METAL BINDER JETTING

Design Guidelines

Complimenting its existing metallurgical capabilities, DSB Technologies designs and manufactures complex part designs for serial production through metal Binder Jetting.

GENERAL DESIGN PRINCIPLES FOR BINDER JET COMPONENTS

- **Basic Dimensions – As Sintered**
  - General rule of thumb is ± 1.5 % of nominal feature size. The tightest basic tolerance that can be held as sintered is ± 0.004".
- **Part Weight**
  - From 5 grams to 10+ kilograms
- **Minimum Feature Resolution**
  - In XY: 0.020" (.5mm)
  - In Z: 0.040" (1mm)
- **Binder Jet Plus Machining**
  - Any feature on a printed part can be finish machined to meet drawing dimensions. Consult w/ DSB for details on the tightest achievable tolerance.
- **Material Options**
  - SS 17-4 PH (97% Minimum Density)
  - SS 316/316L (97% Minimum Density)

Note: Consult w/ DSB for details on achievable tolerances as sintered. A mark up drawing can be provided during the RFQ and DFAM stage.

WALL THICKNESS FOR BINDER JET COMPONENTS

- **Minimum Wall Thickness**
  - 0.040" or 1mm.
  - Thinner walls will go through an evaluation from DSB engineers for approval during the DFAM stage.
- **Maximum Wall Thickness**
  - Roughly 0.60" or about 15mm
  - Thicker walls will go through an evaluation from DSB engineers for approval during the DFAM stage.

Note: Thicker walls are better for a higher yield in de-powdering.

BINDER JET COMPONENT SURFACE ROUGHNESS

- **As Sintered**
  - Roughly 4 – 7 micrometer Ra
- **Plus Bead Blasting**
  - Roughly 3 – 6 micrometer Ra

Note: Additional surface finishing techniques can bring the surface roughness even lower as needed.

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ADDITIONAL GENERAL DESIGN GUIDELINES FOR MIM

- **General Design Principles**
  - Traditional design principles don't apply to binder jet 3D printing. The process offers 360 design freedom, engineers can truly think outside the box when designing for this process. The more intricate the design, typically the more value you'll get out of this process when compared to traditional manufacturing techniques.
- **De-powdering**
  - Following the printing process, parts will need to be handled in the green state for de-powdering. When designing parts for binder jet consider how the part can be optimized for powder removal.
- **Support-free angles**
  - The support-free angle rule that's used when designing for DMLS doesn't apply for binder jetting.
- **Flat Surfaces**
  - Design with a flat surface when possible for ease of sintering.
- **Others**
  - Several features can be printed onto the component, such as logos, text, and honeycombs.

Note: Any additional questions on design for BJT can be answered by the engineers at DSB.

BUILD BOX DIMENSIONS

- **ExOne 25PRO:**
  - 400 x 250 x 250 (mm)
  - Suitable for production, R&D, and prototyping
- **ExOne Innovent+:**
  - 160 x 65 x 65 (mm)
  - Suitable for R&D and prototyping

Note: DSB Engineers will adjust the nominal part size when printing to compensate for shrinkage. You can assume the maximum part footprint to be ~70% of the build box dimensions.

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