

CASE STUDY

Custom rupture discs protect vital power equipment during space missions



THE CHALLENGE

A space exploration company contacted us to discuss pressure safety management for the lithium-ion battery system on their spacecraft. They were proposing to install solar panels for power generation, with a li-ion battery system for storage and distribution. They needed a pressure management solution that would support safe normal battery function in extreme conditions, yet also vent excess gas and heat in the event of an emergency battery fault or thermal runaway.

CONDITIONS IN SPACE

Rupture discs used in space must operate reliably in some of the harshest conditions imaginable:

- Hard vacuum impacts the leak, flow, and burst characteristics of the discs;
- Extreme thermal cycling from sub-zero cryogenic propellants to direct sunlight must not fatigue the disc material and affect performance;
- High vibration, shock, and acoustic loads during launch and deployment must not trigger premature opening;
- The disc must remain unaffected by long-term exposure to UV and ionizing radiation.

THE SOLUTION

Working with the customer's engineers, we established the parameters for the rupture disc sizes, shapes, weights and burst pressures. We then selected the most suitable disc types for the conditions in space, customizing the materials, sizes, disc designs, and connection fittings to ensure perfect performance and direct, easy integration into the battery system.

RUPTURE DISC SOLUTIONS SELECTED

- **PRO-LP:** The PRO-LP Low Pressure Disc combines fast, accurate, reliable opening with an ultra low-profile, holderless design to save space.
- **PCR:** The PCR is designed to perform reliably at high pressures without fragmenting. It excels in extreme cycling and high vacuum/back pressure conditions.
- **HPSR:** The HPSR's welded design eliminates leak paths and allows for easy installation. The robust disc withstands full vacuum, very high cycling conditions and temperatures up to 600°F.



Let's talk mission success

Contact us today for a no-obligation discussion to explore how our advanced rupture disc designs can help you push the frontiers of technology - on land, at sea, in the air, and in space.

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