Increase Productivity. Reduce Costs.

Optimize direct metal printing with advancements in print platforms and build strategies

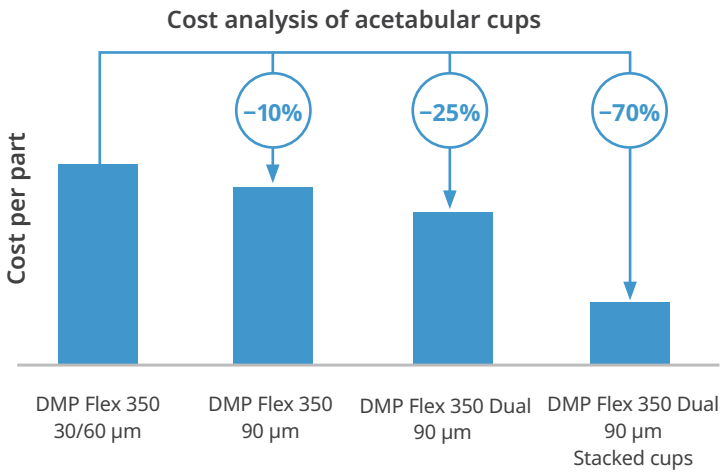
Direct Metal Printing (DMP) is becoming the preferred method for the manufacture of orthopedic implants such as interbody fusion and arthroplasty devices. It enables integration of complex porous scaffolds and surface lattices to support bone in-growth and help improve patient recovery time. These porous design structures also enable the implant to more closely simulate human bone stiffness. Today, advanced 3D printing technologies and design strategies enable you to produce devices faster and more cost-effectively. They also extend the advantages of additive manufacturing to large joint applications such as acetabular cups.

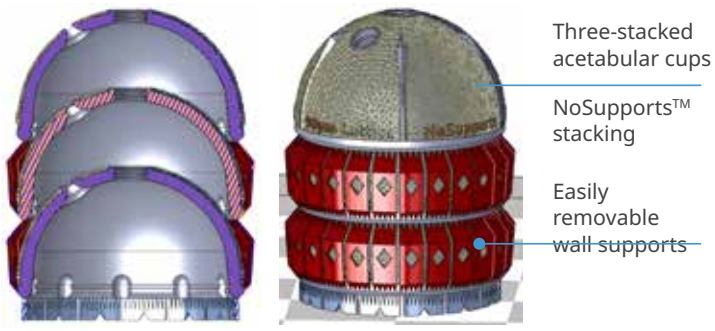
Stacked Acetabular Cups

Achieve faster throughput with DMP Flex 350 Dual and DMP Factory 350 Dual

Explore replacing or augmenting conventional manufacturing routes or Electron Beam Powder Bed Fusion (E-PBF) with laser-based additive manufacturing for producing primary acetabular cups. 3D Systems' two-laser DMP Flex 350 Dual and DMP Factory 350 Dual offers a truly cost-competitive and production-scalable DMP solution with industry-leading part quality.

When the dual-laser productivity increase is combined with a new LaserForm Ti Gr23 (A) parameter set for 90 µm layer thickness, acetabular cups printed nearly three times faster compared to single-laser production times. A cost analysis of acetabular cups for different DMP configurations is shown in the adjacent graph.





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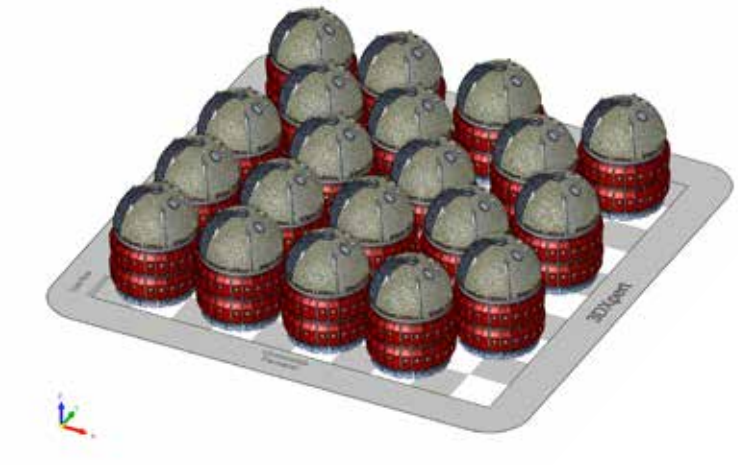
Stacked Acetabular Cups Cont.

