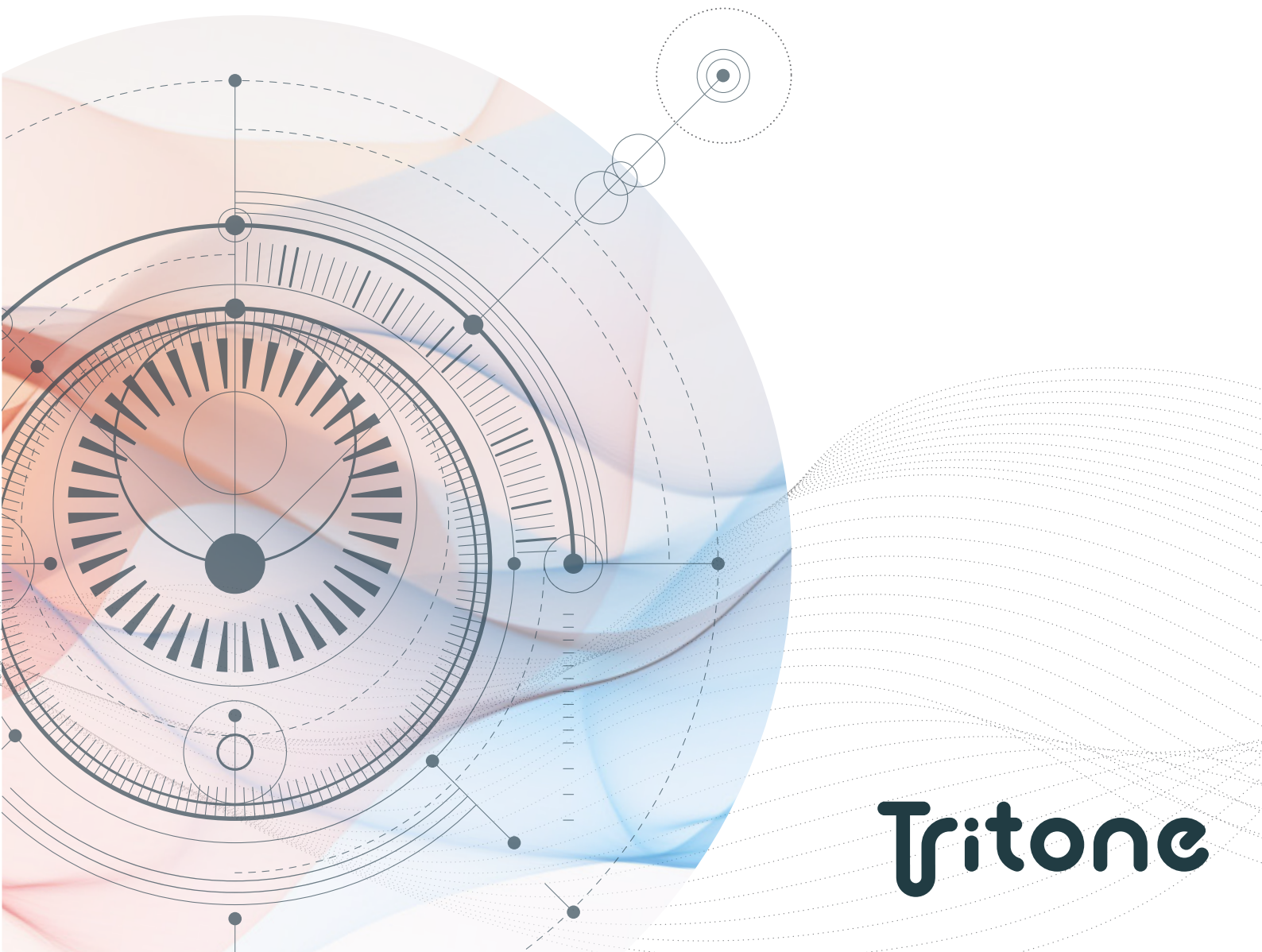


# Pro Tip: Precision Where it Matters – The Power of Variable Layer Thickness (VLT)

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**Tritone**



## **CHALLENGE:** **Is Uniform High Z Resolution Worth the Trade-Off of Longer Manufacturing Time**

In additive manufacturing, precision often comes at a cost—longer build times and reduced throughput. When dealing with parts featuring curved surfaces, fine details, or critical geometries, high surface quality and minimizing “staircase effect” is a must. However, applying uniform high Z-resolution printing along the entire part, regardless of its geometric complexity, leads to unnecessary overhead: excessive layer counts, extended print times, and higher operational costs.

The challenge lies in finding a way to maintain maximum throughput while still delivering superior surface finishes and eliminating the staircase effect.



