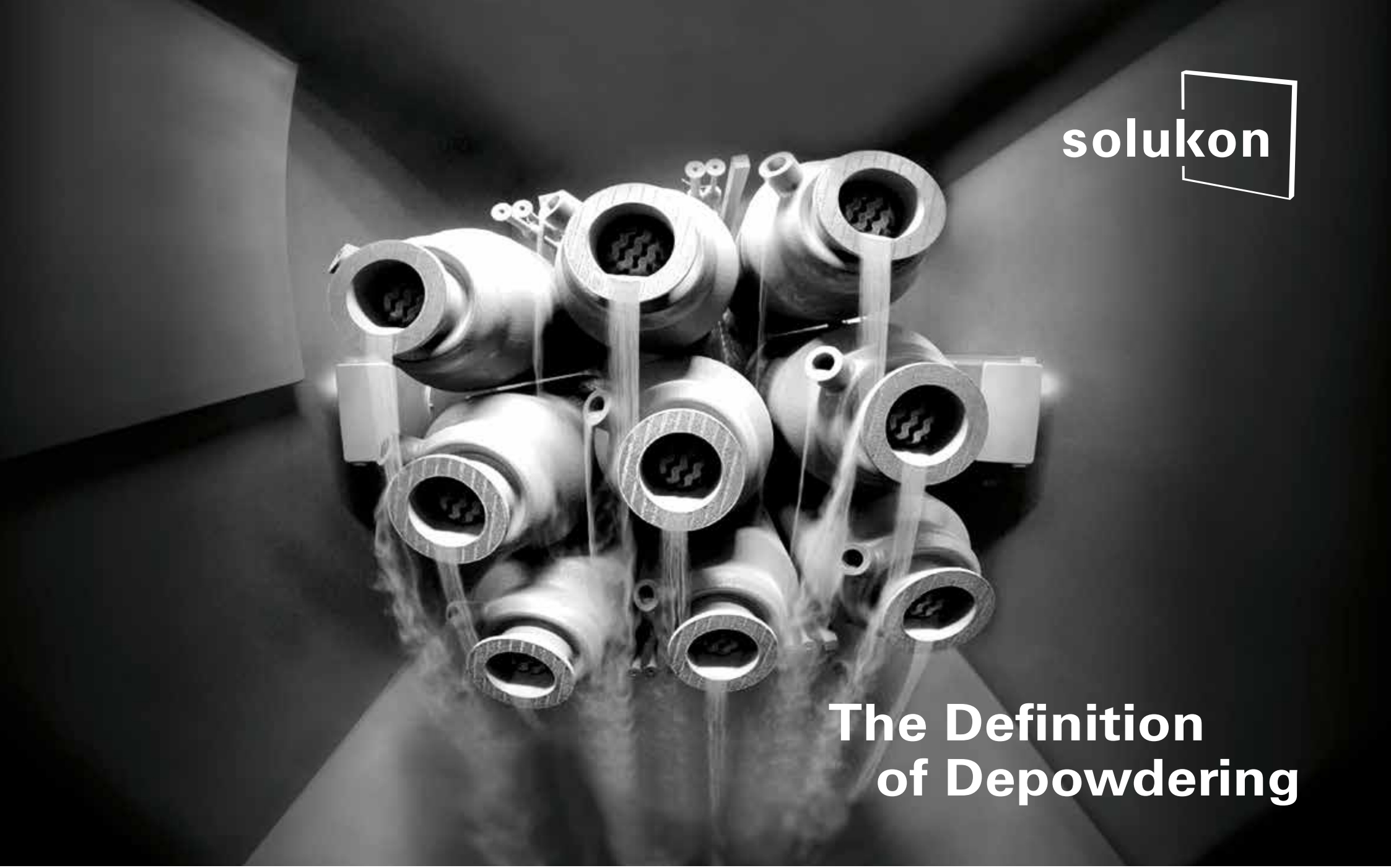


solukon

The Definition of Depowdering

Depowdering Systems 2024/25

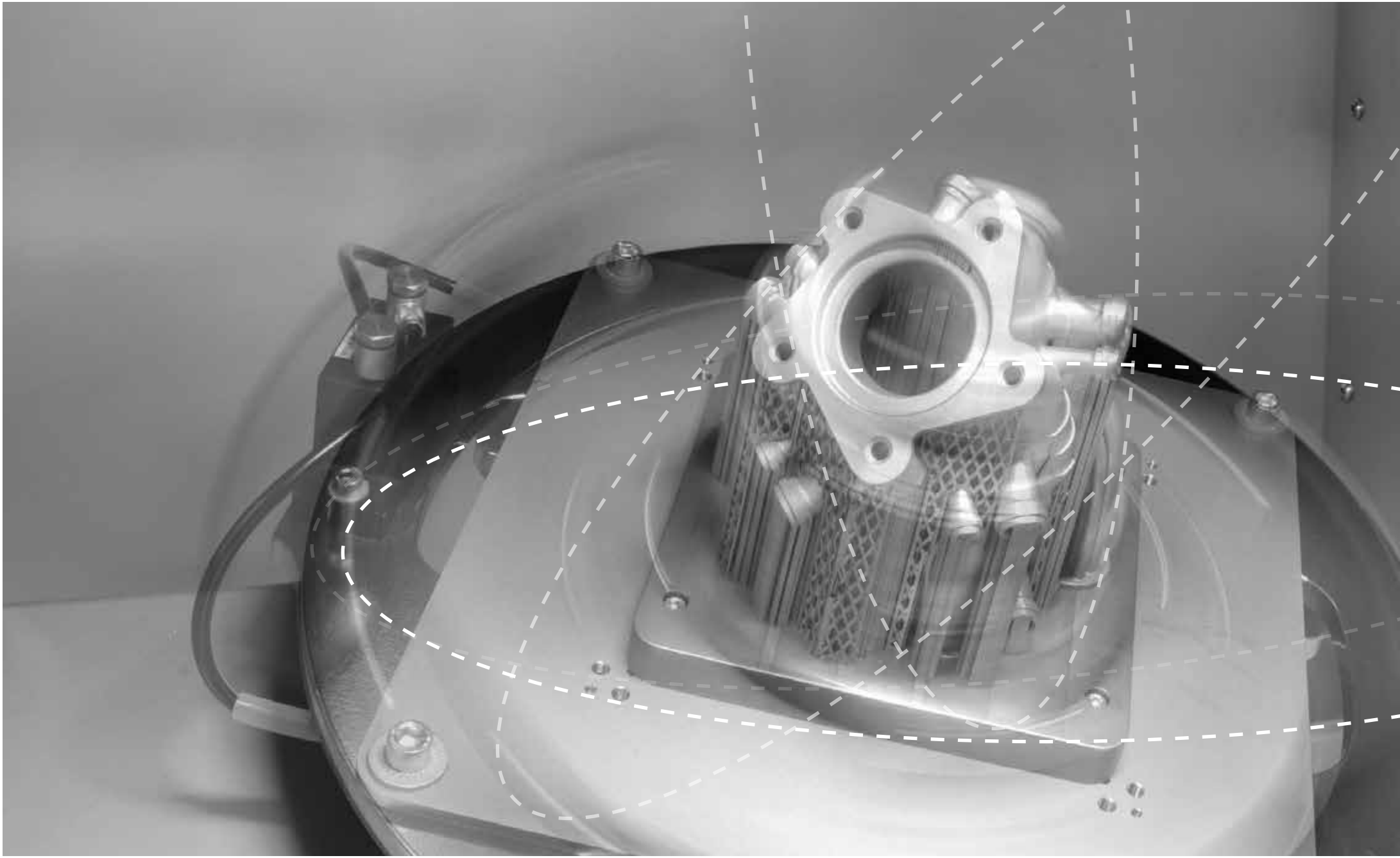
Contents

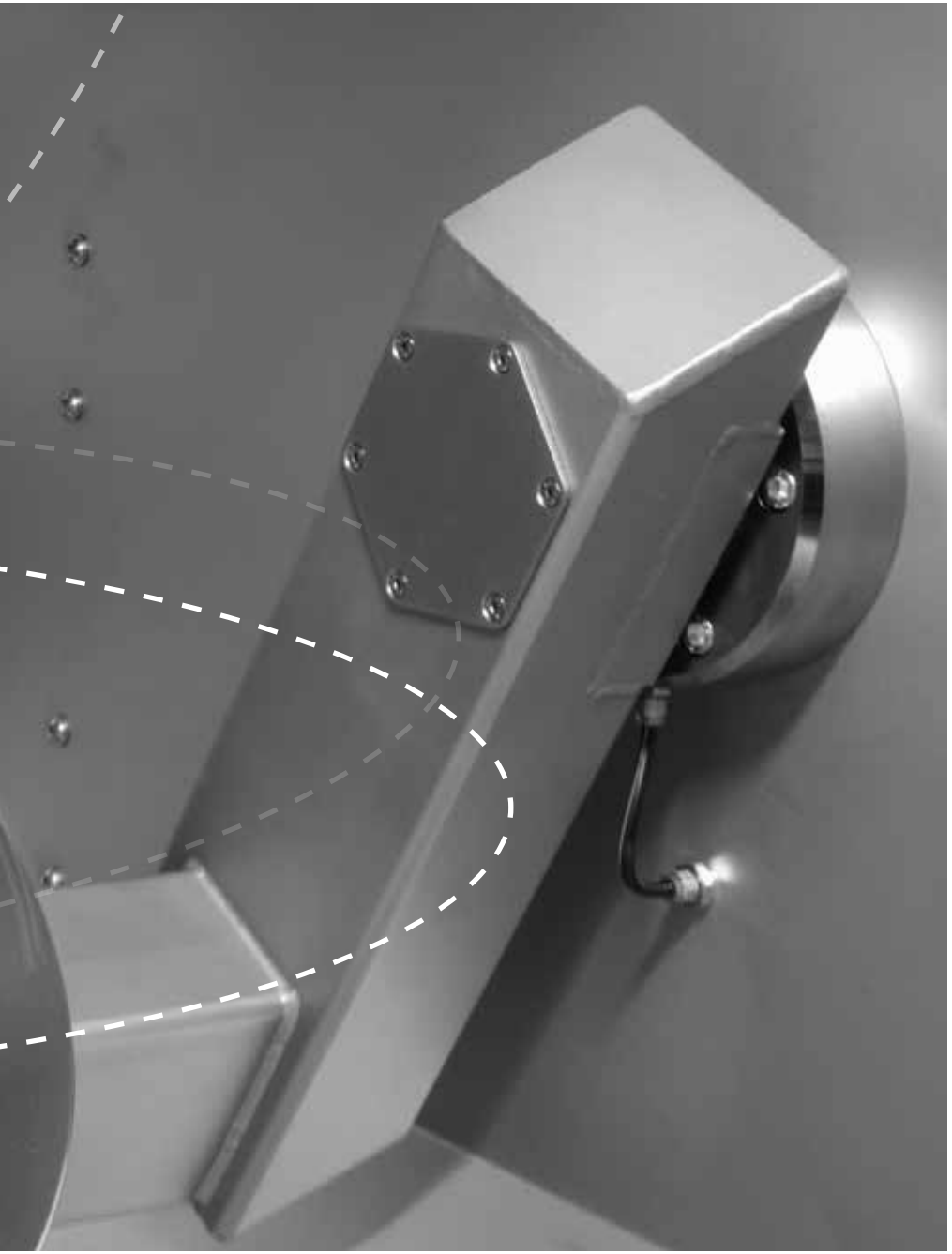
Solukon is a high-quality manufacturer of peripheral equipment for additive manufacturing technologies. With the introduction of the first SFM-AT800 system in 2014, Solukon is known as a pioneer in the field of automated depowdering of metal AM components.

Solukon products meet the highest functionality and safety standards. They are approved for safe and reliable processing of powder materials, including tough-to-handle, reactive and hazardous metal powders.

Inspired by users, Solukon systems are engineered to provide a robust process-driven method of handling powder removal and retrieval, from loading to the final cleaning, ensuring convenient and economical operation. Solukon has extensive experience in the engineering of additive manufacturing systems.

Based in Augsburg, Germany, the company develops and supplies systems to industrial users and to several leading manufacturers of 3D printing systems in the metal and plastic sectors.





Solukon SPR® Technology

All Solukon systems are based on the unique depowdering technology Smart Powder Recuperation SPR®.

