

Not just producing geometries – producing material properties

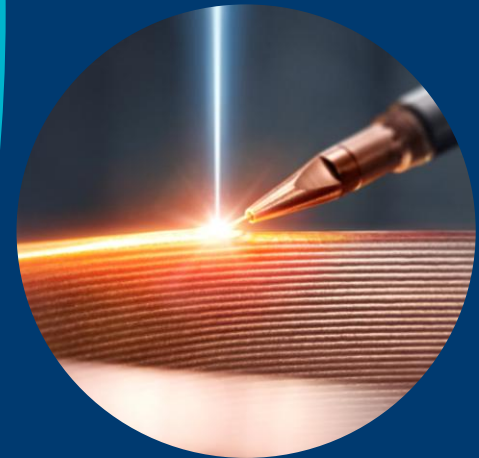
Innovation Club 2025 @ pro-beam group

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www.pro-beam.com



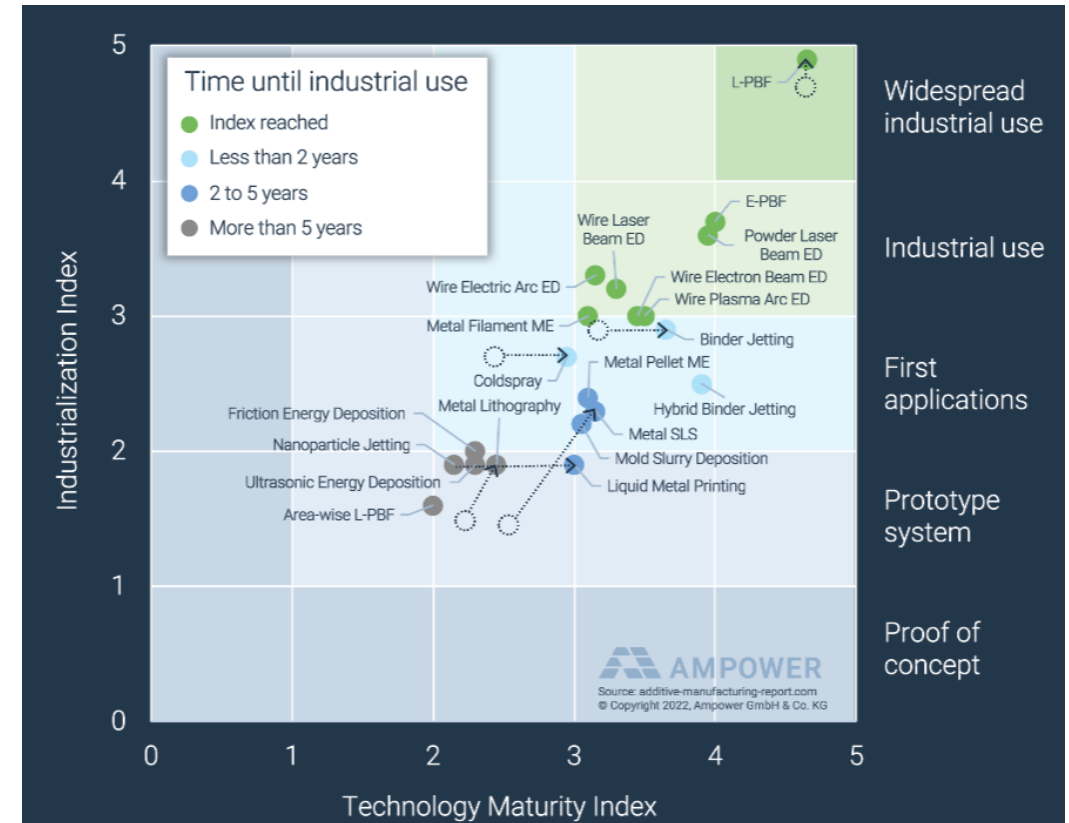
Business Unit Additive Technological Overview