## **SOLUTION:** **Smarter Manufacturing with MoldJet® VLT**

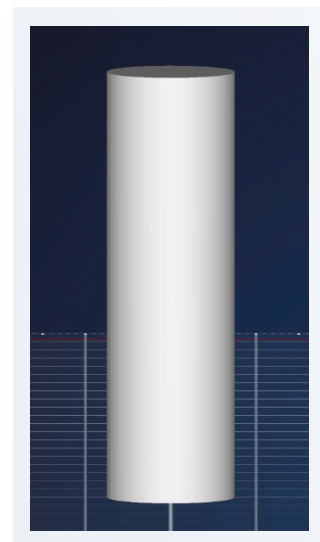
MoldJet® technology from introduces a breakthrough solution: Variable Layer Thickness (VLT). This production-optimized capability allows dynamic control of layer height during the manufacturing process. Layer thickness can be adjusted within the following ranges:

- ▶ **Metals:** 50–125 microns
- ▶ **Ceramics:** 25–75 microns

By applying thinner layers only in critical regions (curved edges, areas with a radius) and thicker layers in less demanding zones—VLT enables a surgical approach to resolution, rather than a one-size-fits-all method. The result: optimized build times, enhanced part quality, and no compromise on functional performance or surface.

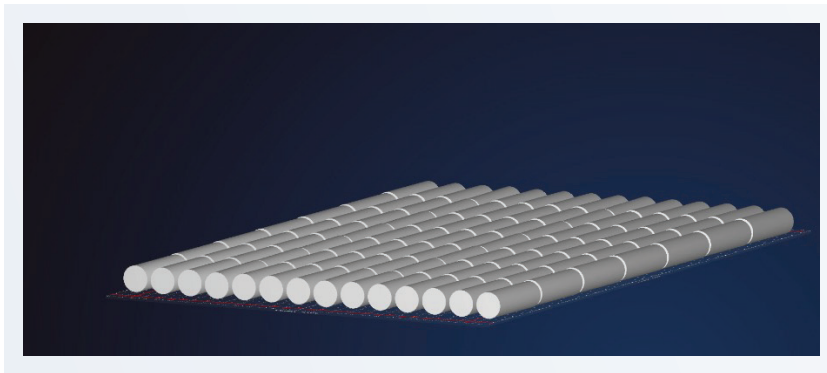
### **How it Works:**

- ▶ In cases of constant cross-section geometries, thicker layers (e.g. 125 microns) accelerate build speed without compromising on surface quality and staircase effect

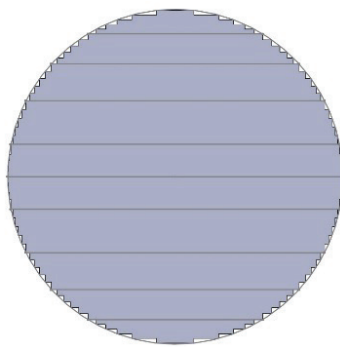


## Precision Where It Matters — Power of Variable Layer Thickness (VLT)

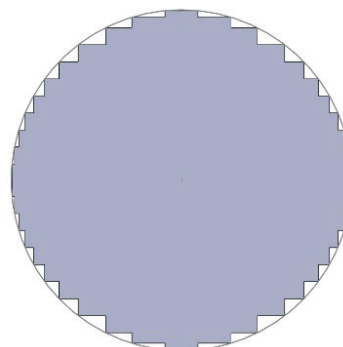
- ▶ In cases of geometries with variable cross-section along the Build direction (Z), geometrically, thinner layers (e.g., 50 microns) enhance surface quality and fine detail while diminishing staircase effect.
- ▶ VLT functionality best performs when applied in serial production cases where a pattern of the same part fills a specific tray, allows layer thickness modification along the Z-axis, across identical parts on a tray.



- ▶ This smart layering strategy is part of the manufacturing design intent and is defined during the job preparation phase, optimizing the job print time.



VLT ( $R, r_2$ ) 125→25 (micron)



125 micron ( $R, r_1$ )

$$A \rightarrow (R, r_1) > A \rightarrow (R, r_2) \Rightarrow r > r$$



## KEY BENEFITS OF VLT IN MOLDJET

### ▶ Selective Z Resolution Control

Fine-tune layer thickness based on part geometry—apply high Z resolution only where necessary, not across the entire part.

### ▶ Improved Surface Quality

Achieve smooth, staircase-minimized finishes in a curved or complex regions

### ▶ Maximum Throughput

Avoid excessive print times. Combine coarse and fine layers intelligently to balance quality and speed.

### ▶ Optimized Production Planning

Enable cost-effective, high-efficiency manufacturing through smart design-phase adjustments that translate directly into leaner, faster builds.



With MoldJet's VLT feature, quality no longer comes at the expense of speed. This adaptive manufacturing approach lets you focus precision only where it matters most, unlocking a new level of efficiency in metal and ceramic part production.

Upgrade your process with precision-engineered productivity.