LPW

PowderLife

Powders, products and solutions
to support AM in production

- Powder supplied to custom specifications

- Reduced risk of powder contamination
  and exposure to health, safety and
  environmental hazards

- Material traceability and control through
  repeated builds

LPW

At LPW, we don't just make powders, we add intelligence and offer practical, cost effective solutions. Our knowledge base is unrivalled and the customer is our number one priority.

We manufacture and process metal powders exclusively for AM in the world's first facility dedicated to AM powders. Through our hardware and software solutions we add control to manage your powder quality when used repeatedly throughout your bespoke AM process.

Our Vision:
"Understand Additive Manufacturing from the Perspective of the Powder"

Metal Powders for Additive Manufacturing

Here at LPW we have a high level of expertise in Additive Manufacturing (AM) and a long experience of working with leading companies within the aerospace, medical, and automotive industries.

All LPW powders are shipped with a certificate of conformance. With a clear focus on quality, LPW is proud to be certified to AS9100, AS9120, ISO9001 and ISO13485.

LPW manufactures metal powders produced by Vacuum Inert Gas Atomisation (VIGA) and Plasma Atomisation (PA).

In-house, we size and blend powder made by electrode induction melting gas atomization (EIGA), PA, and plasma rotating electrode process (PREP).

Our standard metal AM powders are available off-the-shelf and are optimised to each AM machine type. Powders are shipped in HDPE containers chosen for robustness and resistance to moisture ingress.

For powder control and monitoring during transport and storage, larger quantities of powders can be shipped in the PowderTrace smart hopper, adding confidence in your material audit trail.

PowderRange

With an impressive range of standard powders in stock we offer rapid delivery with 24 hours from order to dispatch, and will do our very best to meet the tightest of deadlines wherever you are in the world.

If the standard AM metal powder you're looking for is not on our list of PowderRange ready to ship materials, contact LPW directly for our materials available on request. For more bespoke materials LPW, is able to undertake a programme of custom alloy development tested for your application.

22	26	13	27	28
Ti	**Fe**	**Al**	**Co**	**Ni**
TITANIUM	IRON	ALUMINIUM	COBALT	NICKEL

Custom alloys

For many alloys LPW is able to offer different products of the same composition, optimised for your specific application on your particular AM machine. Custom chemistries, sizes, and blends are available, along with a comprehensive range of powder analysis tests including morphology and contamination analysis.

By use of different atomisation gases to vary mechanical properties, we can achieve improved flowability of powder for 'flow-critical' machine platforms, lower residual elements for more demanding applications, and controlled interstitials for enhanced mechanical properties.

The experienced team of applications engineers here at LPW add intelligence to AM development by:

- Developing new powder chemistries to deliver specific properties
- Exploring novel alloys
- Investigating compositions for new applications

Powder Life

Powders, products and solutions to support AM in production

Traditionally, Additive Manufacturing equipment users believed that powder is 100% reusable, that any unmelted powder can be stored and reused again and again.

Here at LPW we know this is a dangerous assumption. On an AM machine, powder changes during use. Powder picks up moisture during storage. Operators make mistakes – mix powders, don't write things down, don't clean out machines properly. Don't waste money and take the risk assuming the powder is good, know your powder is good.

LPW Technology's PowderLife solution allows you to know. PowderLife focuses on the AM process from the perspective of the powder – track, control, and measure at every point the powder is used, from initial supply, through use and re-use.

