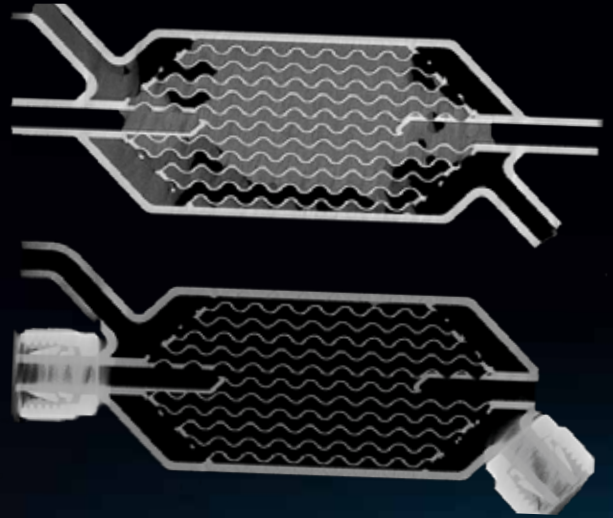


Selective Chemical Declogging for Metal AM

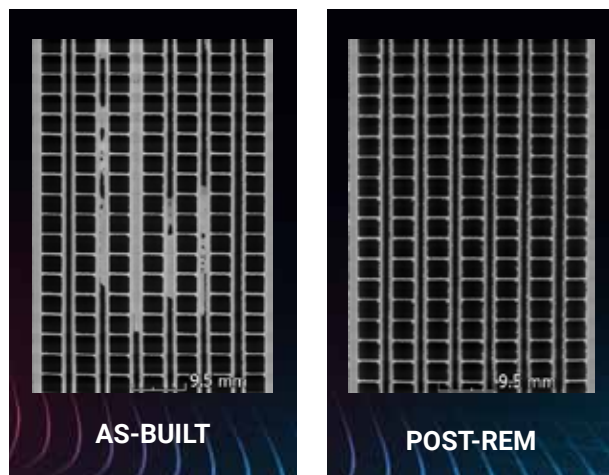


Powder Removal for Complex Internal Channels

One of the biggest challenges in Metal Additive Manufacturing (AM), specifically Powder Bed Fusion, is removing **residual powder trapped inside complex internal channels**. Standard cleaning methods, such as ultrasound or air blasting, often fail to reach deep inside intricate designs like heat exchangers.

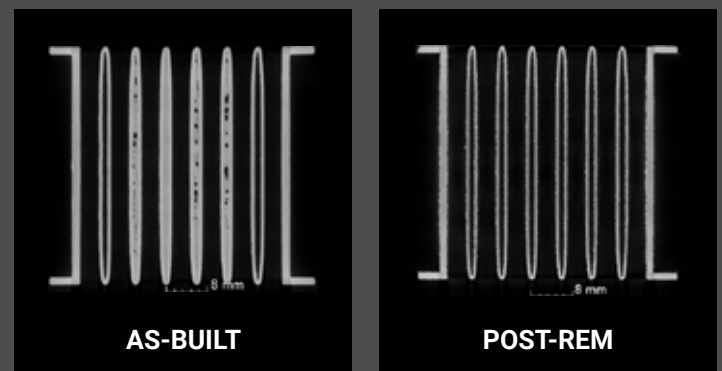
REM Surface Engineering has developed a Selective Chemical Declogging Process that eliminates this barrier. By using selective chemistry that targets loose powder while ignoring solid metal, manufacturers can finally achieve the geometric freedom promised by 3D printing without fear of clogging or flow restriction.

Example Heat Exchanger



Key Benefits

- **Non-Destructive Integrity** Completely removes powder without thinning walls, pitting the surface, or altering the dimensional accuracy of the part.
- **Unlocks Complex Geometries** Successfully clears architectures previously thought impossible to clean, such as Triply Periodic Minimal Surface (TPMS) cores and high-density multi-channel designs.
- **Speed & Efficiency** Capable of clearing severe clogs in as little as 30 minutes, turning unusable parts into production-ready components.
- **Restored Performance** Eliminating blockages ensures the component meets its original design specifications for thermal efficiency, flow rate, and pressure drop.
- **Multi-Alloy Compatibility** Validated effectiveness on various alloys, including Aluminum (F-357, AlSi10Mg, CP1) and Inconel (IN-718).



