

Syntactic Foam For Use As a Noise Suppressor

A process for manufacturing syntactic foams with micro-sphere inclusions for use as a noise suppression

Inventors at Georgia Tech have developed a novel process for manufacturing urethane syntactic foams with polystyrene microsphere inclusions. The material is designed as a noise suppression component that can be used to replace conventional bladder-style liners in hydraulic systems. Inserting the syntactic foam liner allows more efficient operation in high pressure processes by mechanically reinforcing the microsphere void particles. The process uses a “charge gas” to over-pressurize the polystyrene microspheres that are infused within the host urethane matrix structure. The special tailoring enhances the overall physical material properties by preventing the microspheres from compressing, shrinking, and stiffening the foam structure. The simple 2-step modification process allows the foam to retain noise reduction compliance at elevated operating pressures of 35 MPa and higher.

Summary Bullets

- Reduces pressure pulses from “fluid-borne noise” which fatigue mechanical seals and cause system leaks
- Reduces “structure-borne vibrations” that create operator discomfort and make it difficult to control tasks that require precision
- Reduces “air-borne noise” that disrupts work-site communication and creates a hazardous work environment

Solution Advantages

- Reduces pressure pulses from “fluid-borne noise” which fatigue mechanical seals and cause system leaks
- Reduces “structure-borne vibrations” that create operator discomfort and make it difficult to control tasks that require precision
- Reduces “air-borne noise” that disrupts work-site communication and creates a hazardous work environment
- Allows syntactic foam to be used in high-pressure applications above the current operating limit of 7 MPa

Potential Commercial Applications

- Replacements for the “bladder” component of conventional in-line noise suppressors
- High pressure hydraulic applications
- Construction applications
- In off-road and on-road vehicles

- Any process or system that includes pumps or actuators

Background and More Information

Syntactic Foams are closed-cell composite materials that have low densities, high specific strengths, and low thermal expansion coefficients. They are commonly used in marine buoyancy and acoustic damping applications, but there is an opportunity to expand usage in industrial applications that are subject to high decibel fluid-borne, air-borne, and structural vibration noises. Efficiently damping noise in high pressure hydraulic processes allows for greater health and environmental compliance and improved control of equipment in tasks requiring high precision.

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