Key:
- PowderEye
- PowderLab
- PowderTrace
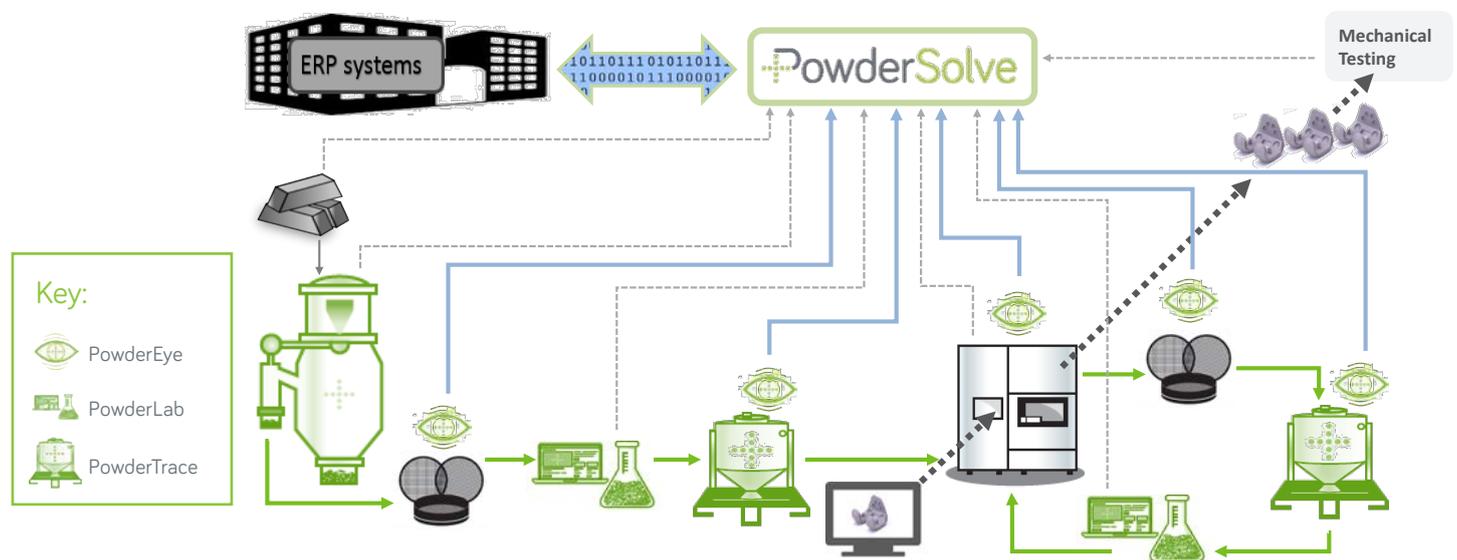
PowderLife provides:

- Full metal powder traceability through repeated builds, material tracked and managed during the AM process via PowderSolve

- Reduced operator exposure to health, safety and environmental hazards

- Reduced cost of AM operations with automation and extended powder usage

- Minimised risk of contamination with reduced manual intervention

PowderLife Integration tailored to your production process design.

Seamless PowderLife implementation, reduces the opportunity for airborne powder particles, minimising contamination and delivering a safer working environment

- Range of stands designed to position PowderTrace hoppers above your key equipment

- Selection of adaptors to ensure no powder loss throughout the process

PowderEye mounted sensors to monitor the in-process environment

Wireless Receiver hub transmitting data to PowderSolve

Powder Solve

At the heart of PowderLife, is LPW's PowderSolve, the smart software for full metal powder traceability throughout your Additive Manufacturing process.

Imagine a hand-held device that can connect to software so powerful it can track your metal powders and their condition from point of order, through your goods-in, storage, production, sieving, blending and re-use applications.

What if it could identify parts produced from that powder wherever and whenever they were built?

Imagine intelligent software exclusively focused on AM, giving you total control of traceability of powders, builds and processes… Welcome to PowderSolve.
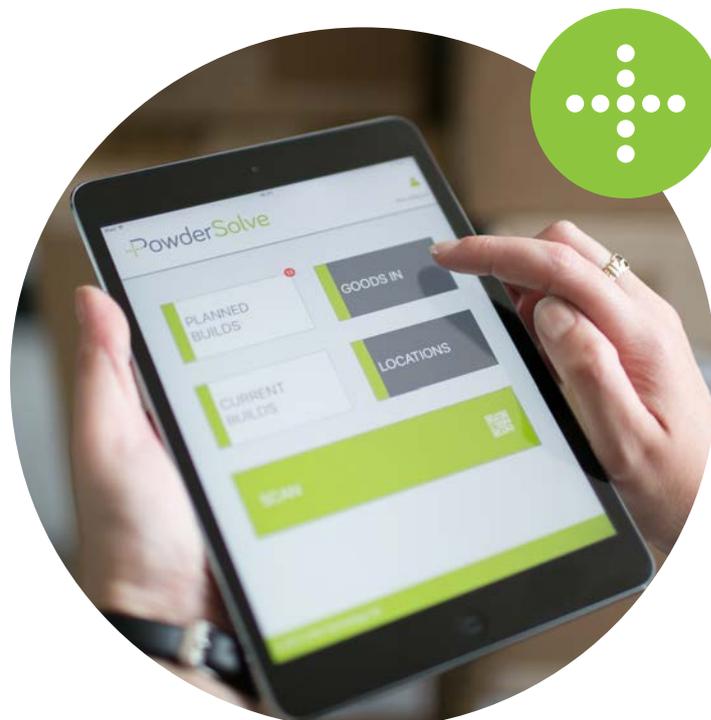
Optimise your ROI and avoid costly build failures

Minimise component failure with PowderSolve's effective AM powder management. Record powder degradation analysis through repeated builds, predict the potential life of your powder before it moves out of specification, and enjoy confidence that your powder is within your predefined specification so you can maximise your material use and reduce risk.

