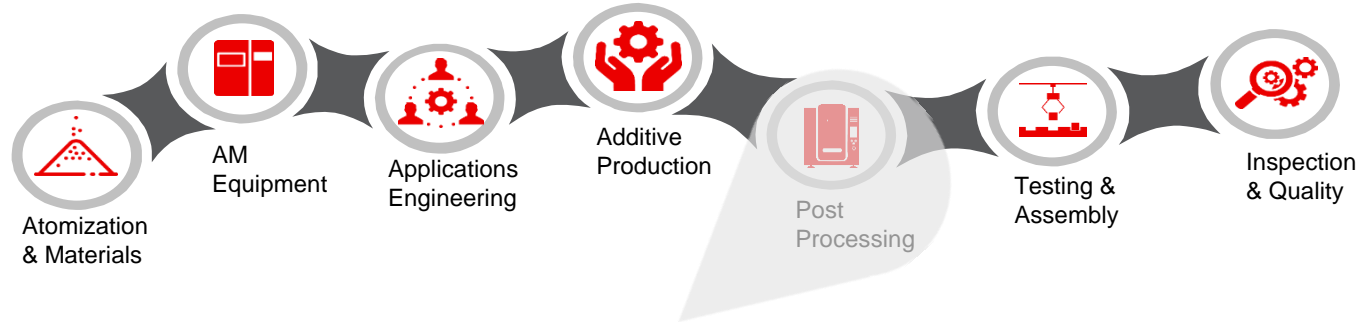


Oerlikon

Post Processing



Overview Post Processing



Post processing is an important part of the process chain.



Part separation

Part separation from build platform (saw, EDM)



Support removal

Cleaning parts from support structures



Machining

CNC machining to reach dimensions / tolerances



Surface finishing

Improve surface quality for technical or aesthetic reasons



Coating

Apply thin or thick film coatings



Heat treatment

Heat treatment and HIP (e.g. hardening)

Challenges and solutions for post processing

Challenges

- Cost efficient process for part removal, Automatization
- Part traceability
- Support removal often manual and no automated process
- Removability -> design limitations
- Surface finishing of inner surfaces
- Surface quality is depending from build orientation
- Coating results are depending from build parameters and surface finishing.



Part separation



Support removal



Machining



Surface finishing



Coating



Heat treatment

Solutions

- New machine concepts for part separation: EDM (e.g. AgieCharmilles) and saws (e.g. Kasto)
- Avoiding support during build process
- Automated support structure removal process (e.g. Hirtenberger)
- Electrochemical Polishing, Blasting and Mass Finishing, Laser Polishing, Abrasive Flow Machining
- PVD, Laser Cladding, Thermal Spray, Nitriding


Challenges and solutions: Top Priorities

Challenges


Solutions

AM Priorities

Cost Reduction




Function Integration




Design Freedom




Quality



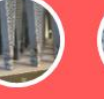
Heat treatment




New machine concepts for part removal (AgieCharmilles)



Avoiding build process (structure removal (merger))



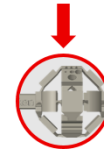
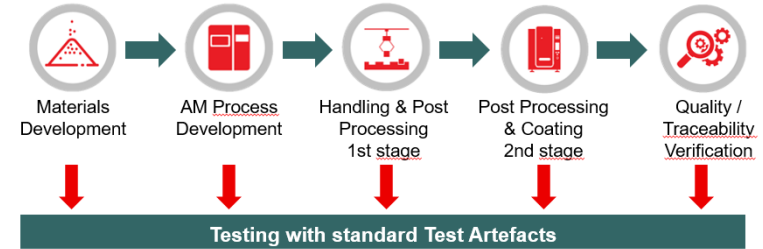
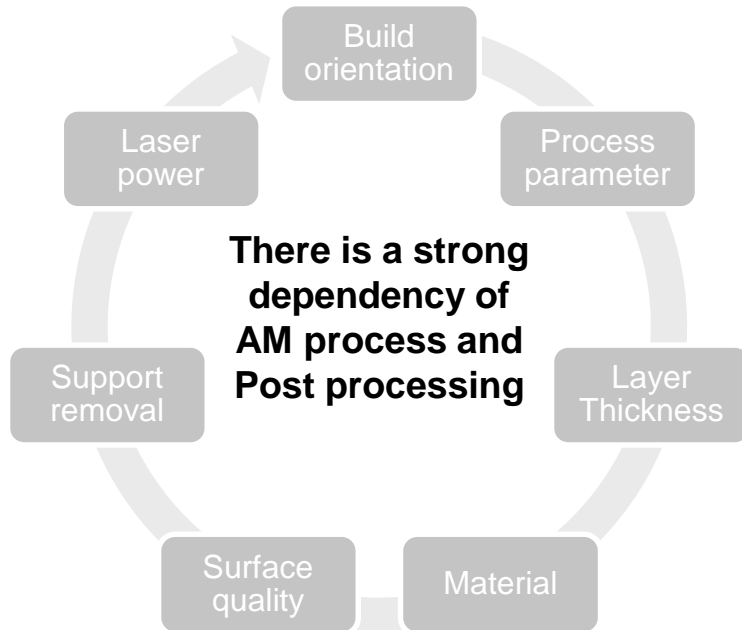
Electrochemical Machining, Blasting, Laser Polishing, Anodizing



Coating, Thermal Spray, Nitriding

Why is post processing so important?

Every part manufactured by AM needs post processing



morQ
Measurement Object
for Roughness
Qualification
www.Oerlikon.com/morq

Coating as one solution to improve functionality of AM parts

Coating is an option to improve functionalities e.g. thermal, wear protection, thermal stability, chemical stability

Challenges

- Weight reduction of the rocket system to allow for a greater payload to be inserted into orbit
- Critical thermal operating conditions

Solutions

- **Material:** 718 Nickel Alloy for AM
- **Advanced Production:** AM application engineering design and AM production PBF-LB/M
- **Post-Processing:** Metco Thermal Barrier Coating applied to the inner surface and Balzers PVD Corrosion/ Wear Resistant Coating applied to the outer surface

Thermal Spray
Coating

PVD & PACVD
Coating



Thank you.

oerlikon
am