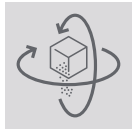
Solukon systems remove residual powder from laser-fused parts by automatic rotation and adjustable vibration within a protected atmosphere.

Through programmable rotation of the part around two axes, non-fused build material is removed from complex voids and narrow support structures, and can be collected free of contamination for reusing.

Depending on the machine model the motion sequence of the swiveling arms can be programmed conventionally or by using the SPR-Pathfinder® software. The S-Version of some Solukon systems has two endless rotating axes with two programmable servo-drives and can move the part along any imaginable path. To clean in series, you can save the movement pattern as well as the vibration in a program.

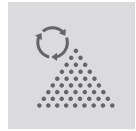
With Solukon's unique SPR® Technology, you thus standardize your depowdering and always get reliable and repeatable cleaning results.

Protected Atmosphere



Programmable 2-Axis Movement

Powder Fluidization with Controlled Vibration



Contamination free Powder Recovery

Advantages

The increasing process performance and the material properties of powder-bed-based jet melting processes in the metal sector have significantly advanced their industrial use in recent years.

The growing production also leads to an increasing inspection of the process by supervisory authorities, risk managers and legal departments.

One focus is powder removal, the step in the production chain where the greatest risk to work and plant safety is dust exposure.

Solukon offers a comprehensive solution to the challenge of powder removal.

- Time savings
- Repeatable cleaning results
- Approved explosion protection
- High degree of protection from hazardous dusts
- Safety controlled inert gas infusion
- HEPA filtration system
- Robust design with minimum maintenance
- Powder recovery

Product Overview

Metal Depowdering Systems

SFM-AT
1500-S

SFM-AT
1000-S

SFM-AT
800-S

SFM-AT
350
350-E

SFM-AT
200


solukon

600 x 600 x 1,500 mm
820 x 820 x 1,300 mm

2,100 kg

It is the ideal depowdering system for extra-large, heavy and complex parts, such as rocket engines.

SFM-AT1500-S

A new titan for extra-large parts with a height up to 1,500 mm

SFM-AT1500-S is a depowdering system that was specially developed for cleaning extra-large, heavy and complex parts, such as rocket engines. The system can accommodate parts with heights of up to 1500 mm and weights of up to 2100 kg.

Maximum capacity, minimum footprint

Despite its enormous load capacity the SFM-AT1500-S is extremely compact. The structure is arranged so flat that no platforms or stairs are necessary to load the parts. This makes the system unique in terms of its footprint and particularly safe and convenient when loading and handling large components.

Top Solukon quality for extraordinary requirements

Top machine quality, maximum safety with inerting for reactive materials and best cleaning results thanks to programmable rotation. These features also describe what is currently the largest Solukon system. Massive parts can be easily inserted by crane via front-top-loading.

Intelligent cleaning of massive parts

The SFM-AT1500-S cleans complex interior channels in a fully automated process and without programming efforts by using SPR-Pathfinder. With the compatible Digital-Factory-Tool, all data relevant to depowdering can be tracked in a protocol file.

Ready for automated powder conveying

The significant quantities of powder that accumulate during depowdering can be safely discharged with the compatible SFM-PCU powder collection unit, complete with sensor monitoring.

SFM-AT 1500S


I-O
ROOF
MOVE

600 x 600 x 1,000 mm

800 kg

It is the ideal depowdering system for the aerospace industry.

SFM-AT1000-S

The pro-version ideal for extraordinary large parts with a height up to 1,000 mm

The SFM-AT1000-S is an automatic depowdering system for large and heavy metal components with a height of up to 1,000 mm and a maximum weight of 800 kg. This makes it the ideal postprocessing system for the aerospace industry. The SFM-AT1000-S depowders even the most complex rocket engines, which have internal cavities and channels, fully automatically and efficiently. The system is based on the unique Solukon Smart Powder Recuperation technology SPR®.

Intelligent motion and optimized handling of various part sizes

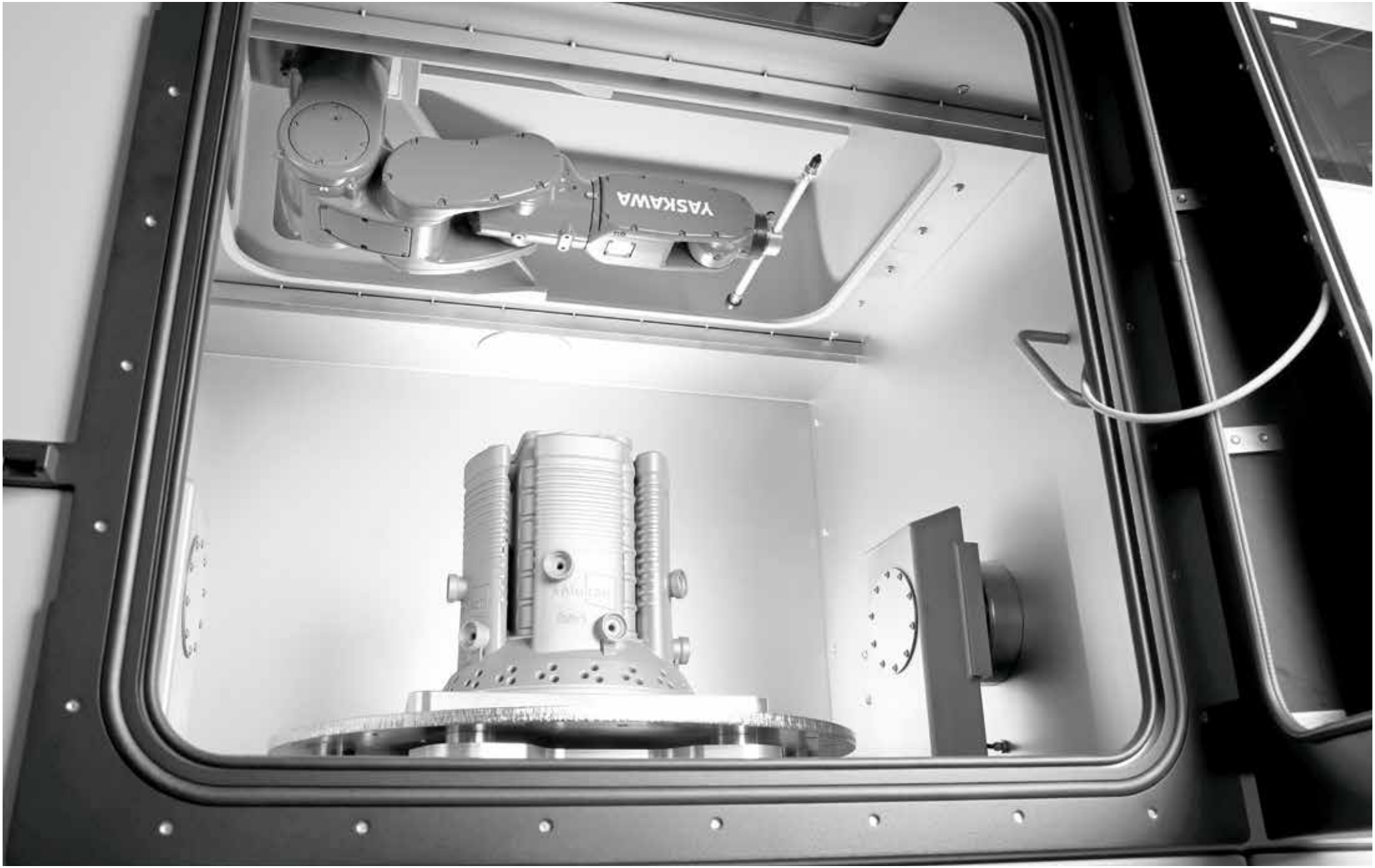
The SFM-AT1000-S has two endless rotating axes with programmable servo drives so that it can move the part along any imaginable path. The system is available in a long-arm and a short-arm version for an optimized handling of parts with a special center of gravity. In addition, the SFM-AT1000-S is compatible with SPR-Pathfinder® software from serial number 1. The software automatically calculates the ideal motion sequence for each part, which is then read and executed by the Solukon system so that the powder is removed residual free.

