



Active Cooling Systems

Thermal Management Solutions for eVTOL Industry

As today's electronics become more compact and powerful, the demand for more efficient thermal management strategies is critical to performance.



RESERVOIR FOR eVTOL BATTERY COOLING SYSTEM

Our customer needed to manage large volume changes in their water battery cooling system with a maintenance free reservoir. As an integral part of the cooling system on an electric aircraft, the reservoir had to be a high reliability solution which would be designed for the life of the aircraft.

SMB's all welded titanium bellows reservoir design provided a low weight solution in a very limited installation window.

This is another example of a customer bringing a difficult technical challenge to SMB's engineering and leaving with a solution that is both cost effective and technically robust.



VOLUME COMPENSATOR FOR eVTOL PROPULSION ELECTRONICS COOLING SYSTEM

Our customer developed an eVTOL aircraft with an advanced liquid cooling loop for the electric propulsion system.

Without robust cooling solutions, the massive amount of waste heat generated by the electrical equipment can damage the electronics, batteries, and propulsion equipment, which may potentially cause failures.

SMB developed a maintenance-free, light-weight titanium metal bellows volume compensator directly integrated into the propulsion system. The bellows volume compensator maintains proper fluid pressure while also managing the thermal expansion of the coolant fluid.

VOLUME COMPENSATOR FOR eVTOL COOLING SYSTEM

APPLICATION

Our customer needed a light weight volume compensator to allow for the thermal expansion of the coolant fluid in the primary electronics cooling system power supply for an eVTOL aircraft application.

PROBLEM

- Assembly was required to withstand aircraft shock loads/flight environment
- Assembly must support fluid weight without motion or significantly influencing performance and final system pressures
- Assembly must compensate for thermally induced volume changes with minimal pressure increase within a restricted envelope

SOLUTION

Senior Metal Bellows provided an all titanium square welded metal bellows with special vibration dampening to create a maintenance-free volume compensator with:

- Ultra-low weight and limited installation space
- Minimal pressure increases while maintaining consistent steady fluid flow
- Lower life cycle costs
- Zero leakage due to hermetically sealed bellows design
- Proven capabilities over extreme temperature range

● **LET'S TALK!**

For any questions or to engage with our technical team, please contact us at

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