Optimize build times and reduce processing times with NoSupports™

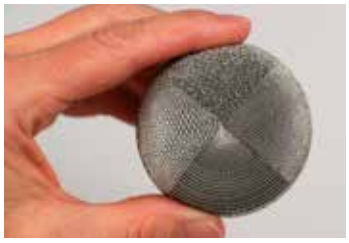
Further optimize build times for serial production and drastically reduce post-processing time for support removal with 3D Systems NoSupports build strategies. Now you can make acetabular cup production even more cost-effective by using a supportless, stacking configuration. This approach saves time, reduces labor cost and minimizes material waste, while improving dimensional repeatability. See the impact on cost per part in the final column in the graph on the previous page.



60 acetabular cups per build printed in 90 µm in 26 hours with the DMP Flex 350 Dual and DMP Factory 350 Dual

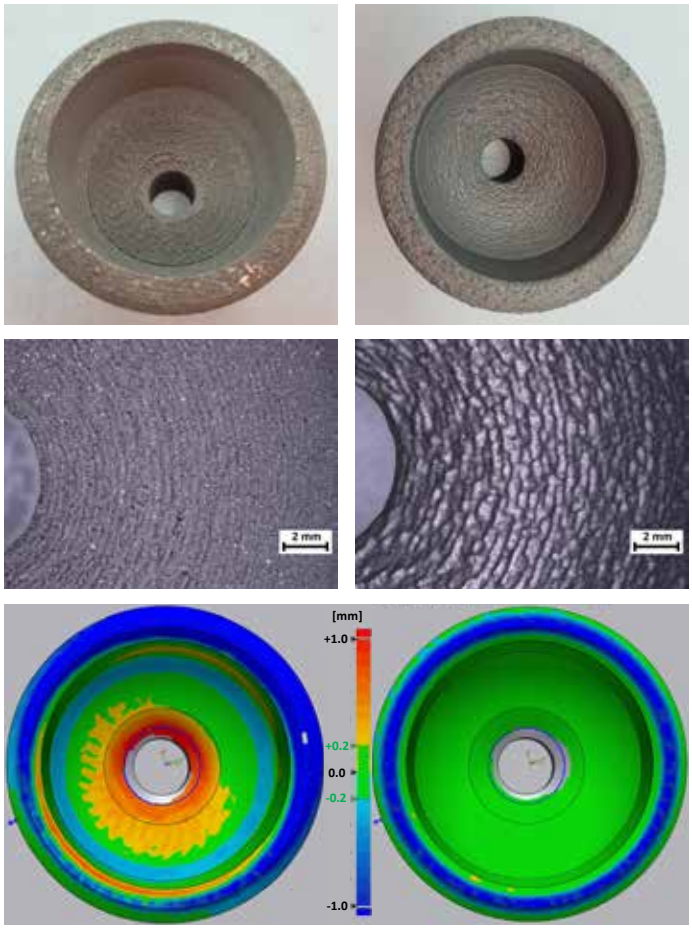
Customize lattice design in 3DXpert®

Create complex porous scaffolds and surface lattices in 3DXpert to help support monolithic bone in-growth, while eliminating post-process surface treatments. The software allows you to produce fine features like lattices in 30 µm layer thickness while printing the bulk in 90 µm. This strategy enables massive increase in productivity, without compromising print resolution or part quality.



Improved surface uniformity and dimensional accuracy with NoSupports

The NoSupports build strategy enables improved surface homogeneity in downfacing overhang zones and reduces the risk for dimensional variation caused by manual finishing. The acetabular cups exhibit a typical downfacing surface roughness of 38 µm Ra, after sand blasting.