Safety and Connectivity

When working with reactive materials such as titanium or aluminum, you can use the system under inert condition. The recovered metal powder can be reused in further printing processes.
Furthermore, the SFMAT1000-S has an OPC UA interface for connectivity.

Advanced loading and handling of large parts

(Crane) loading of extra large parts is even easier with the new pneumatic opening roof and a front door that opens wider.



SFM-AI 800S with robot-integration

SFM-AT800-S

The award-winning flagship for complex geometries with a height up to 600 mm

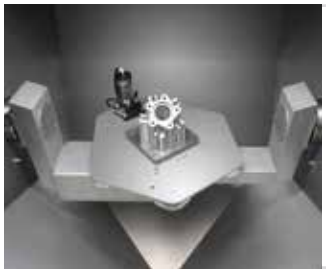
The SFM-AT800-S is an automatic system for efficient depowdering of metal laser melted parts. It depowders parts with a height up to 600 mm and offers the industry's highest standards of powder removal for large and complex parts with internal channels and hard-to-access geometries, such as heat exchangers. The postprocessing system uses the unique Solukon Smart Powder Recuperation technology SPR®.
The SFM-AT800-S therefore cleans metal parts within a sealed process chamber using targeted vibration and automated programmable endless rotation along two axes. Due to rotation of the parts unmelted build material can flow out of complex voids and support structures.

Programmable motion

The SFM-AT800-S is compatible with SPR-Pathfinder® software from serial number 1. The software automatically calculates the ideal motion sequence for each part, which is then read and executed by the Solukon system so that the powder is removed residual-free.

Safety and connectivity

After the automatic powder removal just use the sealed glove ports to manually clean with compressed air or inert gas. When working with reactive materials such as titanium or aluminum, you can use the system under inert condition. After the automated depowdering the metal powder is ready for reuse because it is free of any contamination.
In addition, the SFM-AT800-S is ready for robot loading or/and OPC UA.



600 x 600 x 600 mm
800 x 400 x 550 mm

300 kg

It is used in several industries
like aerospace and automotive.

SFM-AT350 & SFM-AT350-E

The new standard for medium-sized parts up to 100 kg

The SFM-AT350 is an automated system for efficient depowdering of metal laser melted parts weighing up to 100 kg. An optimized chamber volume, an enhanced freedom of motion and intelligent features characterize the SFM-AT350. The SFM-AT350 thus sets new standards for the depowdering of medium-sized metal components.

Pneumatic or piezoelectric excitation

The SFM-AT350 has a pneumatic vibration excitation that can be optionally supplemented with a knocker. Alternatively, the SFM-AT350-E is available with piezoelectric (ultrasonic) excitation which cleans the component particularly gently through very high and self-regulating vibration.

Programmable motion

The latest generation of the SFM-AT350 and SFM-AT350-E is compatible with the SPR-Pathfinder® software. The software automatically calculates the ideal motion sequence for each part, which is then read and executed by the Solukon system so that the powder is removed residual-free.

