

steel

- Failsafe safety
- Minimal maintenance workload (regular visual inspection)
- Opening pressures achievable from 25 mbar – including for extensive explosion vents
- Permanent tightness throughout the entire life cycle of the battery systems (IP66)
- Isolation cassettes are optionally available to avoid dropping below the dew point

The combination of both products forms the basis for an optimally designed protective system, consisting of preventative and constructive fire protection and explosion safety.

### REMBE's contribution towards improving safety

REMBE GmbH Safety + Control is the market leader in the fields of explosion safety and explosion venting and can draw on almost 50 years of experience. The expertise covers the following range of services:

#### Consulting.

- Support in developing adequate, project-specific safety concepts for battery systems
- Explosion-related calculations (e.g. calculation of explosion venting surfaces) according to national and international standards

#### Engineering.

- Testing and validation of protective measures at the accredited testing laboratory REMBE Research + Technology Center GmbH, e.g.:
- Fire and explosion tests with prototypes under practical conditions
- Testing of explosion pressure resistance or flame penetration tests for battery housings
- Development of flameless explosion venting systems to prevent explosive flames and flying debris

#### Products.

- Accredited products according to national and international standards
- Special solutions and dimensions available as series products

#### Service.

- Maintenance und regular inspection



Fig. 6: GSME gas sensor

About REMBE – the REMBE Alliance introduces itself

Most people associate REMBE with REMBE GmbH Safety + Control, the specialist for explosion safety and explosion venting worldwide. The company offers customers cross-

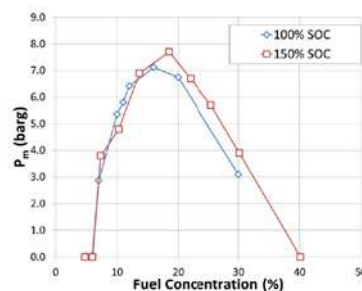


Fig. 7: Max. explosion pressure for combustion in a 20-litre vessel as part of thermal runaway for a 8.7-Wh cell with a state of charge SOC of 100% (Exponent Inc. – Thermal Runaway and Safety of Large Lithium-Ion Battery Systems – 2015)

industry safety concepts for plants and equipment. All products are manufactured in Germany and meet the requirements of national and international regulations. REMBE customers include market leaders in various industries, including the food, timber, chemical and pharmaceutical industries.

The company's engineering expertise is based on more than 45 years of

application and project experience. As an independent, owner-managed family business, REMBE combines expertise with the highest quality standards and is involved in various specialist committees worldwide. Short coordination paths allow for



Fig. 8: Explosion vent with isolation cassette

quick reactions and customer-specific solutions for all applications, from standard products to high-tech special designs. In addition to REMBE GmbH Safety + Control ([www.rembe.de](http://www.rembe.de)) with approx. 280 employees worldwide, headquartered in Brilon (Hochsauerland, Germany), and numerous subsidiaries worldwide (Italy, Finland, Brazil, USA, China, Dubai, Singapore, South Africa, Japan), four other companies operate under the REMBE umbrella brand:

- REMBE Research & Technology Center GmbH ([www.rembe-rtc.de](http://www.rembe-rtc.de))
- REMBE Advanced Services + Solutions GmbH ([www.rembe-services.de](http://www.rembe-services.de))
- REMBE Kersting GmbH ([www.rembe-kersting.de](http://www.rembe-kersting.de))
- REMBE FibreForce GmbH ([www.argusline.de](http://www.argusline.de))