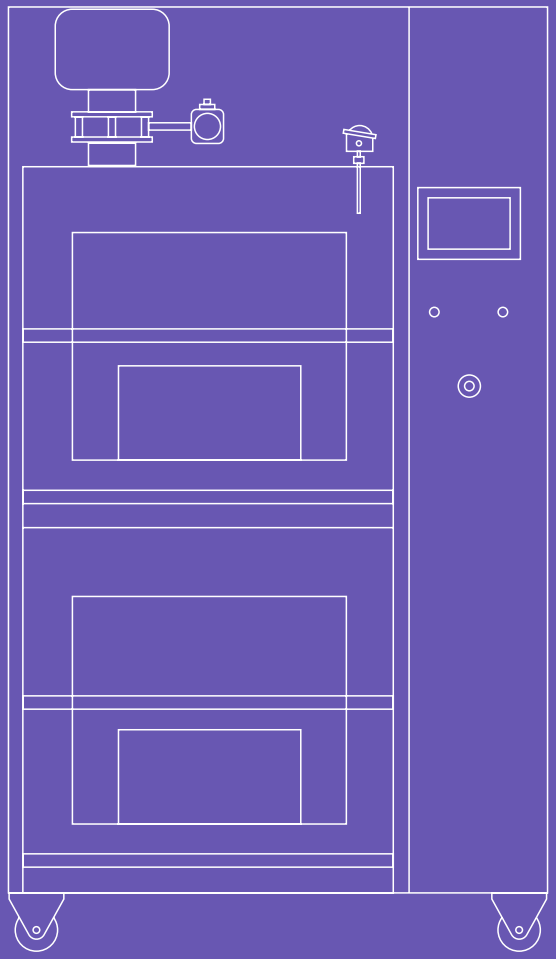
3DPro® **Powder Dry Cabinet**

ADDITIVE MANUFACTURING



NIPPON GASES

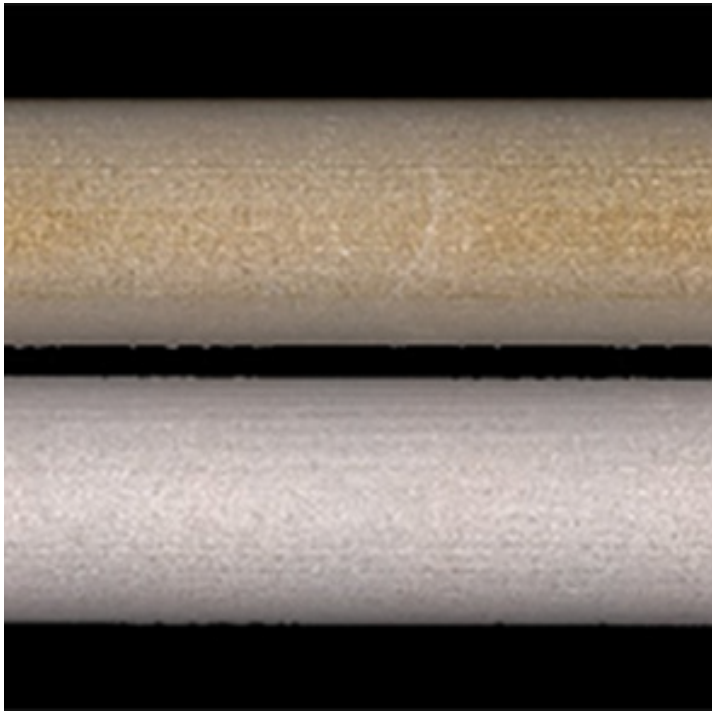
Defining the problem

Quality assurance for an additive manufacturing process already begins with the best possible storage of the base materials. This is particularly true for metal melting processes. Reproducible production of high-quality components in today's high-performance metal AM systems requires a non-contaminated metal powder as base material.

However, the small particle size of the powder and the resulting large surface area lead to adsorption of moisture and oxygen from the surrounding atmosphere and contamination of the material.

This contamination can lead to problems with:

- The mechanical integrity of the components.
- Inconsistent component qualities.
- Gas inclusions in the manufactured products.
- A variable gas purity in the building chamber.