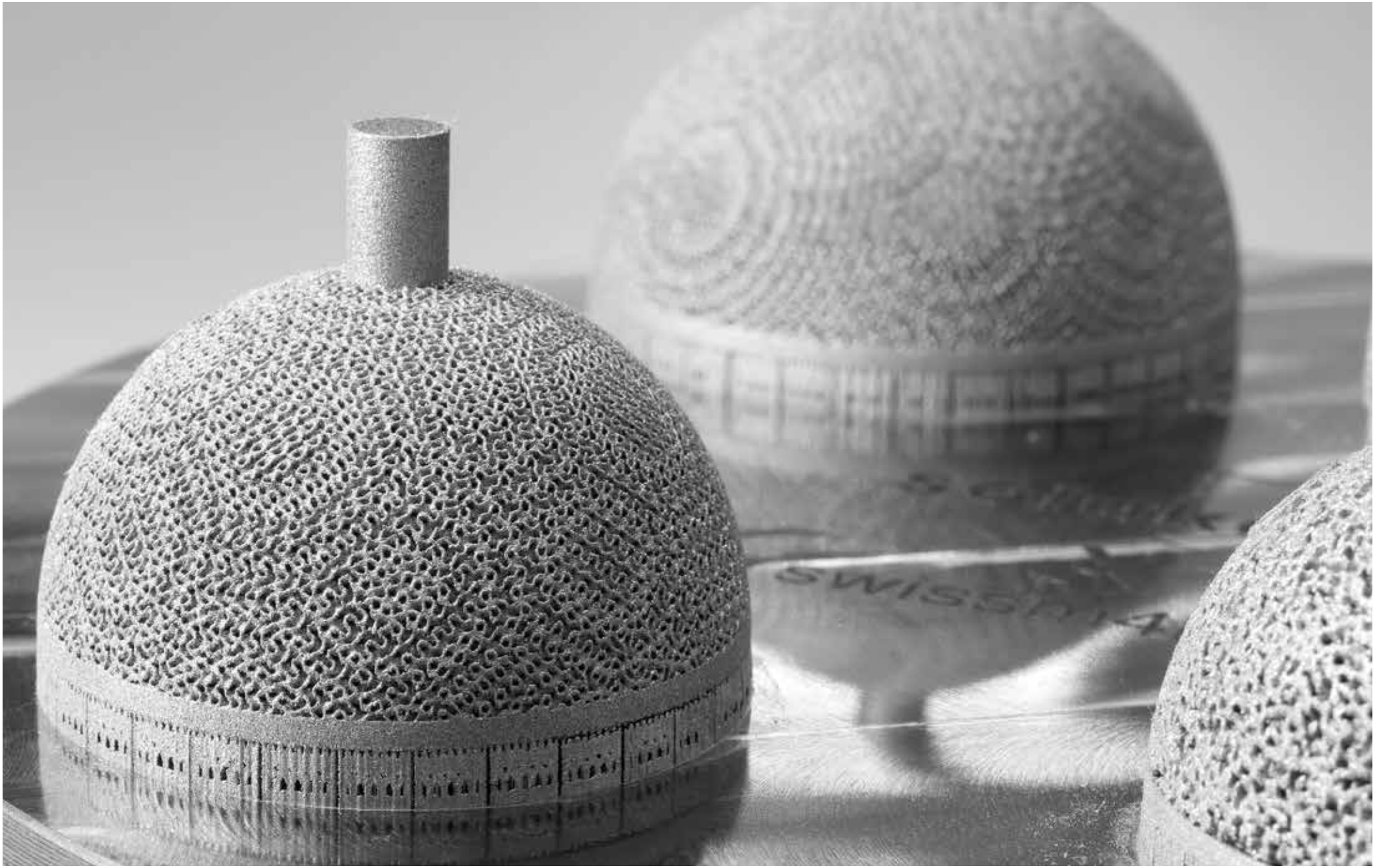
Connectivity and process monitoring

As an option, the Digital-Factory-Tool allows process monitoring and automation integration.

400 x 400 x 400 mm
500 x 280 x 400 mm

100 kg

For delicate structures
with piezoelectric excitation
in ultrasonic range.



SFM-AT200

The entry-level depowdering system for medical components or laboratory applications

The SFM-AT200 is a cost-effective solution for efficient and thorough cleaning of laser-melted metal parts. It meets the highest standards of safety, functionality and durability - and comes with a small footprint and simple operation.

Featuring optimal vibration excitation and automated rotation, the SFM-AT200 cleans complex voids and support structures.
The frequency of the vibration system is adjustable. The SFM-AT200 is designed without any ignition source. The safety monitored inert gas infusion mechanism ensures protection against explosion when working with reactive metal powders. The process chamber can be inerted within minutes with low inert gas consumption.

300 x 300 x 230 mm

60 kg

It is particularly suitable for medical parts made of titanium alloys and for laboratory applications.

SFM-PCU

The peripheral system for automated metal powder handling

The Solukon Powder Collection Unit SFM-PCU is a station for all common metal powders. With a volume of more than 100 liters, the SFM-PCU is the ideal peripheral system for large powder quantities.

Safe and automated conveying of powder

Directly connected to the Solukon powder removal system, an integrated vacuum conveyor extracts the powder and gently transports it via a hose into the large, rollable container of the SFM-PCU.
From here, the contamination free powder can be transferred to a reprocessing station or similar via a neutral interface, and is ready for further printing processes. The filling level of the collection station is sensed and can be checked via large inspection windows. In addition, the digital connection to the Solukon depowdering system ensures real time monitoring of the process status.

The SFM-PCU is the ideal peripheral unit for Solukon systems in the large component segment and for series production. Up to three Solukon depowdering systems can be connected to one SFM-PCU.

SFP770

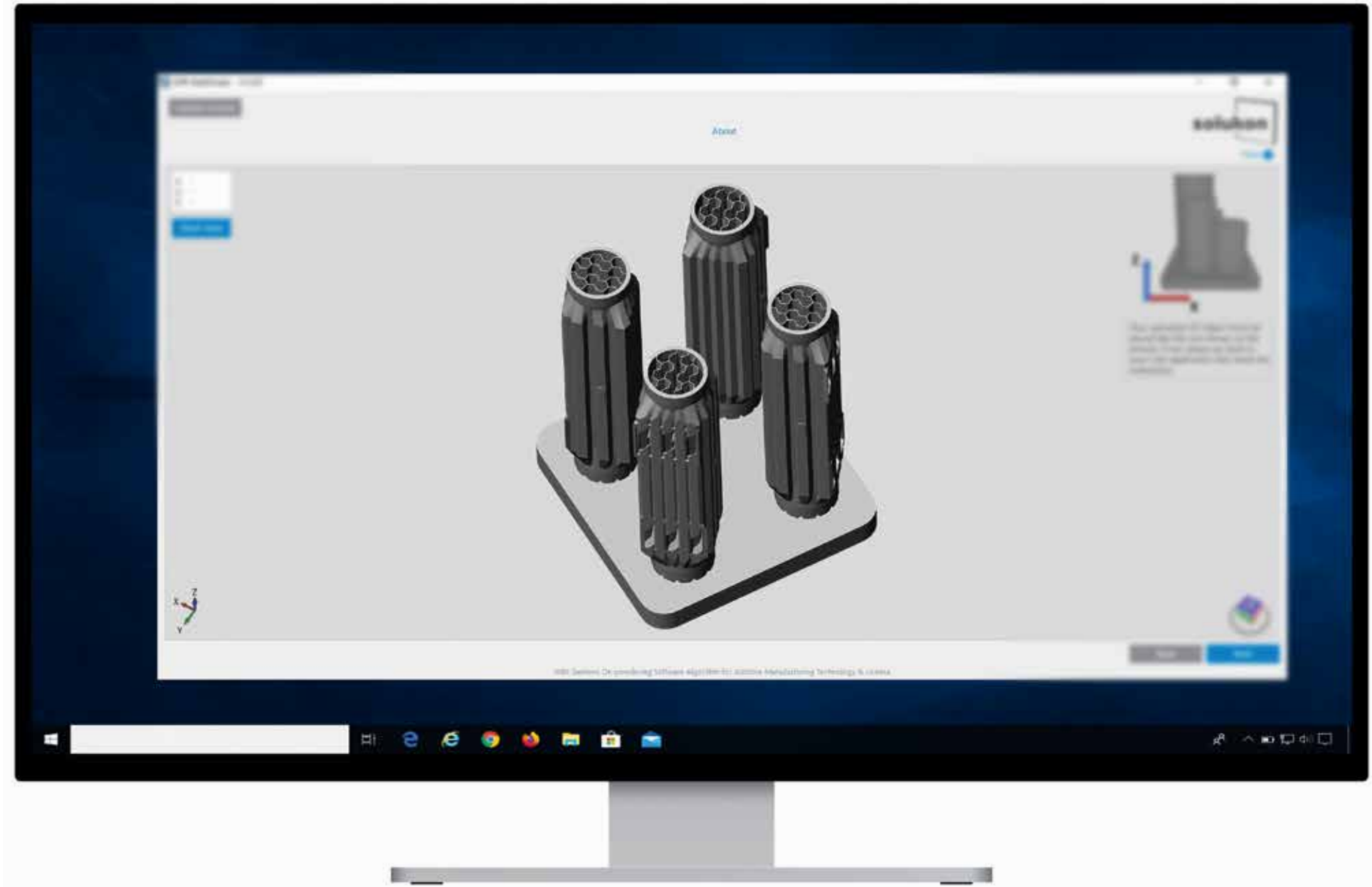
Unpacking and cleaning station for plastic parts in a single unit

