

Perfect finish with ADDvance[®] Cryoclean.

Enhancing post-treatment results in
additive manufacturing.

ADDvance[®] Cryoclean from Linde was designed specifically to clean and smooth the surface of 3D parts, also complementing abrasive methods to increase the effectiveness of post-treatment finishing in additive manufacturing.

Benefits of ADDvance Cryoclean at a glance

- Residue-free component surface – clean right down to the surface microstructure
- Low environmental impact thanks to carbon dioxide
- Seamless adjustment of cleaning power
- Less abrasive material to consume and dispose of
- Lower operating costs



Today's AM cleaning challenge

During the 3D printing process, blast powder residue or unfused powder can build up on the part being built. Particularly in the case of small, elaborate parts and components with complex geometries, removing particles from holes and cavities can be quite challenging. Existing techniques have a number of drawbacks, including surface discolouration and a sub-optimum finish.

Many additive manufacturers rely on heat, for instance, to remove residue or unfused powder from 3D parts. However, the high temperatures required to melt powder particles can result in discolouration. Techniques such as abrasive blasting, abrasive barrel finishing, abrasive flow machining, plasma polishing, micro machining and electrochemical polishing are also used but these vary in effectiveness and can consume high volumes of abrasive material which then has to be disposed of.

The ADDvance Cryoclean advantage

We have created a dedicated solution that overcomes the downsides of high temperatures and increases the effectiveness of post-treatment finishing in additive manufacturing. Also designed to complement abrasive blasting processes, ADDvance Cryoclean uses liquid carbon dioxide (CO₂) to achieve perfect cleaning results with all 3D parts – no matter how small or complex they are.

ADDvance Cryoclean blasts carbon dioxide particles (CO₂ snow) directly onto the surface to be cleaned, embrittling the residue for easy removal. With ADDvance Cryoclean snow+, an abrasive agent can be admixed with the dry ice particles to remove stubborn powder residue. The operator can adapt the CO₂ snow/abrasive material ratio from gentle to abrasive to suit the task at hand.

Enhanced post processing service customised to your needs

ADDvance Cryoclean is designed for flexibility to suit individual cleaning challenges and it can be combined with an abrasive material for difficult-to-remove residue.

Our solution includes:

- Specially designed, encapsulated ADDvance Cryoclean snow+ unit blasting cabinet for cleaning with CO₂ snow (and abrasives)
- De Laval nozzle to accelerate and focus the snow particles
- Liquid CO₂ supply scheme – design, provisioning and installation of a liquid carbon dioxide system
- PRESUS® – CO₂ pressure control system
- On-site support – process and technical support, maintenance included
- Gas safety – equipment, safety checks and training



Talk to our AM experts today to see how we can enhance the efficiency and environmental performance of your 3D post-treatment processes. Email us at info@additivemanufacturing@linde.com or visit www.linde-gas.com/am.

Linde AG

Gases Division, Seitnerstrasse 70, 82049 Pullach, Germany

Phone +49 89 7446 1661, Fax +49 89 7446 2071, info-additivemanufacturing@linde.com, www.linde-gas.com/am

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