How The Process Works

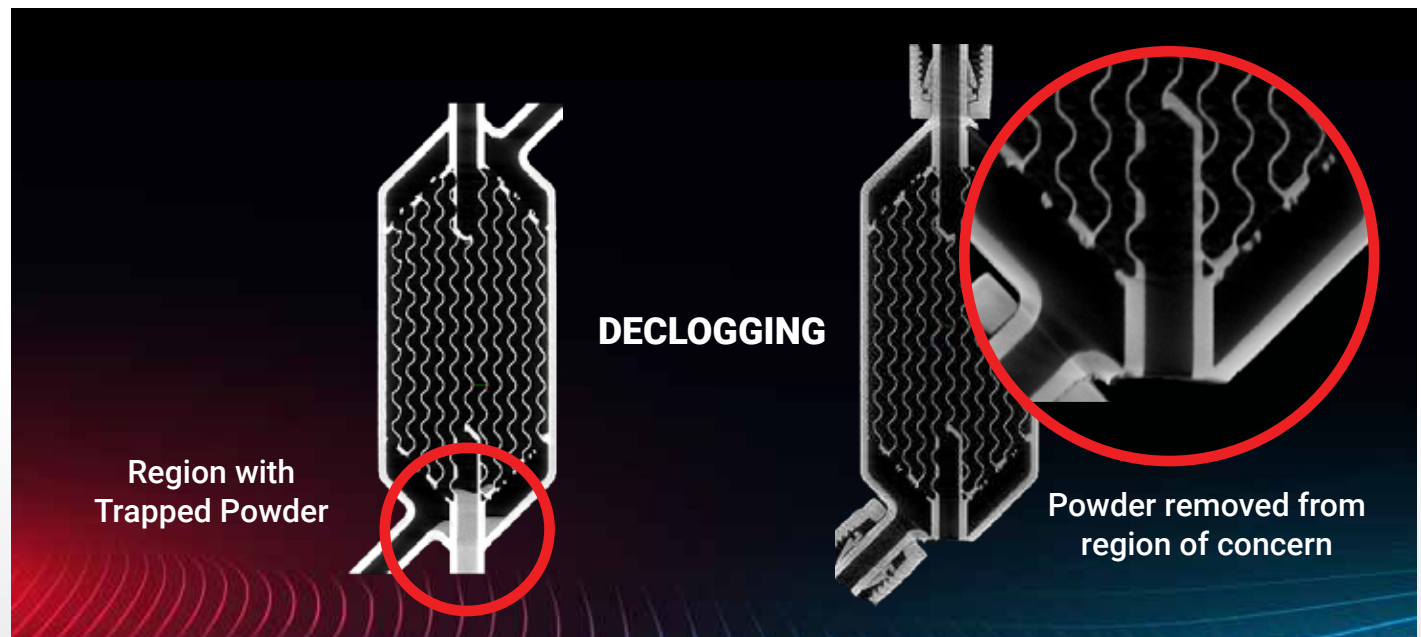
This process moves beyond mechanical cleaning by combining chemical engineering with fluid dynamics.

- **Selective Chemistry** The system uses proprietary chemical solutions engineered to be “self-limiting.” This means the chemicals aggressively dissolve high-surface-area oxides and loosely sintered powder but stop reacting once they hit the fully consolidated (solid) metal walls.
- **Pressure-Vacuum Cycling** Simply soaking the part isn't enough. The system utilizes an automated cycle of alternating pressure and vacuum.
- **Deep Penetration** These cycles drive the chemistry into the deepest, most tortuous internal networks. Capillary forces draw the fluid into powder clumps, ensuring every grain of trapped material is dissolved and flushed out.



Automated Channel Declogger

REM's Proprietary Chemical Formulation Targets Trapped Powder Removal on Initial Target Alloy



Work with REM! We're a technology solution provider. We work with you to define and validate the optimal processing approach for your application. We can support your production needs via outsourced processing at a REM facility or via a process installation at your facility.

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