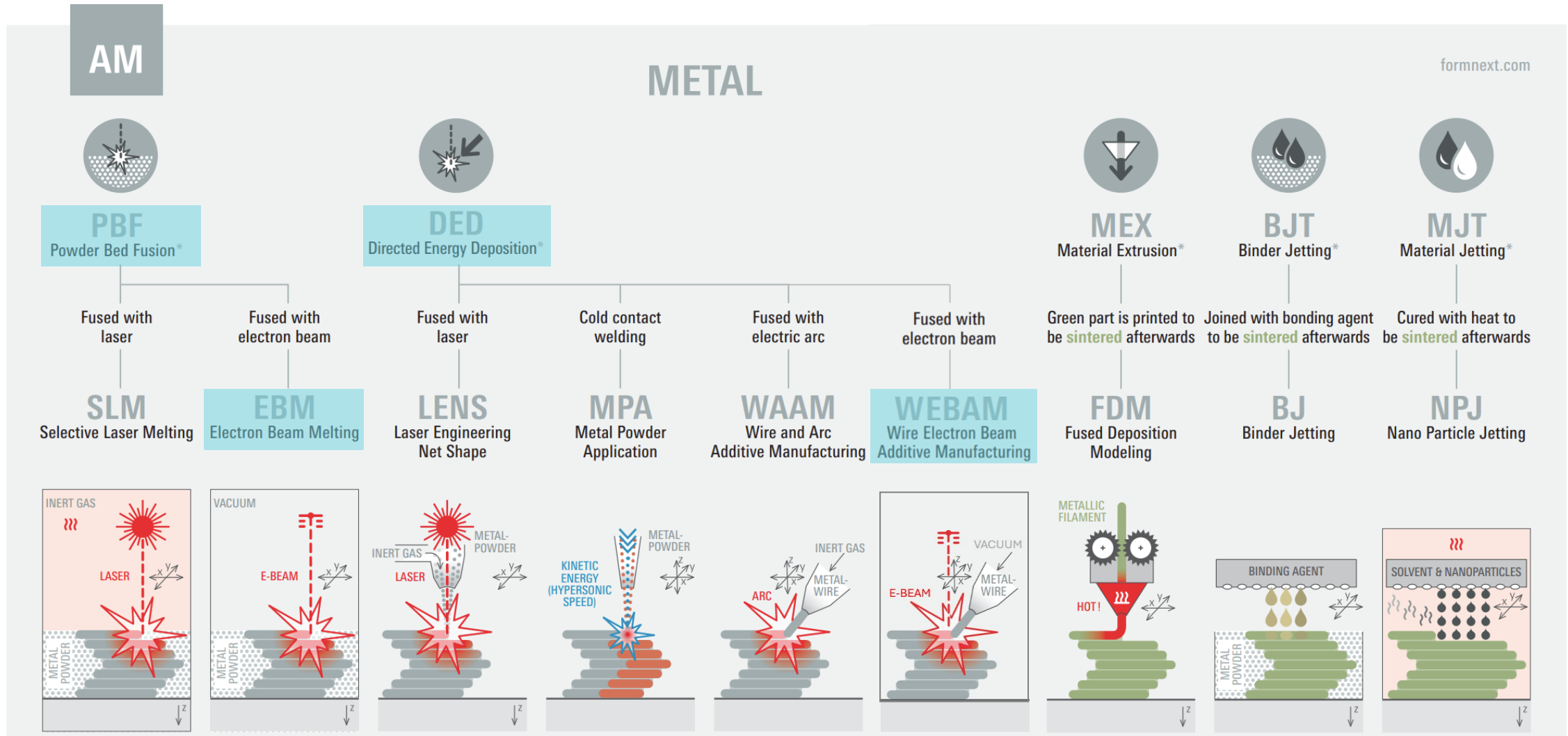


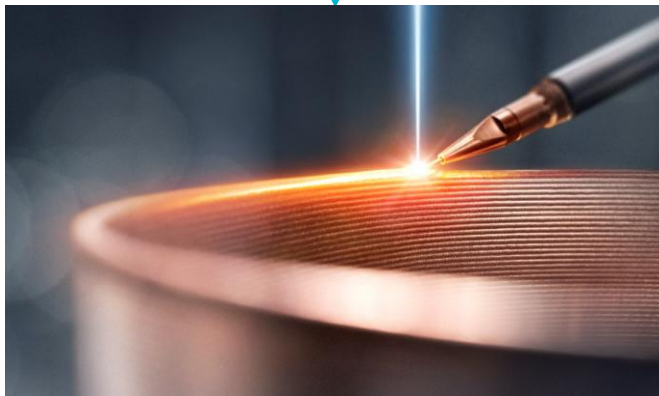


- ~ 18 different technologies for metal AM
- ~ 8 industrially mature
- pro-beam additive GmbH active in EB-PBF and WEBAM

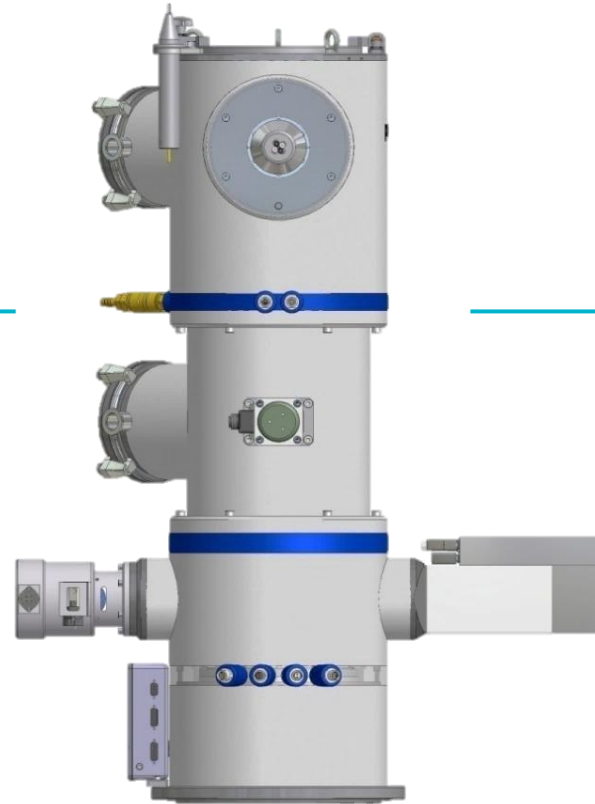
	Technologie	Energiequelle	Materialform
Laser beam powder bed fusion LB-PBF	Powder bed	Laser	Powder