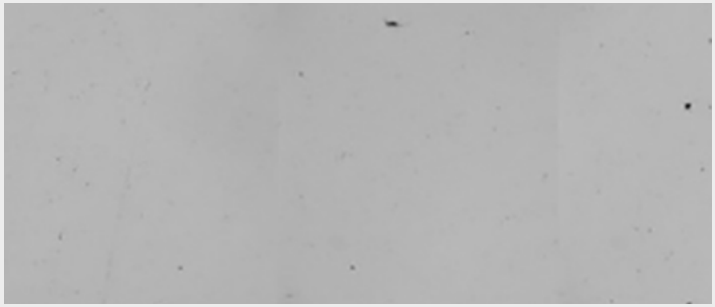
Comparison between two 3D printed samples with a different result due to oxidation

Metal powder for 3D printing

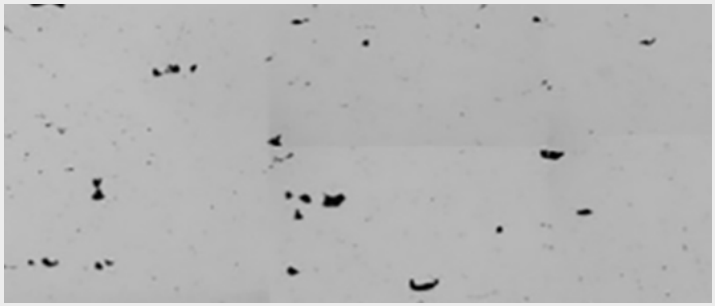
Our solution

The 3DPro® **Powder Dry Cabinet** enables the storage of metal powders for additive manufacturing in a controlled and inert atmosphere, realised by a continuous purging process of the storage cabinet with high purity gas. The integrated oxygen and humidity sensors, in combination with the built-in heating system, allow the user to precisely adjust the storage atmosphere.

With the 3DPro® **Powder Dry Cabinet**, the powder can be reliably supplied to the production process in a consistently high quality.



Example of printed parts with dry powder



Example of printed parts with moist powder

Features

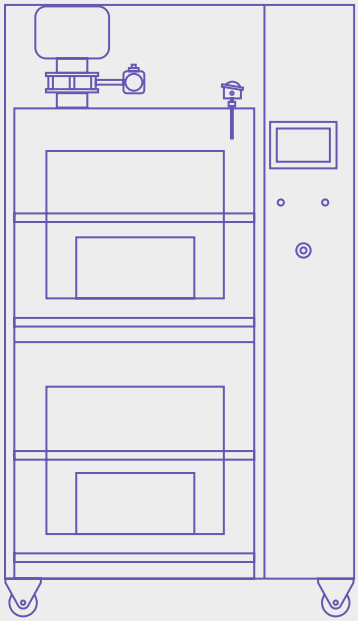
3DPro® **Powder Dry Cabinet**

1. **Constant powder quality through oxygen and moisture control**

- Oxygen and humidity sensors for continuous monitoring of the atmosphere in the cabinet.
- Integrated heating system in the back wall.
- Status detection of the door.
- Configurable target value for oxygen and humidity via digital touch panel display.

Example of standard industrial desiccators, typically developed for electronic components

- No oxygen humidity measurement.
- No heat-up/temperature control.
- No status detection of the door.
- No regulation of oxygen/humidity values.



2. Latest IoT technology integrated

The fully automatic inert gas flow control makes it possible to reach a preset oxygen and/or humidity level in a short time and with minimal gas consumption.

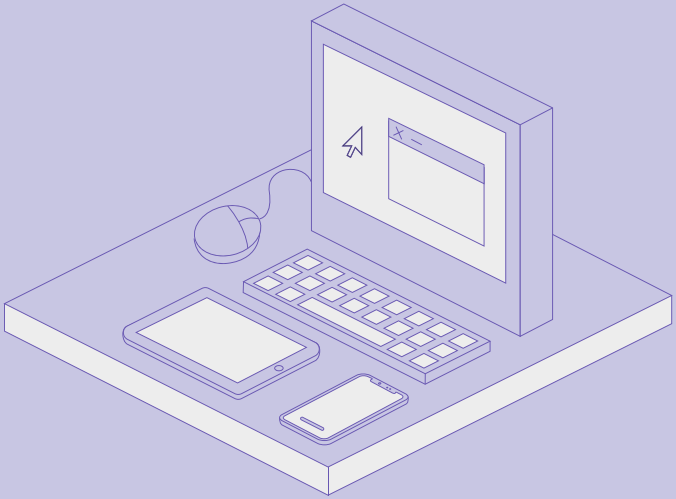
3DPro® **MiruGas® telemetry system** for data monitoring from customer PC or other smart-devices (service contract required) - 7-inch full-color touch panel display.

