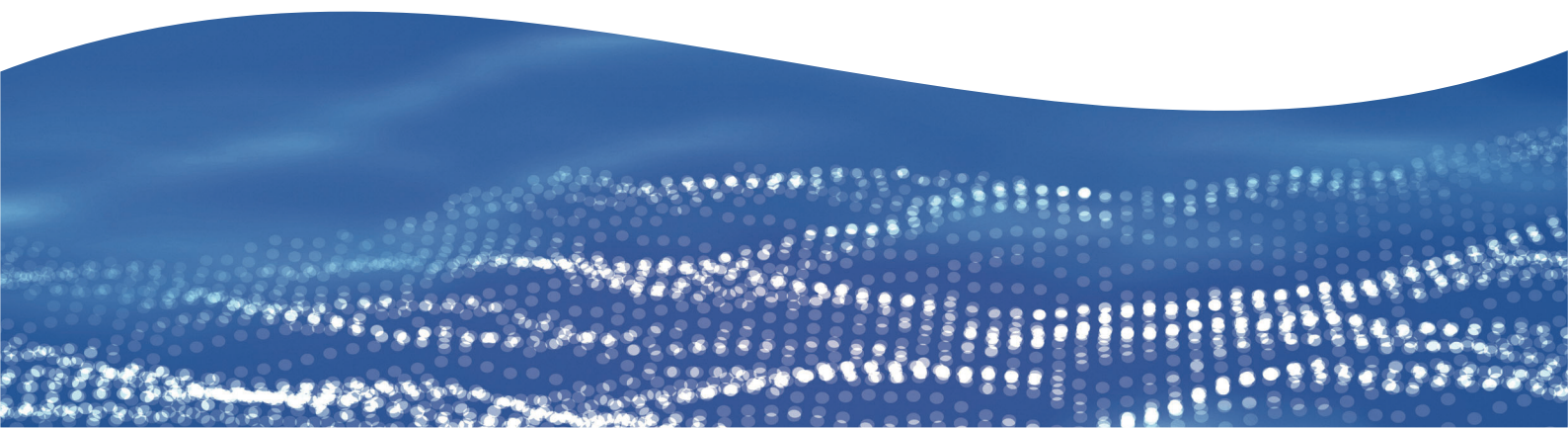




# **Battery Packs in Pressure Housings**

**IMCA D 002**  
**March 2021**





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#### **IMCA D 002 – Version History**

Date	Reason	Revision
March 2021	Minor Updates	Rev. 1
July 2016	Minor updates made during review process	Rev. 0.1
January 1996	Initial publication	Rev. 0

# Battery Packs in Pressure Housings

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## **1 Objectives**

The objectives are to:

- a) draw attention to the problems which can arise with battery packs when used in pressure housings;
- b) provide guidance on their fitting and operation.

## **2 Application**

This guidance is intended to apply internationally, but it is recognised that some countries will have regulations that require different standards or practices to be followed. Where local or national regulations are more stringent than those contained herein, they will always take precedence over this guidance.

## **3 Background**

An incident occurred involving a bell external battery assembly when the bursting disc fitted to the bottom of the pressure housing ruptured discharging the contents with considerable force. It was, in effect, a small explosion resulting in a significant gas and fume discharge with a high potential for serious injury to personnel.

## **4 Causal Factors**

The immediate cause was found to be an electrical short-circuit. This resulted in a power drain on the battery leading to heat generation which promoted further cell breakdown, further short-circuiting, overheating and pressure build up in the casing followed eventually by violent venting from the battery casing via the bursting disc.

It was not possible to establish beyond doubt:

- a) the cause of the initial short circuit. It is known however that the battery was 10 years old and was not protected by a shunt diode;
- b) whether there had been insulation on the negative lead.

## **5 Recommendations**

The following criteria should be observed:

1. Batteries should always be used in accordance with manufacturers' recommendations.
2. Installation, maintenance, and servicing of battery packs in pressure housings should only be performed by a competent person.
3. Battery terminals/leads should be clearly marked as to their use and must be adequately insulated to protect against short circuit.
4. Periodic examination, testing and renewal of the cells as necessary should be included within the planned maintenance system.
5. As a general rule, shunt diodes should be provided across each cell of a primary battery to avoid the possibility of polarity-reversal occurring in any cell under discharge conditions.
6. The battery housing must be fitted with an appropriate pressure relief device, sited to discharge to a safe place if activated unexpectedly.

7. Batteries should be charged in line with the guidance given in [IMCA D 055 – Prevention of explosions during battery charging in relation to diving systems](#).
8. The battery casing should only be opened in a well-ventilated space. Consideration should be given to purging the housing with air prior to opening. Suitable eye and respiratory protection should be worn in case of a sudden release of pressure and noxious fumes which may be harmful if inhaled.
9. Lead acid batteries should not be used in a hyperbaric environment.
10. Battery packs being put into storage should be suitably prepared for the length of time envisaged. Manufacturers recommendations for storage, maintenance and testing should be followed.

#### References

1. [IMCA D 055 – Prevention of explosions during battery charging in relation to diving systems](#)
2. [IMCA D 024 – DESIGN for saturation \(bell\) diving systems](#)