Electron beam powder bed fusion EB-PBF	Powder bed	Elektron beam	Powder
Laser DED	DED	Laser	WirePowder
Wire arc additive manufacturing WAAM	DED	Arc/Plasma	Wire
Wire electron beam additive manufacturing WEBAM	DED	Elektron beam	Wire







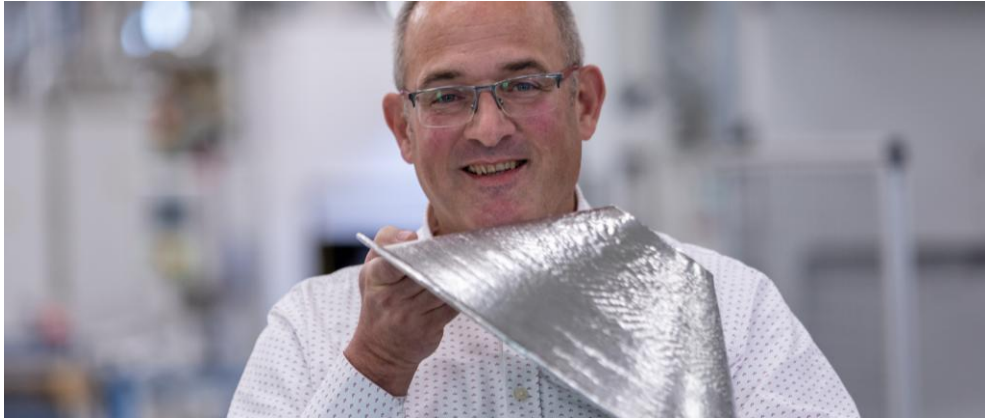
Wire Electron Beam Additive Manufacturing



