SCALABLE PROPELLANT MANAGEMENT DEVICES (PMD) FOR WEAPONS AND MUNITIONS

mott
MISSION CRITICAL PRECISION

## OPTIMIZES FLUID EXTRACTION FOR MAXIMUM STANDOFF RANGE

PMDs ensure more consistent fuel delivery to prevent engine flame out, despite maneuvers, slosh or low/high-G flight.

- Integrated Surface Tension Elements (STEs) with gradient porous wicking deliver reliable liquidpropellant flow with minimal pressure drop
- Compact, lightweight design— using U.S.-based Laser Powder Bed Fusion (LPBF) manufacturin — improves efficiency and design flexibility
- Optimized for gas exclusion and stable performance in high-g environments outperforming conventional woven screen designs

KEY BENEFITS

- Enhanced Performance : Optimized designs achieve up to 98.5% fluid extraction, increasing range while reducing engine-stall risk and improving fuel efficiency in microgravity and high-acceleration environments (up to 12 g).

- Reduced Size, Weight, and Power (SWaP): Space efficient, custom-engineered wicking components and hardware reduce system footprint and weight.

- Faster and Cost-Efficient: Accelerates design iterations and prototyping (reviews in days/weeks; flight-ready parts in months), and cuts material and tooling costs.

Example of design freedom

Example of multiple porosities for wicking
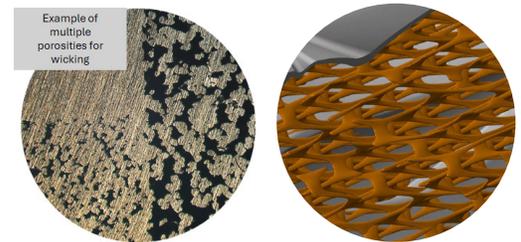
Multi-function porous lattice design to aid flow and filtration

DESIGN APPROACH & TECHNICAL SPECIFICATIONS

Laser Powder Bed Fusion enables a wide range of custom geometries

SPECIFICATIONS

Aspect	Specification	Aspect	Specification
Materials	316L, Ti-6-4, Inconel 625, etc... other upon request	Density consistency	+0.007-0.1 g/cc
Build Volume	9.7"x9.7"x13" (larger sizes available)	Flow consistency	+10%
Feature resolution	+0.015" (solid) +0.02" (porous)	Mass consistency	+5%
Dimension consistency	+0.001-0.002" (part-to-part)	Printed solid surface finish	350 µin Ra
Micro-porosity characteristics	0-50% porous 1 to 100 micron	Machined surface finish	5-32 µin Ra

Rapid Parameter Development
Each line represents a different iteration of porous parameters implemented to target various transfer rates. All parts were printed in one build.

Liquid Transfer Rates — Mass of H20 (grams) vs Time (seconds)