The SFP770 is the world's first postprocessing system to include both an automatic unpacking station and a cleaning station for SLS components. The system is compatible with the 3D printing system EOS P 770 (adapters for EOS FORMIGA P 110 and P 500 available on request) and is able to unpack and clean the polymer parts directly from the build box of the 3D printer.

The SFP770 thus takes a significant step towards a more comfortable, safer and more efficient postprocessing of polymer parts.

Especially for companies with a high throughput of plastic parts or prototypes, the postprocessing system is the perfect choice since a fully loaded 150 l volume build box is unpacked and cleaned within 30 minutes.

The SFP770 handles a complete build box of an EOS P 770 printer.



Digital Depowdering

SPR-Pathfinder®

The software for automated depowdering

The SPR-Pathfinder® uses the build job's CAD file to calculate the ideal motion sequence in the Solukon system. The SPR-Pathfinder® calculations are based on a flow simulation that analyzes the part's digital twin.
The individually calculated motion sequence is then read by the Solukon system, which in turn runs the programmed paths. This ensures that even the most complex parts are cleaned in record time and without any human programming effort.

With SPR-Pathfinder® depowdering can even be pre-simulated before printing the part. As soon as the CAD file of the part is ready designers can test depowdering in the software.

As an exclusive Solukon product, SPR-Pathfinder® is only compatible with Solukon depowdering systems. The software can currently run on the latest generation of the SFM AT350/-E and on SFM-AT800-S and SFM-AT1000-S models already starting with serial number 1.

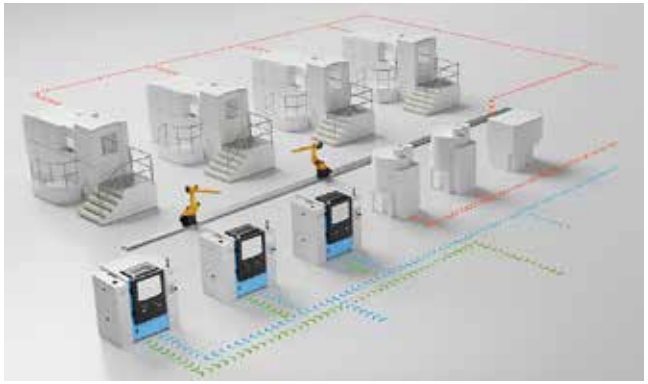
SPR-
PATHFINDER®

Digital-Factory-Tool (DFT)

A sensor and interface kit for quality assurance and automation integration

The Solukon Digital-Factory-Tool allows an easy integration of automated powder removal into an overall digital AM process.
For process validation and quality assurance the DFT records all relevant data of the depowdering process (e.g. residual oxygen, humidity, chamber pressure) and summarizes them in a protocol. Deviations from defined values can be displayed and evaluated directly.

By measuring media consumption (e.g. power consumption, compressed air consumption), the DFT displays the CO_2 footprint of the automated depowdering process. Provided via OPC UA, the data can be integrated in the digital dashboard of the control center.



Comparison Table

Metal Depowdering Systems






	SFM-AT1500-S	SFM-AT1000-S	SFM-AT800-S	SFM-AT350	SFM-AT350-E	SFM-AT200
PART SPECIFICATIONS						
Part Dimensions (W x D x H) [mm]	600 x 600 x 1,500 820 x 820 x 1,300	600 x 600 x 1,000	600 x 600 x 600 800 x 400 x 550	400 x 400 x 400 500 x 280 x 400	400 x 400 x 400 500 x 280 x 400	300 x 300 x 230
Maximum build plate weight [kg]	2100 kg	800 kg	300 kg	100 kg	100 kg	60 kg
Titanium alloys	✓	✓	✓	✓	✓	✓
Aluminum alloys	✓	✓	✓	✓	✓	✓
Steel alloys	✓	✓	✓	✓	✓	✓
SYSTEM SPECIFICATIONS						
Machine Dimensions (W x D x H) [mm]	2,630 x 2,150 x 2,430	2,110 x 1,580 x 2,255	2,140 x 1,390 x 2,175	1,310 x 1,100 x 2,140	1,310 x 1,100 x 2,140	1,150 x 985 x 1,139
Installation space [m]	5.0 x 3.75 x 4.0	3.6 x 2.6 x 3.5	3.5 x 2.5 x 3.0	2.3 x 2.3 x 2.3	2.3 x 2.3 x 2.3	2.2 x 2.4 x 2.2
Machine weight [kg]	3200 kg	1250 kg	1100 kg	420 kg	420 kg	150 kg
EQUIPMENT/ EQUIPMENT OPTIONS						
Front loading	✓	✓	✓	✓	✓	
Top loading	✓	✓	✓			✓
Robot loading	✓	✓	✓			
Back loading	✓	✓	✓			
Transportation frame	✓	✓	✓	✓	✓	✓
LED lighting 3000 Lumen	✓	✓	✓	✓	✓	






