



THE POWER OF RELIABILITY





A WORLD CLASS LEADER IN THERMAL BATTERIES

The European leader and number two in the world in a very high technical, added value sector, the ASB Group specialises in the research, design and manufacture of **Thermal Batteries**.

Our products are the result of a **partnership** with those involved in the world of **high technology, aeronautics, space, defence and energy**.

Resulting from its technological expertise, ASB has created a division specialising in **glass-to-metal seals**: ASB Hermetics.

EXPERIENCE AND MASTERY OF EMERGENCY ENERGY

With manufacturing facilities in **France** (ASB - Bourges), the **United Kingdom** (MSB - Glasgow), and the **United States** (ATB - Cockeysville, Maryland), ASB Group enjoys the benefit of 60 years experience and the support of reliable parent companies known for their high level of expertise: **EADS and SAFT**.

ASB Group is able to provide **emergency energy solutions** in every industrial sector. The main advantages of these include:

- **Exceptional reliability levels (over 99.95%),**
- **Operation in extreme conditions,**
- **Storage life over 15 years without maintenance,**
- **Adaptation to suit specific requirements.**



INNOVATION BASED ON EXPECTATIONS

ASB Group relies on closely held **values** to enable it make a difference in this sector.

Quality, for meeting the toughest specifications

ASB Group markets high quality thermal batteries with remarkable performance levels. Its ongoing research is applied not only in the actual design, but in every phase of production and product control.

Our energy sources at the service of our customers

ASB Group sees its mission as working in a close partnership with its customers. The Commercial/Programme Manager provides a coherent, consistent and transparent flow of information thanks to continuous dialogue regarding technical details from the point of specification to completion of development. Respect for customer requirements is also guaranteed with the same degree of rigour and professionalism.

Research and development

ASB Group's unique technical skills are continually improved through its self-funded research programmes. The Group's aim is to anticipate tomorrow's needs today and make tomorrow's technology available to the industry of today.

OUR COMMITMENT TO QUALITY

Our three Design and Manufacturing facilities are certified **ISO-9001** and **EN/AS-9100**, and employ 180 people. To date 3 million batteries have been produced, from 250 different designs. ASB Group offers a wide range of tested solutions **to satisfy very high requirements.**



ASB



MSB



ATB



THE THERMAL BATTERY, AN IDEAL SOURCE OF RESERVE ENERGY



The thermal battery is designed for single use and is completely inert until activated. As such, it is an exceptionally reliable specific energy source.

Our thermal battery can have a **maintenance free** storage life in excess of 15 years before activation, which can be as fast as tenths of a second. As well as functioning in harsh mechanical and climatic environments, thermal batteries offer the **highest specific power performance**.

All thermal batteries are **custom designed** and built to meet specifications such as single and multi-output power requirements, life span including active duration, size, weight, etc.

APPLICATIONS DEFINED FOR HIGH-TECH INDUSTRIES LOOKING TO COMBINE ENERGY AND SAFETY

Traditional fields...

ASB Group's thermal batteries are a factor in the success of all current major aeronautical, space and defence projects in Europe, USA and across the world. The most prestigious names in the field of aeronautics are loyal clients of ASB Group.

... And new users

Thermal batteries are just as widely used in **industrial safety systems** eg. oil-drilling, nuclear power and industrial risk detection. Their future applications will be those that you ask us to create. Our research department is at your disposal to explore innovative solutions along with you in order to guarantee an optimum energy reserve.



THE EXPERTISE AND SERVICE OF THE FUTURE

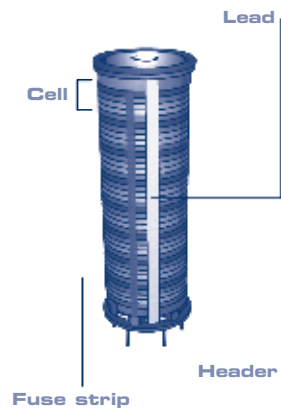
The power of experience for a custom design

ASB Group's thermal batteries are designed **to satisfy all your needs and expectations**. Every design is based on a combination of experience and expertise, including the **Ether** thermal battery design programme unique to ASB Group.

Innovation for and with our partners

ASB and MSB, in their continuous quest for **innovative solutions** for their client's specific needs, have combined their skills to develop a strategy for improvement such as:

- A search for new materials less harmful to the environment,
- An increase in the specific energy and lifetime of thermal batteries.



