

#### What is it?

- It is an automated machine only requiring to load the parts and switch on the machine. The operator is free to do other things whilst letting Typ5 do the work unattended.
- It processes entire build compartments in the 20l class or smaller of powder based AM plastic.
  - The loading mechanism is like a big funnel, if you can pour the powder you can fill the machine. It is identical to Typ4.
- It unpacks - breaks - the powder cake.
- It de-powders the parts.
- It blasts the parts without having to move the parts (only press a switch).
  - 3D printed in the same material as the parts, the blasting material is used in a closed circuit.
    - This means blasting material is recycled. Whilst being a new (and PULVERMEISTER patented) process in our extensive testing near to no blasting material consumption has been identified. (PA11, black)
    - Post treatment, e.g. surface finishing, is greatly facilitated by the per principle non existent contamination. Glass beads or other materials generate remarkable problems in surface finishing, PULVERMEISTER Typ5 does not have this problem.
- It gives the used powder ready to be refreshed.
- It gives the finished parts, ready for usage or shipment.
- The 20l class machine is available for around 30.000,- EUR until 2022-12-31, you can order now, first come first served. Price will increase next year by around 30% due to inflation and end of introduction phase. Requesting a quote via the form on the internet site reserves the price for the customer until ready for shipping (end of Q1).
- Delivery of Typ5 starting in end of Q1/2023.
- Introduced at Formnext Frankfurt 2022.

For a general overview please visit the website: <https://pulvermeister.de/typ5-en/> , more details will be available in the course of the next months.

#### What makes it special?

- The next generation of the 'big brother' Typ3, which has already processed more than 200,000 parts without any modification. It is the low cost evolution of Typ3.
- It uses a vacuum circuit to transport the powder and blasting material.
  - This circuitry is contamination free -> for refreshing and further use of the used powder (already stored in a container -> facilitates handling).
- Practically no powder contamination for the user.
- Conforms to German machine and safety guidelines.
  - No heavy lifting, easy handling.
  - When opening (the lid or the drawer) the whole machine stops immediately for safety reasons.
  - Negative pressure monitoring system. If the vacuum fails, the air pressure of the nozzle is switched off immediate, blasting is interrupted.
  - Drum rotates, inclination of the drum also by rotation of the second axis. Air supply and powder removal through axle.
- Very robust and high quality construction. Simplicity in reliability is the key to the design. No usage of complicated electronics.

- The degree of detachment of the powder from the built surface can be very finely controlled by 4 parameters:
  - Inclination of the drum. (also see video on Typ4 site)
  - Air pressure of the injection nozzle in the drum. (depowdering phase)
  - Air pressure of the blasting nozzle in the drum. (blasting phase)
  - Rotation speed of the drum.
  - Time control of the process.
- Explanation: The adhesive strength of the powder, like its decomposition (or degradation), is linked to the cause of heat absorption in the build process. The more heat the powder absorbs at a particular point, the more it will adhere to the adjacent contact surface and the less likely it is usable for refreshing (degradation). By fine-tuning the 4 parameters mentioned above, it is possible to control how much powder is detached and thus reused, and in what quality.
- The trade-off is how much a part should be stressed and how long it takes to get the required amount of used powder. This fact will become even more interesting if in the future when the mixing ratio of new and old powder changes in favour of a lower use of new powder (constraint: printer progress with cost advantage in serial production due to lower consumption. Politics: Recycling).
  - To de-powder more powder than you want to reuse, simply connect to another vacuum and continue the process to remove degraded powder from parts -> dust reduction when handling parts and reduced waste generation (glass beads/powder vs. pure degraded powder) -> improved health and respiratory system of powder bed printer users in post-processing.
  - PULVERMEISTER also uses the stress factor for quality control. If something went wrong in the manufacturing process, the parts are more likely to break. This was already saving a considerable amount of money as we found that we then had received degraded powder. As the parts are the first step in production, costs are also saved:
    - No wastage of electronic components with the added work of casting into casing.
    - No shipping of faulty components to customers (spedition cost and handling).
    - Not having to handle with the increased service cost of exchanging parts and finally customer satisfaction.
  - The blasting process has the same 4 control parameters as the depowdering process. To switch between the two processes, just press the blasting switch on the panel of Typ5. It can not be easier, no changing or transport of parts, these remain in the drum and Typ5 simply continues working.
- The whole process is very fast: for a 16l PA11 Black, EOSP110 build tray with deep cavity parts it takes about 45 minutes (parts are then ready to be shipped). Let's say 60 minutes for safety's sake. That means 8 build compartments of the above material, machine combination in 8 hours. One day building, one day cooling = 16 EOSP110 operated with one Typ5... talking about investment security and scalability.
- Everything you need to use the machine is on the machine (loading funnel has its own place in the machine).
- The drum and other large parts of the Typ5 are made of stainless steel. All other parts can also be made of stainless steel, which is more expensive but may be suitable depending on the inspection criteria: SLS stainless steel 3D printed parts - for food or medical devices.
- It is internationally patented (some are pending, the PULVERMEISTER brand is even protected in the USA and China).

For further questions, please send an eMail to [monaco@pulvermeister.de](mailto:monaco@pulvermeister.de) or call +49 (0)171 3113 868