PowderSolve puts powder track & trace expertise in your hands

*managing data from multiple powder batches in different locations for complete quality assurance*

LPW's cloud based software suite manages all your metal powder data, tracking your powder through repeated builds, blending, across multiple machines, maintaining a record of powder specifications and test data, through to warning if the powder is out of specification.

⊕ *Secure, encrypted quality management software*
  - manages all your powder and build material data in one safe, easy-to-use database

⊕ *Produces a full audit trail of all actions carried out on your powder by users, AM machines or any additional ancillary equipment*
  - visibility of every metal powder touchpoint in your AM process
  - fully auditable - all entries logged and locked
  - app-based operation for ease of use in production environments

⊕ *Adds real-time traceability of your powder through repeated use within your AM machine*
  - *for both "single-batch" and "top-up" methodologies*
  - *dispenses with complex spreadsheets*
  - *tracks and traces powders, batches, generations, blends and components quickly and simply*
  - *rapid and accurate product recall ability*

⊕ *Predicts when your powder will go out of specification*
  - *automated quarantine for build quality assurance*

⊕ *Captures, collates and graphically displays test data and certification for your powder throughout the powder lifecycle - at any time*
  - *tracks powder samples and analysis results throughout the AM process*

⊕ *Produces mechanical test data and generates certificate of conformance for powder and component at each stage through the powder lifecycle*
  - *records test data directly into the software*
  - *gives immediate visibility upon data receipt*
  - *'scan and move' accuracy between locations with minimal manual intervention for full confidence in the location and status of all your powders at all times*
  - *accurate information on your powder stock quantities*
  - *generates labels for individual storage units, powder samples and machines*

Intelligence at your fingertips

A clear overview of your metal powder status is available at the click of a button. A complete record of material in production can be mined to track the history of your powder, confirm the test results from an individual material batch and optimise your processes..

With the ability to trace material to a particular build, PowderSolve can be integrated via an API to your MES/ERP sysem, delivering you complete part traceability.
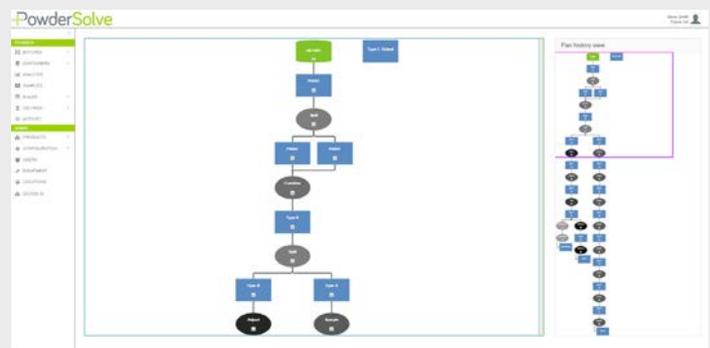
PowderTrace

Integral to PowderLife is LPW's PowderTrace hopper, the smart way to store and transport metal powder for Additive Manufacturing.

To ensure your build integrity you need to know the quality of your metal powder at the beginning of each and every build. At LPW we have developed PowderTrace to help you control and monitor your powder environment - reducing the risk of material contamination whilst adding reliability throughout your metal AM process.

Customise PowderTrace for your AM process

With an array of options to choose from PowderTrace fits perfectly into your production lifecycle, adding consistency and control throughout your manufacturing process.

- Decanting stands are available for safe powder dispensing into all standard AM machines
- Range of adaptors and connectors enables use with all standard AM machines
- Forklift and gantry crane compatible
- Protective frame available for transportation of hazardous materials

Our smart hoppers make data driven decisions possible.

- Fitted with load cells to monitor the powder mass – know when your powder is low
- PowderEye sensor technology for real-time wireless monitoring of the temperature, humidity, pressure and oxygen content of your powder environment
- Fully integrated with PowderSolve AM software to provide a full powder lifecycle management system

PowderTrace ...

...puts you in control of your powder

adding confidence that your AM powders are ready for use, within specification every time.