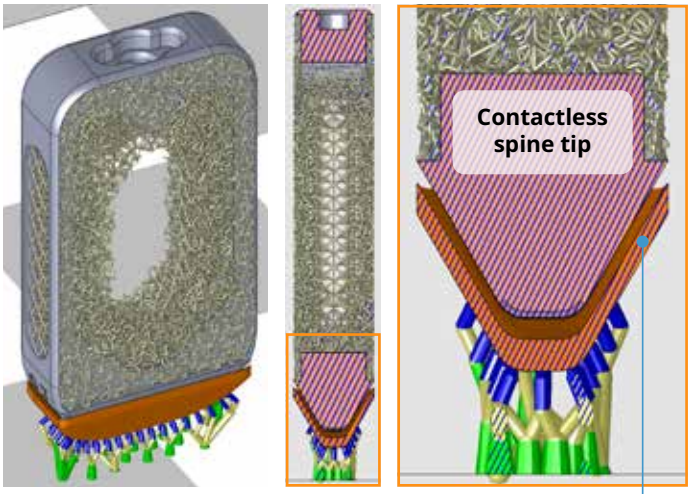
As-printed Sand-blasted

Contactless Spine Cages

Reduce cost and processing times with NoSupports

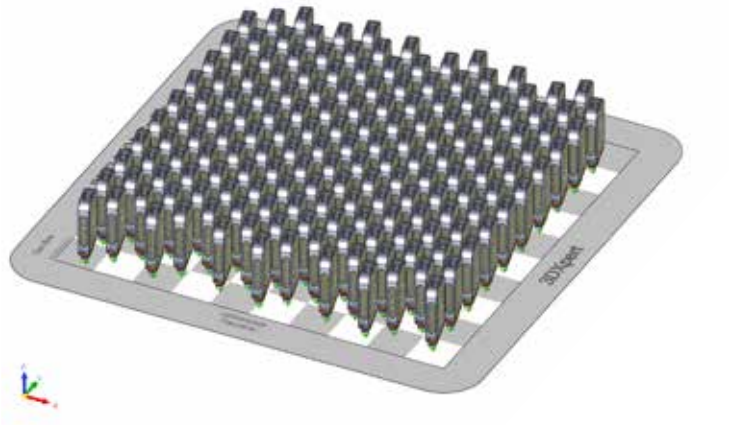
Contactless spine cages can be easily manually removed from the baseplate without the need to remove any supports. This drastically reduces the post-processing time and cost per part, while improving the surface uniformity.

These parts are printed with 3DXpert's new floating support feature, which creates thermal blades that promote thermal transfer from the part to the build plate.

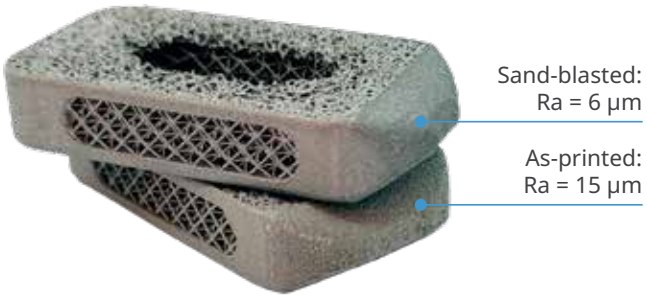


Contactless supports in 3DXpert

Thermal blade created with 3DXpert floating support



170 spine cages per build printed in 90 µm in 16 hours with the DMP Flex 350 Dual and DMP Factory 350 Dual