Electron Beam Generator



Electron Beam Powder Bed Fusion

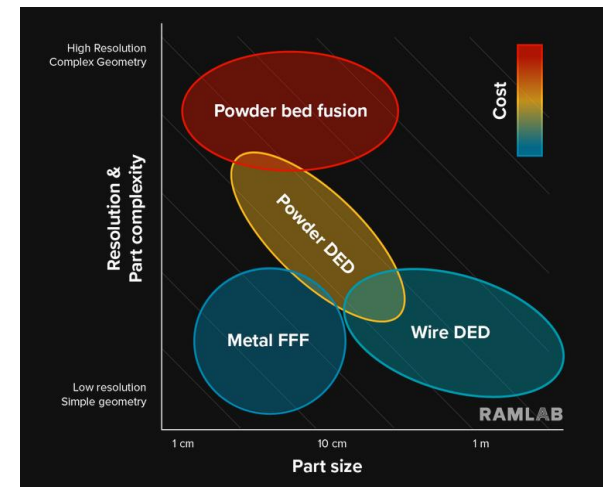


Wire Electron Beam Additive Manufacturing

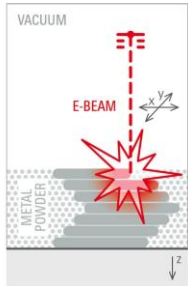
	WEBAM	EBM
Production rate	high	low
Complexity	low	high
Component sizes	large	medium