- Medical grade stainless steel hopper to transport and store your AM metal powders in a controlled environment and reduce the risk of contamination

- Minimises manual handling and the potential for human error

- Connect with all standard metal AM machines, sieves, and powder blenders for seamless use at every stage of your manufacturing process

- Monitor the controlled environment with PowderEye

...simplifies your metal powder management

and lets you concentrate on producing parts with reliability and repeatability

- PowderTrace is primed with argon to create an inert environment, limiting powder exposure to oxygen, nitrogen and moisture

- Positive pressure prevents the powder storage environment from degrading over time

- Material specific name plates and QR codes simplify material identification, enable powder traceability and avoid cross contamination

- Large volume units minimise the storage footprint, replacing handling and storage of multiple small volume plastic containers

- Environmentally friendly, no empty plastic containers for disposal

- Ergonomic, robust, stainless steel construction, can be fully dismantled for easy cleaning

- Equipped with tamper-evident fittings

- 120 L model UN tested for transportation of hazmat material

- When integrated with PowderEye, PowderTrace is ATEX certified for use in hazardous environments.

Safely store, transport and monitor your AM metal powders

Powder (typical alloy)	Standard 120 L model
Steel	440 kg
Titanium	290 kg
Nickel	450 kg
Cobalt	440 kg
Aluminium*	150 kg

*Aluminium is also available in a 230 L PowderTrace model; holding 350 kg of powder.

Responsible metal powder control and management

PowderTrace is designed to be returned to LPW for refilling. Eliminating the use of plastic containers brings handling, financial and environmentally responsible benefits.

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PowderEye

Monitor your AM processing environment in PowderLife with PowderEye, the smart sensor that puts you in control.

With PowderEye monitoring the environmental condition of your metal powders, you can have confidence that your material is within specification and quickly know if powder has been exposed to adverse environmental conditions - wherever it is in transit, in your production area and throughout the build cycle.

Harness Industry 4.0 with PowderEye

PowderEye can be retrofitted to any material handling or storage equipment anywhere in your process. Collect data from multiple sensors throughout your production facility via one wireless receiving station, adding real-time intelligence to your smart factory's processing performance.

PowderEye's range of measurements

Temperature	-20 to +60 °C ±0.2 °C
Humidity	0 to 100 % ±1%
Oxygen	0 to 30 % ± 0.1%
Pressure	60 to 165 kPa ±1.5 kPa
Mass	0 – 1000 kg ±0.1 kg

PowderEye ...

...connects you with your powder

adding confidence that your AM powders are ready for use every time.

- Monitor the environment in which your powder is transported, stored and used
- Measure the environment within your sieves, blenders, and production areas
- Use data to optimise your AM production process

Enhance the smart capability of your AM process by collating real-time, manufacturing environment data to inform critical business decisions.

- Measure the temperature, pressure, oxygen and moisture content of powder environment with a simple traffic light system to alert you of significant change
- Record powder weight in a PowderTrace hopper giving confirmation of material available for build
- Connect to your sieves and blenders, and monitor the production area environment
- Encrypted wireless connection to PowderSolve
- 100 m wireless range, internal data storage capacity, automatic transmission when back in range, ensuring complete data records wherever your powders are located
- Four-month battery life, recalibration every two years, for long-term ease of use and minimal maintenance
- Designed and manufactured by LPW specifically for metal additive manufacturing

PowderLab

Adding powder quality assurance and applications development to metal Additive Manufacturing.

For additional powder certification pre-build, data on powder condition post-build, component analysis and AM process development, we offer our world leading powder laboratories.

Powder Analysis Laboratory

- Full range of powder analysis techniques
- Operating to ASTM as standard, ISO available on request
- Testing in UK & US labs

Powder AM Laboratory

- In-house AM machine
- Process parameter development
- Powder degradation studies
- AM feasibility studies
- Root cause analysis of failed builds

New Material Development

- Atomisation of powder,
- AM machine builds, testing of built parts
- Complete project delivery

PowderFlow

measure your powder flow the easy way

Avoid failed builds, the risk of damage to machine parts, and costly downtime with simple, fast confirmation of material quality.

- Full range of equipment to conduct a comprehensive suite of tests
  - *Hall Flow - ASTM B213, ISO 4490*
  - *Carney Flow – ASTM B964*
  - *Apparent Density - ASTM B212, ISO 3923-1*
  - *Angle of Repose - LPW standardised internal procedure*
- Includes reference powder, stopwatch and calculation software
- Upload results into PowderSolve
- Safely stored in a robust plastic case
- Portable for quick, on-site testing wherever and whenever you need it.

Adding the personal touch

With AM metal powder manufacture in the UK,
processing facilities in the UK and USA, and sales offices
around the world, we add support to your metal Additive
Manufacturing processes wherever you are.

To find your nearest office, visit

www.lpwtechnology.com