	SFM-AT1500-S	SFM-AT1000-S	SFM-AT800-S	SFM-AT350	SFM-AT350-E	SFM-AT200
PROCESSING FEATURES						
Pneumatic vibration with wide frequency range	✓	✓	✓	✓		✓
Programmable pneumatic vibration	✓	✓	✓	✓		
Ultrasonic self-regulating vibration					✓	
High-frequency knocking	✓	✓	✓	✓	✓	
1-axis-movement						✓
Programmable 2-axis-movement	✓	✓	✓	✓	✓	
Manual blowing with air/inert gas	✓	✓	✓	✓	✓	
Programmable blowing with air/inert gas	✓	✓	✓	✓	✓	
Additional connections for compressed air/inert gas	✓	✓	✓	✓	✓	
OPC UA control	✓	✓	✓	✓	✓	
Contamination free powder collection	✓	✓	✓	✓	✓	✓
Digital-Factory-Tool	✓	✓	✓	✓	✓	
SPR-Pathfinder® software	✓	✓	✓	✓	✓	
SAFETY FEATURES						
Explosion safety for reactive metals	✓	✓	✓	✓	✓	✓
Safety controlled inert gas infusion	✓	✓	✓	✓	✓	✓
Ignition free design	✓	✓	✓	✓	✓	✓
HEPA filtered vacuum extraction	✓	✓	✓	✓	✓	

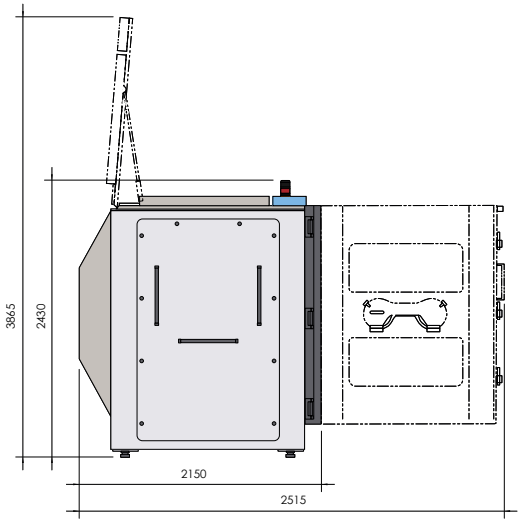
Comparison Table

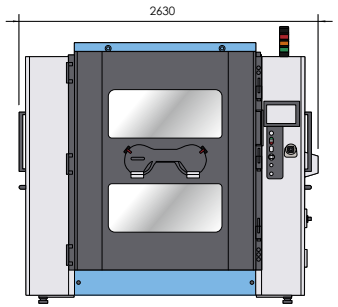
Technical Data

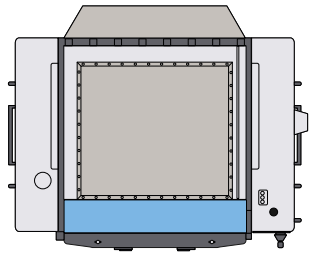
Metal Depowdering Systems

SFM-AT1500-S

Machine Dimensions (W x D x H)	2,630 x 2,150 x 2,430	mm
Installation Space (W x D x H)	5,000 x 3,750 x 4,000	mm
Machine Weight	3,200	kg
Part Dimensions (W x D x H)	600 x 600 x 1,500 820 x 820 x 1,300	mm mm
Part Weight	2,100	kg

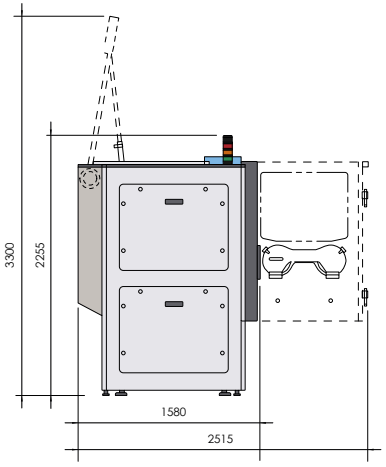


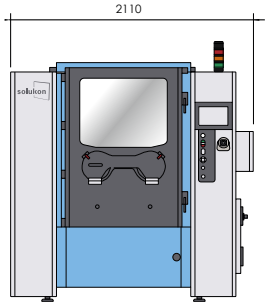


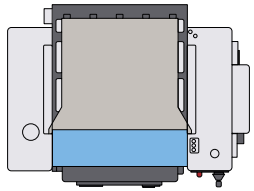


SFM-AT1000-S

Machine Dimensions (W x D x H)	2,110 x 1,580 x 2,255	mm
Installation Space (W x D x H)	3,600 x 2,600 x 3,500	mm
Machine Weight	1,250	kg
Part Dimensions (W x D x H)	600 x 600 x 1,000	mm
Part Weight	800	kg

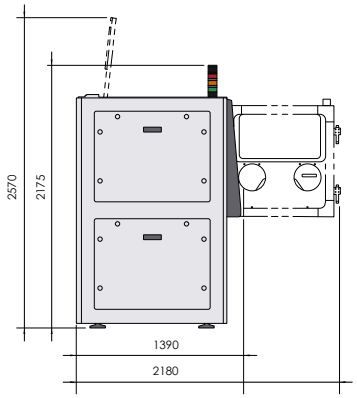


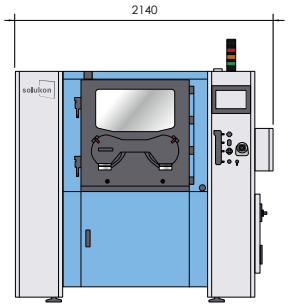


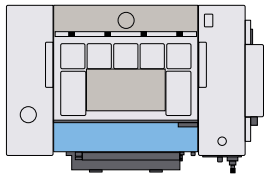


SFM-AT800-S

Machine Dimensions (W x D x H)	2,140 x 1,390 x 2,175	mm
Installation Space (W x D x H)	3,500 x 2,500 x 3,000	mm
Machine Weight	1,100	kg
Part Dimensions (W x D x H)	600 x 600 x 600 800 x 400 x 550	mm mm
Part Weight	300	kg

