ITEM OPPORTUNITY SYNOPSIS

Scouting Number:	2024-165
Name of the item to be scouted:	Additive Manufacturing (3D printed) Parts
State item to be used in:	Washington
Describe the Item:	
Please describe the item application/the end use of the item.	Additive Manufacturing (3D printed) parts using the HP MultiJet Fusion process to manufacture a number of proprietary components
Supplier Information:	
Type of Supplier Being Sought (select from the list below):	
Manufacturer	x
Contract Manufacturer	
Distributor	
Other (Please Specify)	
Reason for Scouting Submission (select from the list below)	
2nd Supplier	x
Price	
Re-Shore	
Past supplier no longer available	
New Product Startup	
BABA	
Other (Please Specify)	
Summary of Technical Specifications and Performance Requirements:	
Describe the manufacturing processes (elaborate to provide as much detail as possible)	HP MultiJet Fusion process. This method provides us the design and small batch manufacturing flexibility that we need as well as a whole host of material and engineering benefits.
Provide dimensions / size / tolerances / performance specifications of the item	Attached is a pamphlet from one of the national on-line retailers that also does this process to better explain what the process is. We have the blueprints and CAD files for the components that we need, and are looking to diversify our supplier base for these components that we can not make in-house.
List required materials needed to make the product, including materials of product components, if applicable	Nylon
Are there applicable certification requirements?	
Yes	
No	x
Please explain:	
Are there any applicable regulations that apply to the production of this item?	
Yes	
No	x
Please explain:	
Are there any other standards / requirements?	
Yes	
No	x
Please explain:	
NAICS CODES:	
NAICS 1	323111 Commercial Printing (except Screen and Books)
NAICS 2	
Additional Comments:	
Additional technical comments:	
Volume and Pricing:	
Estimated Potential Business Volume (i.e. #units per day, month, year):	not for public disclosure
Estimated Target Price/Unit Cost Information:	not for public disclosure
Delivery Requirements:	
When is it needed by? (Immediate, 30 days, 6 months, etc.)	ASAP
Describe packaging requirements (i.e. individually/group packaging, etc.)	Standard. Individually wrapped
Where will this item be shipped?	Washington

Additional Comments:	
Is there other information you would like to include?	

Xometry

HP MULTI JET FUSION
Design Guidelines and Best Practices

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What is Multi Jet Fusion

HP's Multi Jet Fusion is a unique 3D printing process that is vastly different from the others on offer at Xometry. However, it is no less precise, capable of creating high-quality parts up to 10X faster than competing 3D printing processes, allowing you to get to market faster.

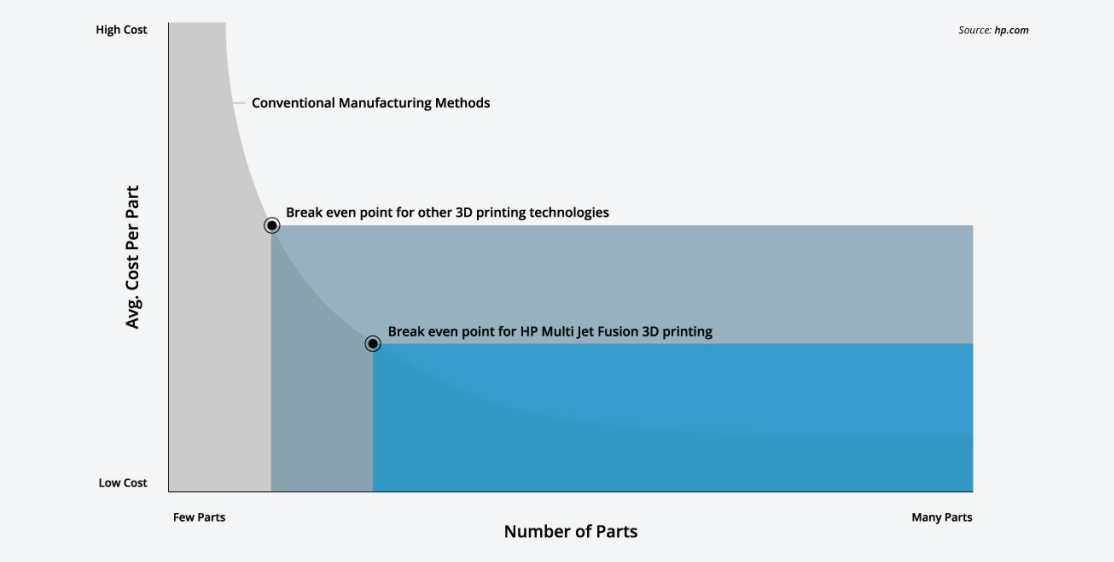
Like all powder-based 3D printing processes, HP Multi Jet Fusion builds parts layer by layer, using a fusing agent and heat to set each layer before moving onto the next. In more traditional 3D printing processes — such as Selective Laser Sintering (SLS), Stereolithography (SLA), or Direct Metal Laser Sintering (DMLS) — each part is imaged, layer by layer, with a single laser beam. HP's Multi Jet Fusion works a bit more like a traditional ink-jet printer with a printhead that deposits the material, and then a fusing agent, across the entire build plate in one pass, allowing for improved economies of scale when printing in bulk.