Electron Beam Melting

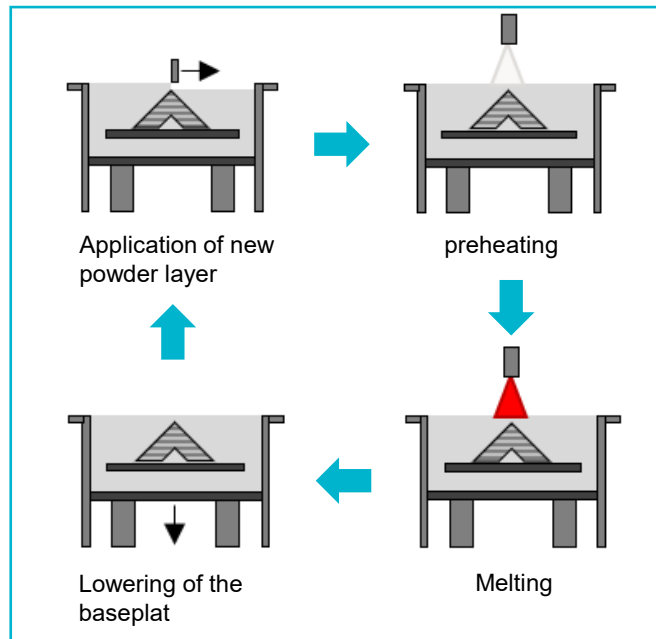




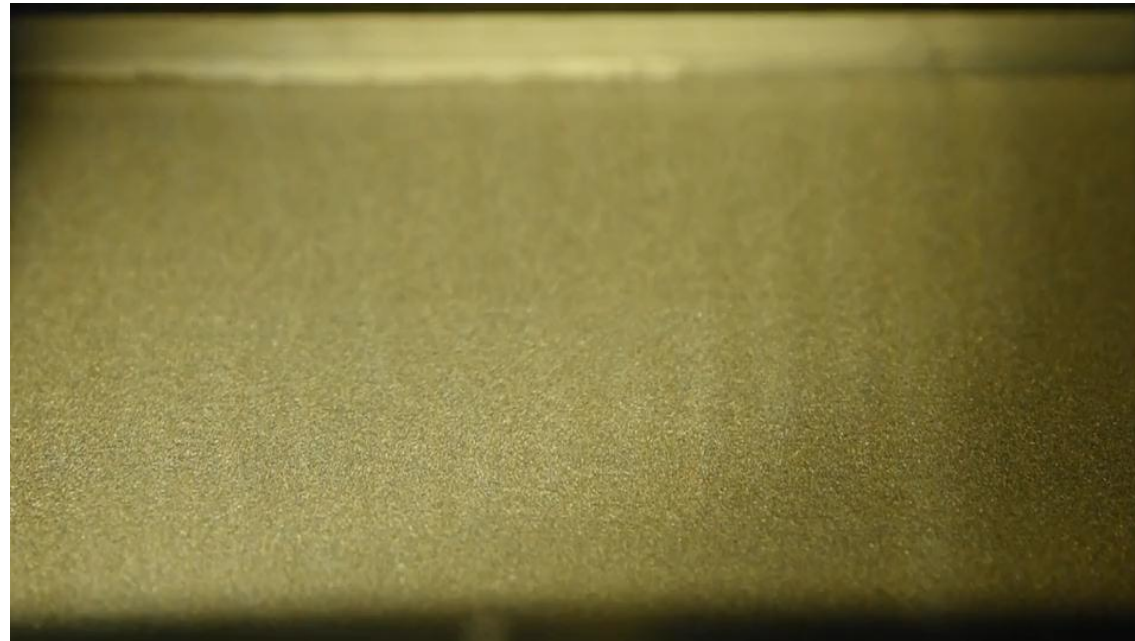


Using a deflected electron beam, metal powder is selectively melted layer by layer in localized areas, thereby solidifying a cross-section of the component.

Process details



Working Principle



EB is key to efficient processing of challenging materials



Challenging materials

- Challenging applications require materials with special properties
 - Oxygen affinity, light reflectivity, thermal conductivity, high melting point, ...
- Design of thermal conditions, gradients and cooling rates