Smooth surface with a downfacing roughness down to 6 µm Ra, after sand blasting

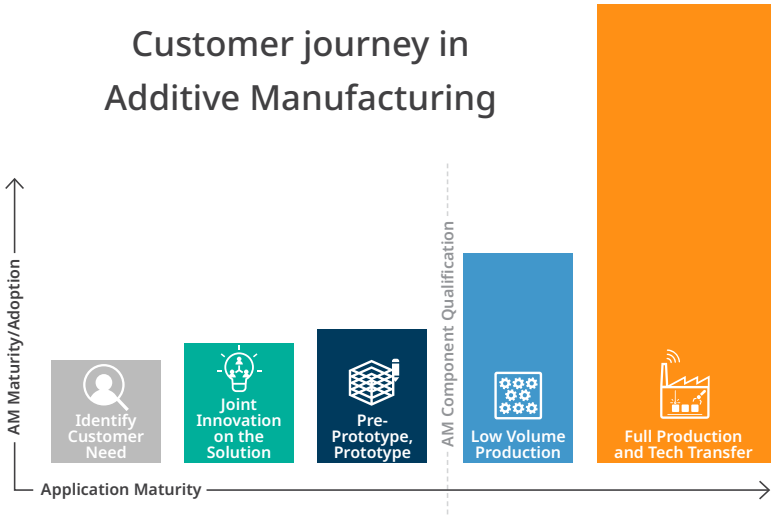
Count on Validated DMP Technology for Serial Production

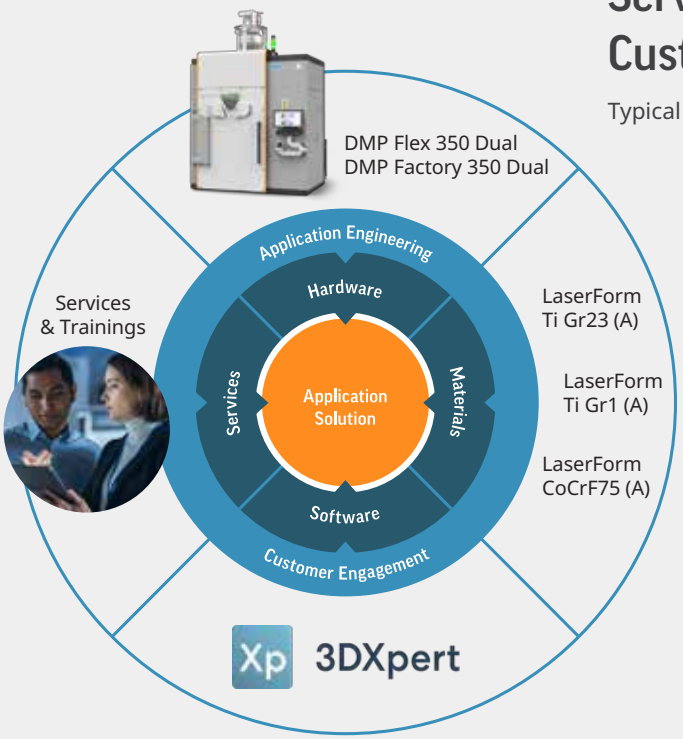
Medical device manufacturers have consistently produced high-quality implantable devices for more than a decade using 3D Systems' DMP platforms. The DMP Flex 350 Dual and DMP Factory 350 Dual achieves the lowest oxygen levels on the market (< 30 ppm) with the unique vacuum chamber, enabling best-in-class titanium printing and powder reuse. The robust DMP architecture yields excellent repeatability and reliability, while meeting stringent quality and regulatory requirements of the global medical device industry.

Gain the Advantage with 3D Systems' End-to-End Solution

We combine validated technologies and materials with advanced software and comprehensive consulting services to offer tailored end-to-end solutions for metal medical device manufacturing.

Customer journey in Additive Manufacturing





Service and Training Modules for Healthcare Customers throughout their AM Journey

Typical timeline

1	Applications Screening	1 day
2	Design for Metal Additive Manufacturing Training	1 day
3	Application Development Quality by Design	6-18 months
4	Application Support	1-day modules
5	Gap Assessment for Validated DMP Production	1 day on-site +, Report 1-2 weeks
6	Validation and Qualification, Certification Support for FDA Clearance	5-18 months
7	Contract Manufacturing for Pilot Production	5-18 months
8	DMP Technology Transfer	Customer/ Application driven

Accelerate and de-risk the development of your next application

Find out how 3D Systems' Application Innovation Group (AIG) and its team of experts can help you develop an application, reduce costs and increase productivity.

Schedule a free consultation today:

3dsystems.com/consulting/application-innovation-group

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