HP Multi Jet Fusion is an extremely exciting, robust and flexible addition to Xometry's manufacturing capabilities. It's excellent for prototyping, small-batch production runs or as a bridge process to injection molding, allowing you to get a feel for how your parts will perform with minimal upfront costs with great economies of scale.

The Benefits of HP's Multi Jet Fusion 3D Printing Process

While there are many benefits to HP Multi Jet Fusion, a few truly stand out. For starters, the standard build parameters are optimized for best density. The result is that MJF parts are watertight.

If you like SLS but want to produce higher quantities for small-batch production runs, Multi Jet Fusion is the way to go. The ability to print multiple parts simultaneously across the entire build volume means you can print parts at rates up to 10X faster than SLS or other 3D printing processes. Also, Multi Jet Fusion delivers more balanced mechanical properties across the X, Y, and Z axes compared to SLS.



If you're interested in injection molding for your project, it's always a good idea to get a 3D printed "test" part before making the investment in metal molds. While SLA is a great 3D printing process for extremely detailed and high-resolution prints, the UV cured resins are not as tough as traditional thermoplastics. Prints begin to degrade in UV light and moisture. Multi Jet Fusion, on the other hand, can produce extremely accurate prints while also maintaining the structural durability of traditional thermoplastics. This makes it a great process for testing fit and functionality before taking your project to injection molding.

Multi Jet Fusion Design Guidelines and Best Practices

There are some very important design specifications to bear in mind to avoid issues in the printing process and to achieve the highest part quality possible. The minimum printable features in the X, Y, and Z planes:

Minimum hole diameter at 1 mm thickness:	**0.5 mm**
Minimum shaft diameter at 1 mm height:	**0.5 mm**
Minimum printable font size for embossed or debossed letters or numbers:	**6 pt**
Minimum clearance at 1 mm thickness:	**0.5 mm**
Minimum slit between walls:	**0.5 mm**

The minimum gap between parts that will be assembled after printing should be at least **0.4 mm (± 0.2 mm of tolerance for each part)** in order to ensure correct assembly. If you're looking to do print-in-place assemblies such as a ball joint or hinge, we recommend a minimum clearance of **0.7 mm between the parts**. Parts with very thick walls above **50 mm** should have an even great gap to ensure proper performance.

When designing parts, we recommend you hollow out the part as much as possible. This will save on fusing agent and powder, reduce sink marks, and reduce print time, saving you money. If your part is hollow and also a closed geometry, drain holes need to be added to the design to aid in the removal of the material. The minimum diameter for the drain holes is **2 mm** and we recommend including at least two holes.