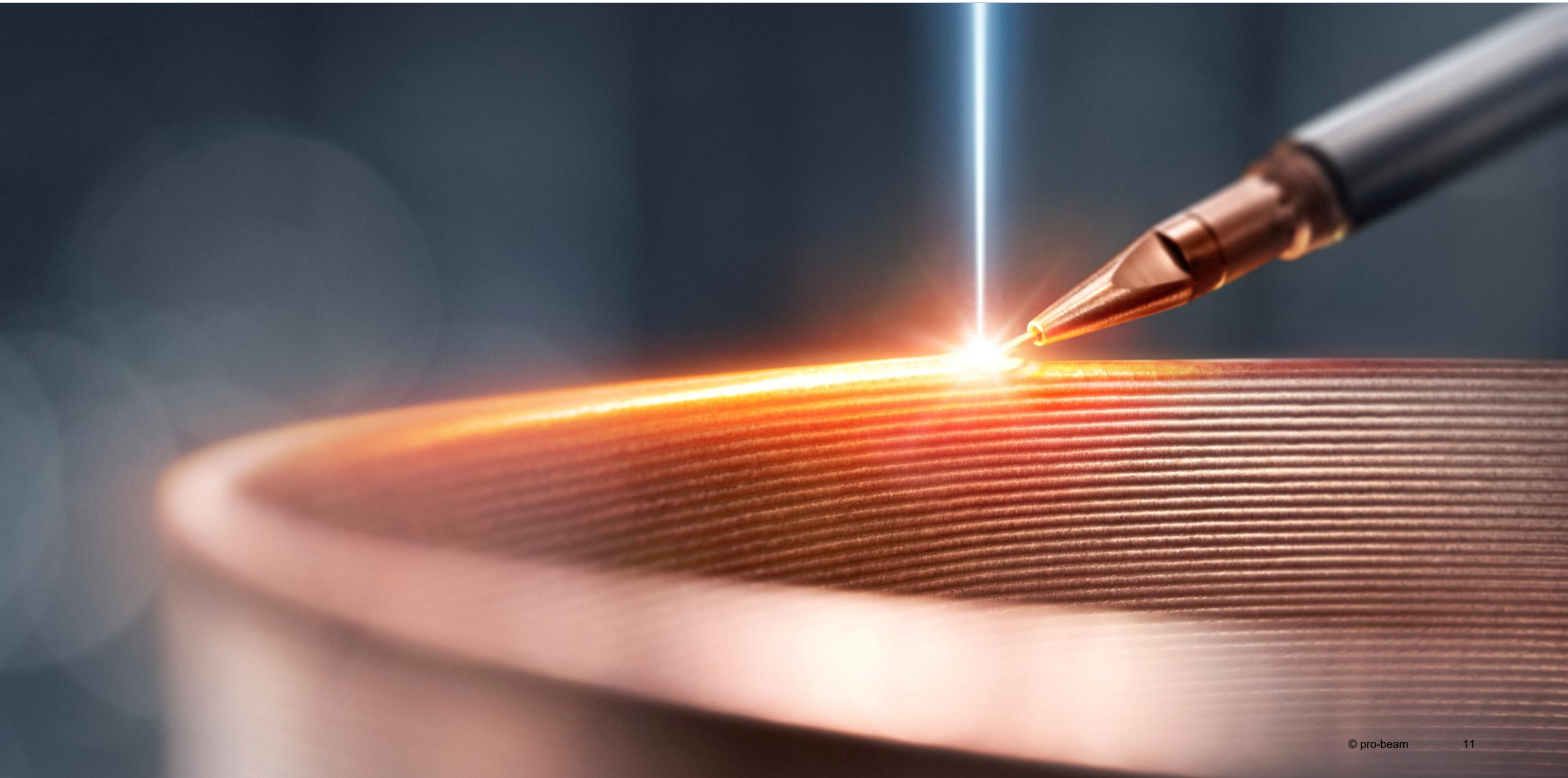
Complexity for free

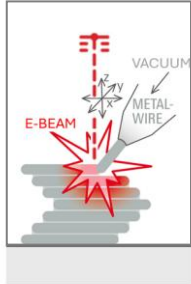
- High resolution and layerwise process enables manufacturing of complex structures
 - Internal cooling channels, lattice structures, ...
- No part specific tools needed



Material Efficiency

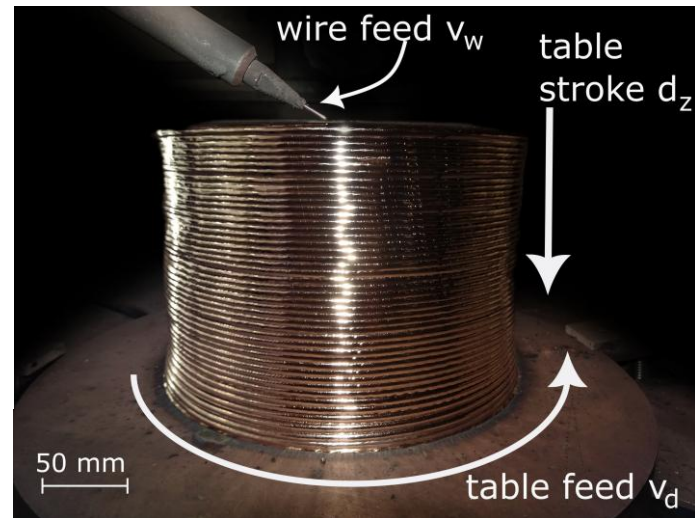
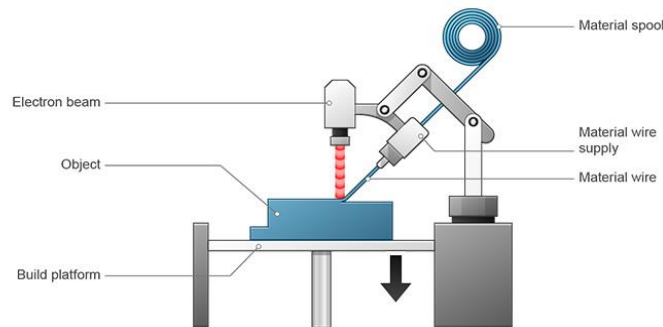
- EBM Operates in high vacuum - no need for shielding gas, reducing complexity and cost
- Powder feedstock from build volume is 100% reusable



