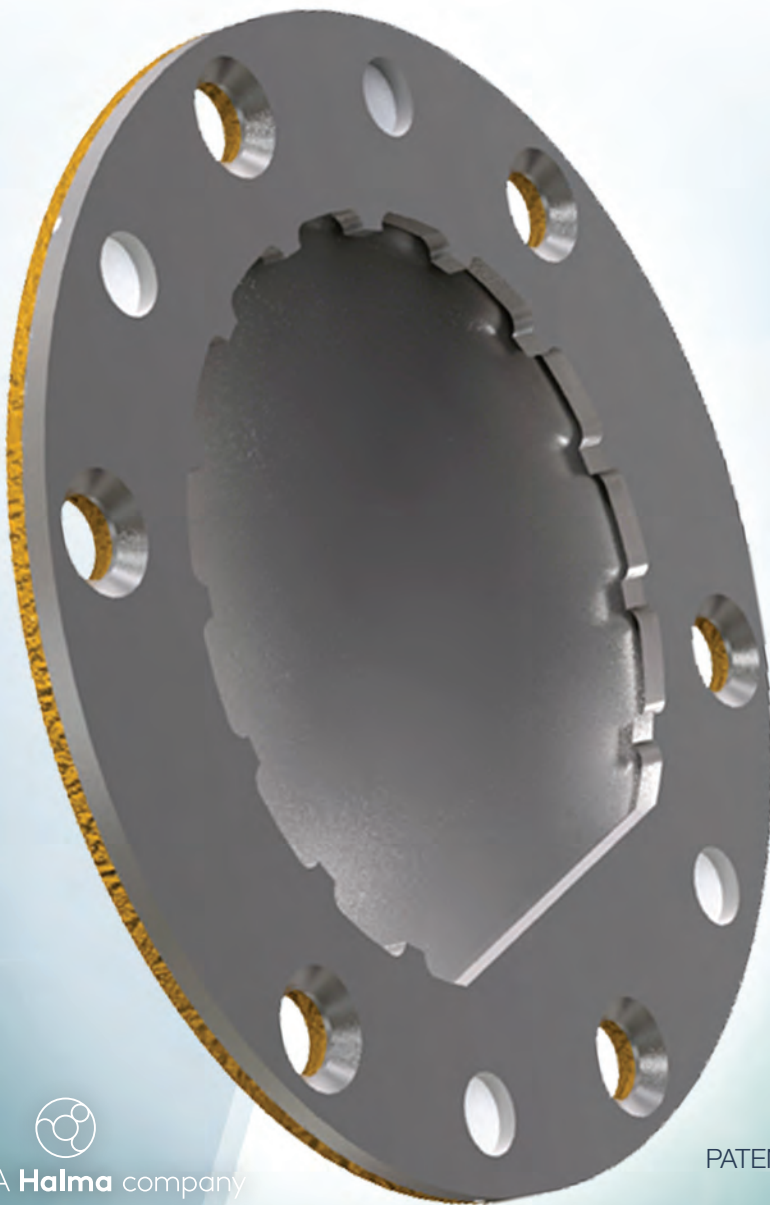


# DUAL-GARD

PRESSURE EQUALIZATION AND RELIEF  
FROM A SINGLE LOCATION

*Dual-Gard integrates a breathing membrane with a metal rupture disc or vent to combine pressure equalization and pressure relief into a single device.*



# Overcome battery safety challenges with OsecoElfab

Drawing on years of research and industry experience, OsecoElfab actively supports the energy applications of the future. Customers have asked for solutions to these common challenges, and the *Dual-Gard device for breathing and venting delivers*.

1

## GUARD AGAINST PROPAGATION

### COMBINE BREATHING MEMBRANE WITH A DISC

- IP-rated membrane constantly equalizes pressure to prevent swelling and contracting
- Metal disc activates within 5 milliseconds to help maintain the integrity of the battery enclosure in an outgassing event
- Full-bore opening provides rapid pressure relief

2

## OVERCOME SPACE LIMITATIONS

### SINGLE VENTING LOCATION

- Both breathing and outgassing can be funneled through one location, using a single pipe, hose or duct to vent all gases from one common area
- Improved ability to control and disperse flammable vent gases
- Low profile design with customizable bolt holes and patterns. No need for a holder.

3

## REDUCE INVENTORY, ASSEMBLY AND INTEGRATION COSTS

### ELIMINATE ADDITIONAL COMPONENTS

- Less inventory to manage
- Fewer machined or cast features enables a less expensive battery enclosure
- Simple and clean battery design is quicker to assemble and easier to integrate
- Reduction in assembly of multiple components

4

## CUSTOMIZE FOR DIFFERENT APPLICATIONS

### SCALABLE BREATHING AREA

- Customizable breathing area to fit different pressure equalization requirements
- Number, size and shape of venting holes can increase or decrease the breathing area depending on the flow requirements of a particular enclosure
- Disc and gasket options also configurable
- Mount the disc inside or outside the enclosure



# DUAL-GARD

**BREATHING AND VENTING FROM A SINGLE LOCATION**

**Dual-Gard is a dual device integrating pressure equalization and full-bore opening pressure relief into a single disc or vent.**

Dual-Gard offers an additional breathing function that allows air and other gases to move in and out of the enclosure. This equalizes internal and external pressures to prevent a build-up of gas and pressure, and guard against any swelling or contracting of the enclosure. In an emergency venting situation, the metal disc or vent will operate as usual to relieve overpressure quickly and safely.

The IP rated membrane allows air/gas flow for pressure equalization while protecting against dust, dirt, oil and water ingress.

The patent pending design is fully customizable and can be integrated into any metal disc or explosion vent, for any application requiring ongoing pressure equalization alongside rapid overpressure relief.

**OsecoElfab's unique design solution for the challenges of pressure relief in new energy storage technologies.**

- Breathable for pressure equalization
- Rapid, full-bore venting
- Single venting location
- Maintains enclosure integrity
- Combines with our metal discs and vents

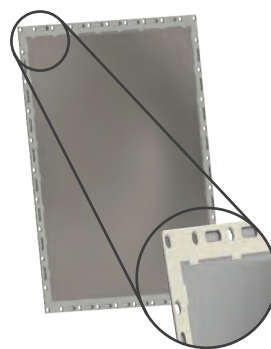
**Hydrophobic and oleophobic:**  
Porous and breathable membrane filters out dirt, water and oils

**Durable:**  
PTFE membrane is IP rated to IPX

**Versatile:**  
Patent encompasses all configurations with our current product offering

**Proven:**  
Standard design incorporates the current tried-and-tested Pro-LP disc

## Fully Customizable



The membrane can be customized to fit our metal discs or vents



Additional slots allow the membrane to free flow air and increase the flow rate



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