phase Compositions	sub-micron or nano-scaled	Ceramics, Metals, Alloys, Carbides	
Solid Phase Concentration <sup>c</sup>	typical maximum	30%	
System Platform	All Oerlikon Metco Plasma Spray Systems		
Spray Guns <sup>d</sup>	TriplexPro-210, SinplexPro series, Metco 9MBM, F4MB-XL		

<sup>a</sup> Operating in closed-loop mode and closed-loop initialization

<sup>b</sup> Liquids with viscosity  $\leq 0.005$  Pa·s and mole weight  $\leq 50$  g/mol are recommended

<sup>c</sup> Higher concentrations may be possible with some precursors and the liquid phase

<sup>d</sup> Equipped with liquid suspension spray injectors

## 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 LFS 400 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.