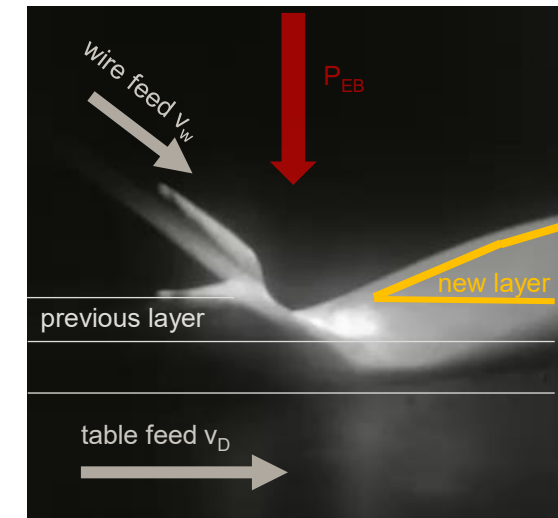


Metal wire is melted using the electron beam and locally deposited layer by layer, forming adjacent and overlapping weld beads to build complex geometries.

Process Details

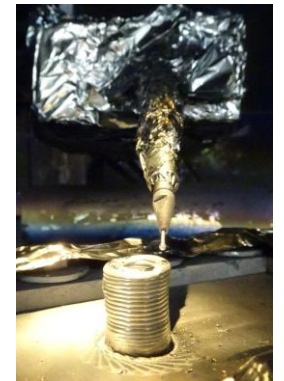
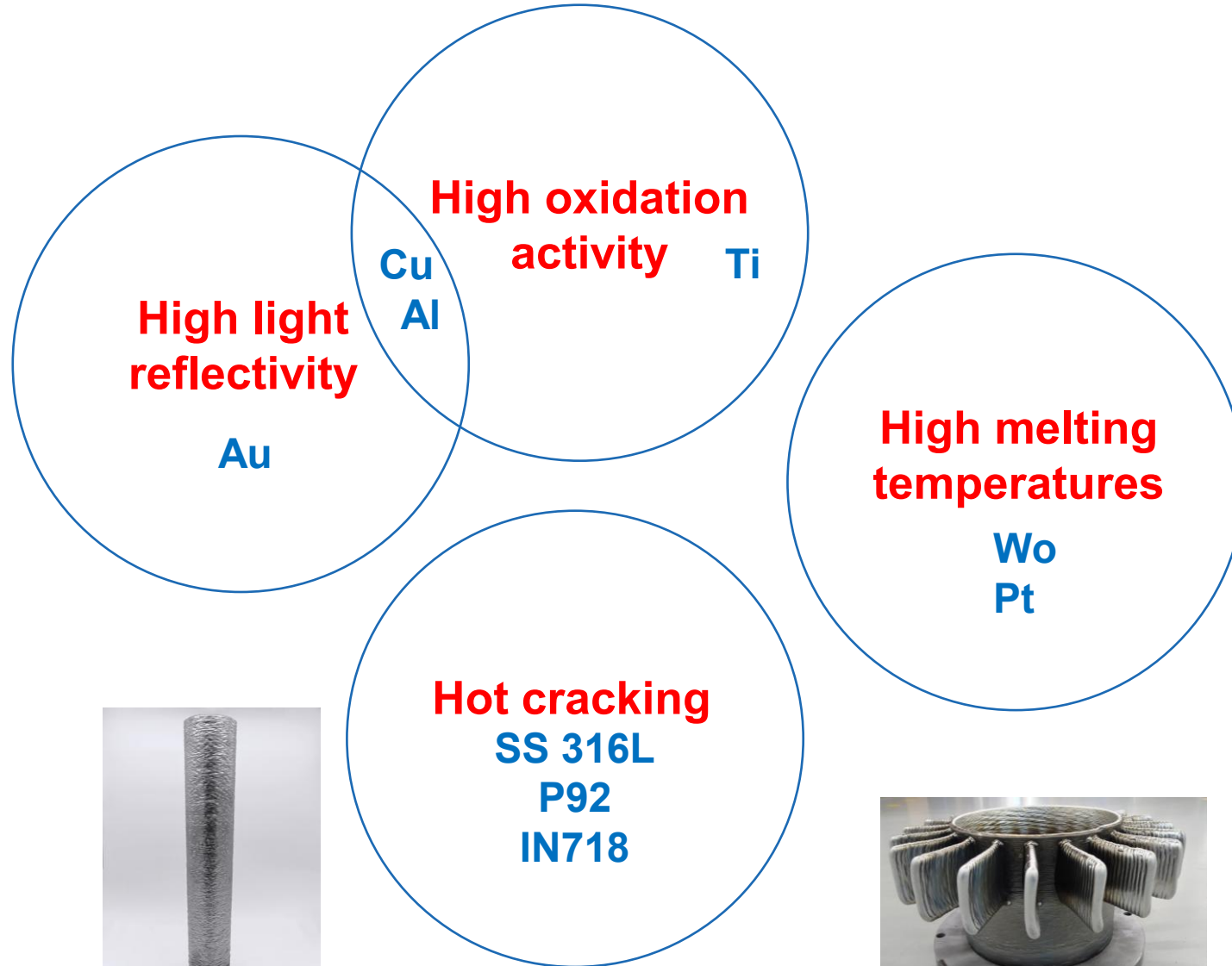
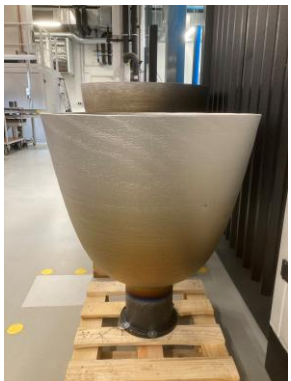
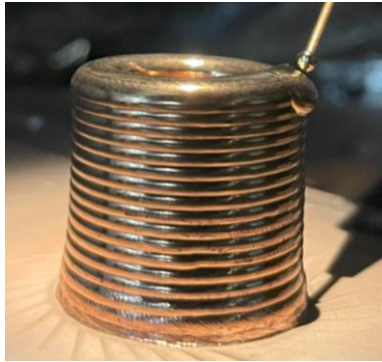


Working Principle



Materials investigated at pro-beam using WEBAM

pro beam



EB is key for high efficiency and productivity

Energy Efficiency

- No energy losses due to reflection, scattering, or optical inefficiencies
- Ideal for highly reflective and thermally conductive materials like pure copper
- Scientific studies show WEBAM consumes only **~1/3 the energy** of laser AM

High Productivity

- Up to **9 kW beam power (40 kW for K6000)**, enabling high deposition rates
- Capable of melting thick wire (1.6 mm diameter) at high feed speeds
- Achieves deposition rates up to **13 kg/h**, far exceeding typical AM benchmarks

Material Efficiency

- Operates in high vacuum - no need for shielding gas, reducing complexity and cost
- Hybrid substrate strategy (welding / AM) reduces machining waste by up to **2/3**
- Flip-frame system enables dual-sided deposition, minimizing thermal distortion



Meet us at Formnext 2025
18. - 21.11.2025 in Frankfurt

Highlights:

- The advantages of spot-exposure strategies with EBM
- Hybrid manufacturing with WEBAM