EXCLUSIVE TECHNOLOGY

As well as the technology based on lithium alloys (Al-Li and Li-Si), ASB Group also offers **unique lithium anode technology (LAN)**, particularly suitable for the production of high-power thermal batteries with optimum specific power performance levels (watt/kg).

Among other exclusive processes, ASB Group has developed the 3-layer pellet manufacturing, combining the anode, electrolyte and cathode compression.

CURRENT PERFORMANCE RANGE	
Voltage	from 2 to 200 V. Thermal batteries can be installed in parallel and in series. Eg. to satisfy a standard requirement of 270 V
Current	from milliamps to 310 A, with density up to 2 A/cm²
Power	up to 9 kW, 25 kW peak
Specific energy	up to 120 Wh/kg, combined with high discharge rates
Discharge time	0.5 seconds to 2 hours
Activation time	from 30 milliseconds upwards
Size	from diam. 18 mm x L 22 mm to diam. 180 mm x L 400 mm



PRODUCTION WITH EXCELLENCE

The very best quality

From the design stage onwards, the industrialisation of the product is of key importance to ensure that the customers **high quality** expectations are met. To achieve this, ASB Group controls both raw materials and finished products and undertakes all the crucial testing of the manufacturing process on site. All this is based on a policy of **continuous improvement**, provided through the international **"World Class"** programme.

Flexibility of production

A distinctive feature of the ASB Group's production is **flexibility**, thus allowing us to produce at short notice **small and large volumes** at three sites.



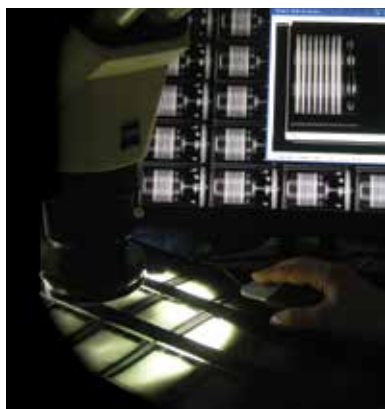
AN EVOLVING RANGE

A comprehensive and ever-increasing range

In addition to traditional thermal battery sectors, ASB Group is continually improving the performance levels of **high power energy** applications for thermal batteries.

Comprehensive product

We can offer a range of integrated solutions to meet any customer requirement, from an electrical interconnect or mechanical fixation stand point.



EXCLUSIVE KNOW-HOW ON GLASS-TO-METAL SEALS

Resulting from its technological skills, ASB Group in 1998 created ASB Hermetics, a division for the development, production and marketing of hermetic sealing.

Our **hermetic seals** allow electrical and electronic information to pass through a medium separating two environments, using glass-to-metal seal technology. Common applications are different industrial sectors, such as **aeronautics, medicine, optics, defence and off-shore oil industry.**

Innovation

To meet various requirements, ASB Hermetics has developed a whole range of metallic substances, allowing several different glass-metal combinations to be assembled. As well as **traditional sealing** (compression and matched glass), ASB Hermetics can produce **special sealing** with materials never used before in this technology : **aluminium & titanium.**



Expertise and skill

The **materials chosen** and the **excellence of the manufacturing** processes allow the performance of the products, all controlled according to Standard MIL-STD 883, to be optimised.

Where necessary, glass-to-metal seals are produced with high performance levels that comply with other relevant standards. From the design stage onwards, an optimum balance between price and performance can be achieved.

An ultra-competitive production tool

ASB Hermetics has **highly efficient production mechanisms** with the **most up-to-date modelling equipment**, including hydrogen seal ovens and heat treatment ovens.

Product quality is guaranteed due to a number of control devices, such as helium leak detectors, dielectric meter, rigidity test, pressure test bench, vibrating jar for monitoring resistance to heavy vibration, cold/hot incubator and X-rays.

MATERIALS USED

Casing:

- Stainless steel
- Inconel®
- FeNi
- FeNiCo
- Titanium
- Aluminium
- Brass
- Steel

Pin:

- FeNi
- FeNiCo
- FeCo
- Copper beryllium



CHARACTERISTICS

- **Insulation** (10 000 Mohm at 500 volt)
- **Rigidity** (1500 V)
- **Hermetic levels** (helium leak rate $< 1 \cdot 10^{-10}$ atm.cm³/s)

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THERMAL BATTERIES



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