Example of standard industrial desiccators developed for electronic components

Fixed flow rate with standard flow meters.

No oxygen and/or humidity measurement.

Does not support telemetry system.

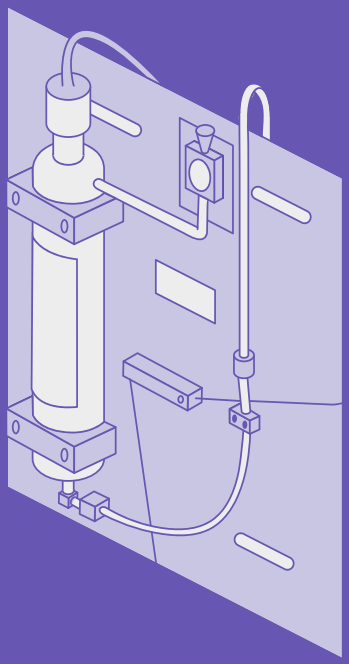


3. Safety

- Emergency stop switch for disconnecting all circuits.
- 120kg max. load per shelf.
- Total of 5 shelves, 4 of which are height adjustable.
- Before door opening, air purge function to minimize the risk of asphyxiation.

Example of standard industrial desiccators developed for electronic components

- Lower maximum weight per shelf.
- No air purge function available.



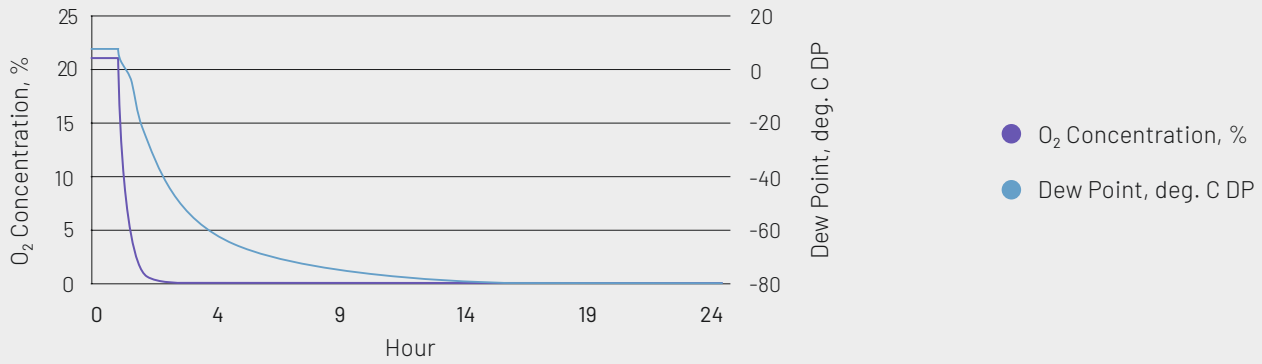
Specification

	3DPro® **Powder Drying Cabinet**
Storage	Sealed or closed powder drums only. Shall be NON-explosive atmosphere
HMI	7 inch color touch panel
Total Storage Weight	300 kg Total (120 kg max. distributed-weight load per shelf table) Height position adjustable 4 shelf panel
Oxygen Sensor	Type: Zirconia Transmitter Meas. Range: 0 to 25% O_2 Accuracy: ±0.5% FS
Moisture Sensor	Type: Capacitive Meas. Range: -110 to 20 deg. C DP Accuracy: +/-2 deg. C DP
Dimension	1183x2075x750mm (WxHxD)
Material & Color	Steel, SUS, White
Reachable Oxygen Level	Less than 50 ppm
Reachable Moisture Level	Lower than -65 deg. C DP
European Compliance	EMC Directive 2004/108/EC (Non-complying ATEX Directive)

Data for Reference

Oxygen and Moisture Trend

Oxygen and Moisture Trend



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