ENVIRONMENTAL CONTROL AND LIFE SUPPORT SYSTEMS

mott
MISSION CRITICAL PRECISION

FLIGHT-PROVEN POROUS METAL FILTRATION AND FLOW CONTROL FOR HUMAN-RATED SPACE MISSIONS AND SCIENTIFIC PLATFORMS.

DESCRIPTION

Mott filters and flow control products are mission-critical in environmental control and life support systems, ensuring the water the astronauts drink is clean, air sampling instruments are protected, and the air they breathe is pristine and continuously recycled with uncompromising efficiency. With decades of proven space flight heritage, these advanced filtration technologies capture microscopic contaminants, ensure a steady flow, and maintain stable humidity levels, all while withstanding the rigors of zero gravity and the harsh environment of space. Designed for durability and reliability, they safeguard human health, support longer missions, and shield sensitive scientific instruments.

Key Benefits

- Removes microscopic particulates, aerosols, and microbial loads.
- Maintains stable humidity, pressure, and gas flow in closed-loop systems.
- Configurable pore size & permeability for oxygen, water, and mixed-gas service.
- Metallic strength tolerates thermal cycling, cleaning, and high $\triangle P$.
- Additive manufacturing enables complex, weld-free, porous-to-solid structures.

APPLICATIONS

» Oxygen Generating Systems / Oxygen Enrichment Modules
» Crew Cabin & Spacesuit Air Circulation / CO_2 Scrubbing Support
» Water Recovery & Wastewater Reclamation Loops
» Atmosphere Sampling & Instrument Flow Control
» Flame Arrestors & Ignition Mitigation
» Thermal Management / Loop Heat Pipe (LHP) Wicking Media
» Propellant & Monopropellant Conditioning (Hydrazine, Xenon feed)
» Particulate & Microbial Barrier Filtration for Recycled Fluids

WHY MOTT FOR ECLSS?

» Flight Heritage: Supported NASA, commercial space, defense, and scientific missions.
» Engineered Porosity: Tight control over pore size distribution for predictable performance.
» Material Range: 316L SS, Titanium, Niobium, Zirconium, Hastelloy®, custom alloys.
» Additive Manufacturing (AM): Lightweight, integrated designs reduce joints and leak risk.
» Testing & Qualification: Cleanliness, burst/pressure, flow, and leak validation to aerospace specs.

Engineering Support: CFD modeling, rapid prototyping, and aerospace-grade validation for oxygen, hydrazine, and thermal systems.

WWW.MOTTCORP.COM / 860-747-6333 / INFO@MOTTCORP.COM / 84 SPRING LANE, FARMINGTON, CT 06032

PRODUCT MATRIX – CONFIGURABLE ECLSS COMPONENTS

Representative options. Many pore sizes, geometries, and alloys available. Ask about custom assemblies.

Application	Product Family	Configurable Parameters	Typical Materials	Notes / Use Case
Oxygen Generation & Cleanup	Porous Flow Discs / Cylinders	Pore size, permeability, OD/ID	316L, Ti, Niobium	Uniform gas distribution; catalyst support beds.
Crew / Spacesuit Air Filtration	Gas Filters / Metal Media Elements	Micron rating, DP, housing interface	316L, Hastelloy	Fine particulate capture; breathable air quality.
Water Recovery & Reclamation	Liquid Filters / Depth Media	Surface area, porosity gradient	316L, Duplex SS	Pre- or post-treatment polish; reclaim loops.
Atmosphere Sampling & Scientific Payloads	Precision Flow Restrictors	Cv range, leak rate, port style	316L, Ti	Stable low-flow metering for analytical systems.
Flame Arrestor Protection	Sintered Porous Flame Arrestors	Element length, burst rating	316L, Inconel®	Ignition mitigation in mixed-gas lines.
Thermal Management / LHP	Wicking & Phase-Separation Media	Capillary pore size, thickness	316L, Ti	Supports Loop Heat Pipes & evaporator surfaces.
Propellant / Hydrazine Systems*	Hydrazine Flow Restrictors & Last-Chance Filters	Flow coeff., compatibility, cleanliness	316L, CRES	Verify chemistry; not for water service (per Alex's note).

SPECIFICATION

Spec Parameter	Value / Range
Specification	Details
Media Grades	0.1–100 µm
Common Alloys	316L SS, Titanium, Inconel, Hastelloy, Monel, Nickel 200
Sheet Thickness	0.007" to 0.125"
Tube Sizes	OD 0.250–1.000"; ID 0.125–0.750"; Length 6–24"
Operating Pressure	–14.7 to 10,000 psig (application-specific)
Operating Temp	–100 to 700 °F; high-temp alloys to 1,700 °F
Leak Rate	≤1×10^–6 sccs He
Particle Removal	≥99.9%; MIL-STD-1246, HEPA up to 99.999%
Differential Pressure	Up to 3,000 psi

Ready to configure an ECLSS filter or flow assembly? Email: info@mottcorp.com | Visit: mottcorp.com/applications/aerospace-defense/

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AIR FILTERS – STANDARD CONFIGURATIONS

Part Number	OD (in)	Length (in)	Typical Weight	Typical Fluids	Typical Flowrate	Max Burst Pressure (psi)
PN 1-XXXX	0.5	3	–	–	–	15,000
PN 2-XXXX	1.0	3	–	–	–	15,000
PN 3-XXXX	1.0	3	–	–	–	5,000
PN 4-XXXX	1.5	3	–	–	–	15,000
PN 5-XXXX	1.5	3	–	–	–	15,000
PN 6-XXXX	1.5	3	–	–	–	5,000
PN 7-XXXX	1.5	4	–	–	–	5,000
PN 8-XXXX	3.0	8	–	–	–	15,000
PN 9-XXXX	3.0	12	–	–	–	15,000
PN 10-XXXX	3.0	12	–	–	–	15,000
PN 11-XXXX	5.0	5	–	–	–	15,000
PN 12-XXXX	5.0	10	–	–	–	15,000
PN 13-XXXX	7.5	10	–	–	–	5,000
PN 14-XXXX	7.5	15	–	–	–	5,000
PN 15-XXXX	10.0	15	–	–	–	5,000
PN 16-XXXX	10.0	20	–	–	–	5,000

WATER FILTERS – STANDARD CONFIGURATIONS

Part Number	OD (in)	Length (in)	Typical Weight	Typical Fluids	Typical Flowrate	Max Burst Pressure (psi)
PN 1-XXXX	0.25	3	–	–	–	15,000
PN 2-XXXX	0.5	3	–	–	–	15,000
PN 3-XXXX	1.0	3	–	–	–	15,000