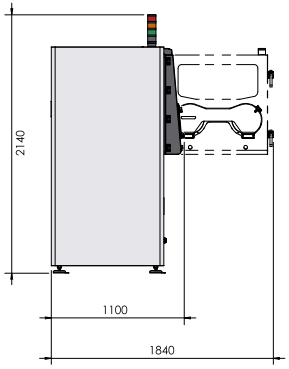


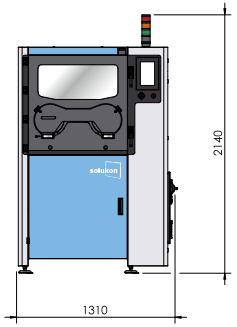


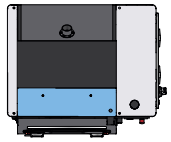


SFM-AT350 I SFM-AT350-E

Machine Dimensions (W x D x H)	1,310 x 1,100 x 2,140	mm
Installation Space (W x D x H)	2,300 x 2,300 x 2,300	mm
Machine Weight	420	kg
Part Dimensions (W x D x H)	400 x 400 x 400 500 x 280 x 400	mm mm
Part Weight	100	kg

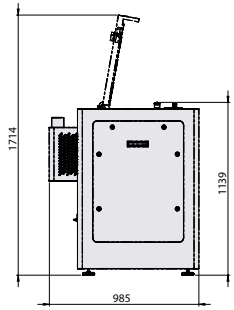


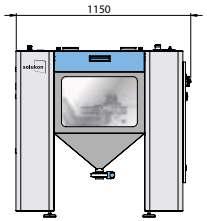


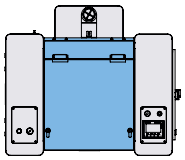


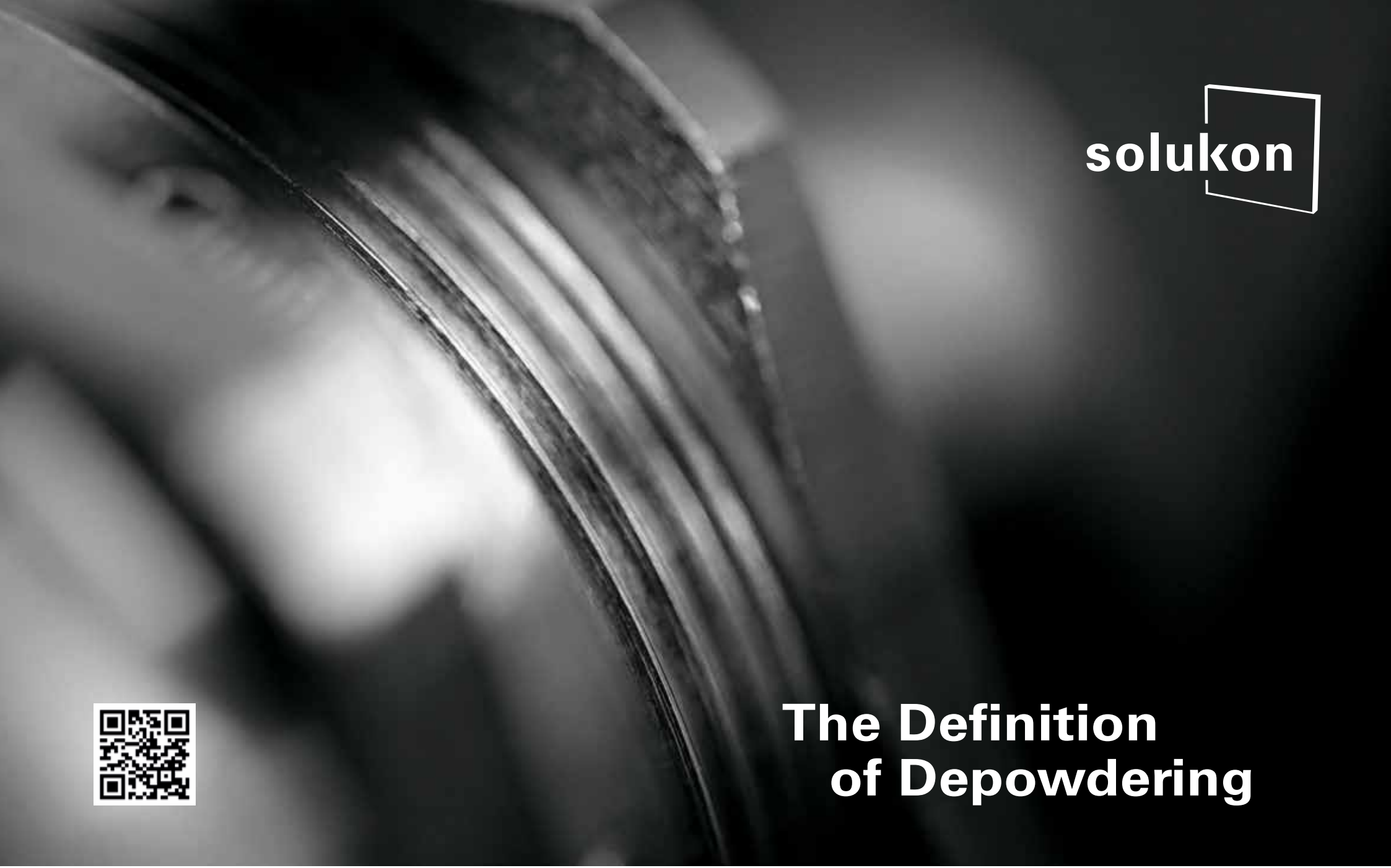
SFM-AT200

Machine Dimensions (W x D x H)	1,150 x 985 x 1,139	mm
Installation Space (W x D x H)	2,200 x 2,400 x 2,200	mm
Machine Weight	150	kg
Part Dimensions (W x D x H)	300 x 300 x 230	mm
Part Weight	60	kg









solukon

The Definition of Depowdering

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as of October 2024