Limitations to Consider When Printing With Multi Jet Fusion

Like all 3D printing processes, there are some limitations to consider before selecting HP Multi Jet Fusion as your additive manufacturing process of choice. If you're printing just a single, one-off part, Multi Jet Fusion might not be the most cost-effective option. The cost-savings for Multi Jet Fusion truly come into play when printing in higher quantities that can fully utilize the available build space.

HP MJF prints in a natural gray color with a slightly textured finish similar to SLS. The natural gray color may be somewhat inconsistent across a single part. We recommend a dyed black finish for best consistency and overall cosmetic appeal.

Teeny-tiny parts and large parts that take up nearly the entire build volume may experience issues. Parts with thicker geometries, flat or broad parts, and parts with uneven wall thicknesses may be prone to significant deviations or warp due to variable thermal shrinkage and stress. Though Multi Jet Fusion is an accurate process — the standard layer thickness is 80 microns with a minimum recommended feature size of 0.5 mm — tiny features or small parts under 0.5 mm can be lost or won't print correctly. Something to keep in mind when designing for Multi Jet Fusion.

Technical Specifications and General Tolerances

The chart below is a great reference to keep on hand when designing for HP's Multi Jet Fusion 3D printing process.

Material Options	• Nylon 12 • Glass-Filled Nylon 12 • Nylon 11 • TPU 95A
Standard Accuracy	• ± 0.012" or ± 0.003"/inch, whichever is greater • ± 0.4mm ≤ 100mm, ± 0.4% >100mm (± 0.016" ≤ 3.900", ± 0.4% > 3.900")
Standard Layer Thickness	• 80 microns (0.0031")
Build Volume	• 380 x 284 x 380 mm or 15" x 11" x 15" • 14" x 11" x 13" is recommended useable area
Minimum Printable Features	• 0.5 mm / 0.020" in X, Y, and Z planes
Finishes	• Natural Gray • Dyed Black (recommended) • Custom

Materials Available for HP Multi Jet Fusion

Xometry's HP Multi Jet Fusion service offers four different material options for printing: Nylon 12 (PA 12), Glass-Filled Nylon 12 (PA 12 GB), Nylon 11 (PA 11), and TPU 95A (Estane M95A).

- **Nylon 12** is a safe bet. Parts printed in Nylon 12 will offer the highest cost savings when compared to the other MJF material options. Glass-Filled Nylon 12 provides an affordable, high-strength material option great for prototyping.

- **Nylon 11** has optimal mechanical properties, with high chemical resistance, ductility, and enhanced elongation-at-break. Its pliable nature and strength mean that Nylon 11 can withstand impact, making it an excellent choice for defense, sports, and medical prosthetic applications.

- **TPU 95A** is a thermoplastic urethane, with high levels of flexibility and tear strength. The material exhibits rubber-like qualities — much like a shoe sole — allowing for a range of end-use applications.

Nylon 12 with Natual Gray Finish

Nylon 12 with Dyed Black Finish

Technical Specifications for HP Multi Jet Fusion Materials

Name	Technical Name	Standard Color	Other Finishes	% Elongation at Break (XY, Z)	MPa Tensile Strength (XY, Z)	°C Heat Deflection (HDT @66 PSI, @264 PSI)	°C Melting Point
Nylon 12	HP 3D High Reusability PA 12	Matte Gray	• Dyed Black • Custom	20%, 15%	48, 48 MPa	175°C, 95°C	187°C
Glass-Filled Nylon 12	HP 3D High Reusability PA 12 Glass Beads	Matte Gray	• Dyed Black • Custom	10%, 10%	30, 30 MPa	174°C, 114°C	186°C
Nylon 11	HP 3D High Reusability PA 11	Matte Gray	• Dyed Black • Custom	55%, 40%	52, 52 MPa	185°C, 54°C	202°C
TPU 95A	Estane 3D TPU M95A-545 OR UV	Matte Gray	• Custom	400%, 90%	17, 8 MPa	Shore A 90-95	80, 35

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