



Case Study: Battery Bag

Morgan Advanced Materials and
German Wings

The challenge

German Wings were looking for a solution to combat the issues that come with the transportation of lithium-based batteries on civil aircraft.

These batteries are generally reliable one issue with them is their ability, in a small number of cases, to overheat and catch fire. While this may be less of an issue and more easily contained in land-based environments or other modes of transport, the prospect of a fire is something which simply cannot be countenanced in the enclosed space of an aircraft, which may be carrying several hundred passengers, as well as crew.

These batteries are subject to the problem of thermal runaway. This can be defined as auto-acceleration of heat generation, with a rapid temperature increase, characterised by the expulsion of flammable gases and liquids from the product casing. Put simply, just one battery overheating can result in a matter of a few minutes in an uncontrollable fire, explosion or pressure wave - or even all three. A number of very serious incidents have occurred over the years, bringing them to the attention of international aviation authorities who have taken strong measures to increase the safety surrounding their transportation as cargo.

However, these batteries are still carried by thousands of passengers and with their propensity to overheat, they pose a constant danger.

The key challenge is to prevent propagation between cells, modules, packaging and surroundings – on an aircraft, the aim is to extend the time available for emergency measures to be employed and for safe landing to occur.

Why German Wings partnered with Morgan

Morgan Advanced had the innovative solution to the issues associated with the lithium batteries that German Wings was looking for. Morgan's expertise in the area of high-performance insulation to prevent the spread of thermal energy is globally renowned, not least in the supply of materials used to encapsulate flight data recorder FDR and cockpit voice recorder (CVR) products, and perhaps even more so in the Oil & Gas sector where its FireMaster® Marine Plus Blanket used to surround the living quarters in offshore extraction facilities, protecting the structure to allow sufficient time for those working on the rig to escape in case of a fire outbreak

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The result

Recognising the problems associated with overheating batteries and the need to minimise fire risk and provide insulation to contain heat spread, Morgan set out to harness the capabilities of its extensive range of state-of-the-art insulation technologies to develop a solution.

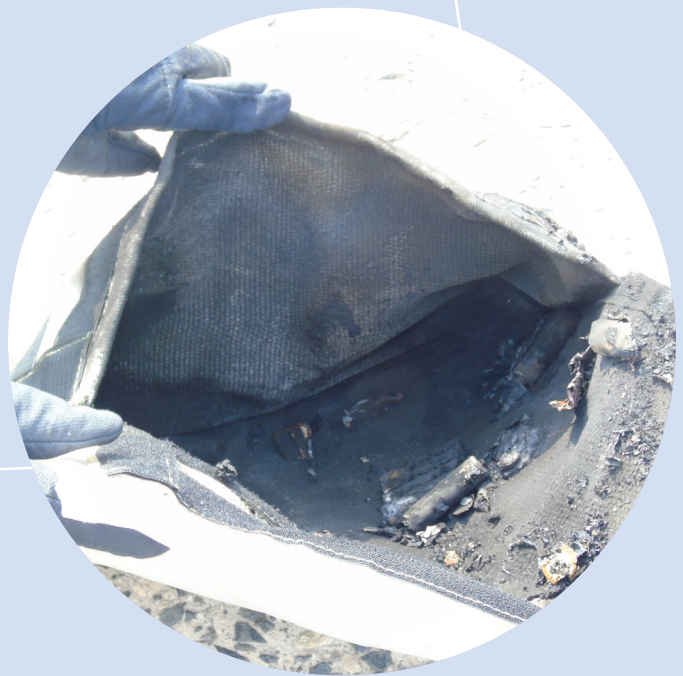
Working in partnership with German Wings, various configurations and combinations of Morgan's material range were examined and considered to contain heat and fire, minimise further fire risk and counter the issue of heat transfer.

The result was the battery bag solution. The ideal bag solution uses at its core the same product – FireMaster Marine Plus blanket, which is typically used to protect FRP composite, steel and aluminium structures for extended periods.

The outer layer comprises a silicone-coated glass cloth and hook-and-loop tape fastener to secure the bag once the contents had been placed inside. The materials have been chosen to maintain their integrity even when they come into contact with water, which can be added immediately to help cool down the overheated battery.

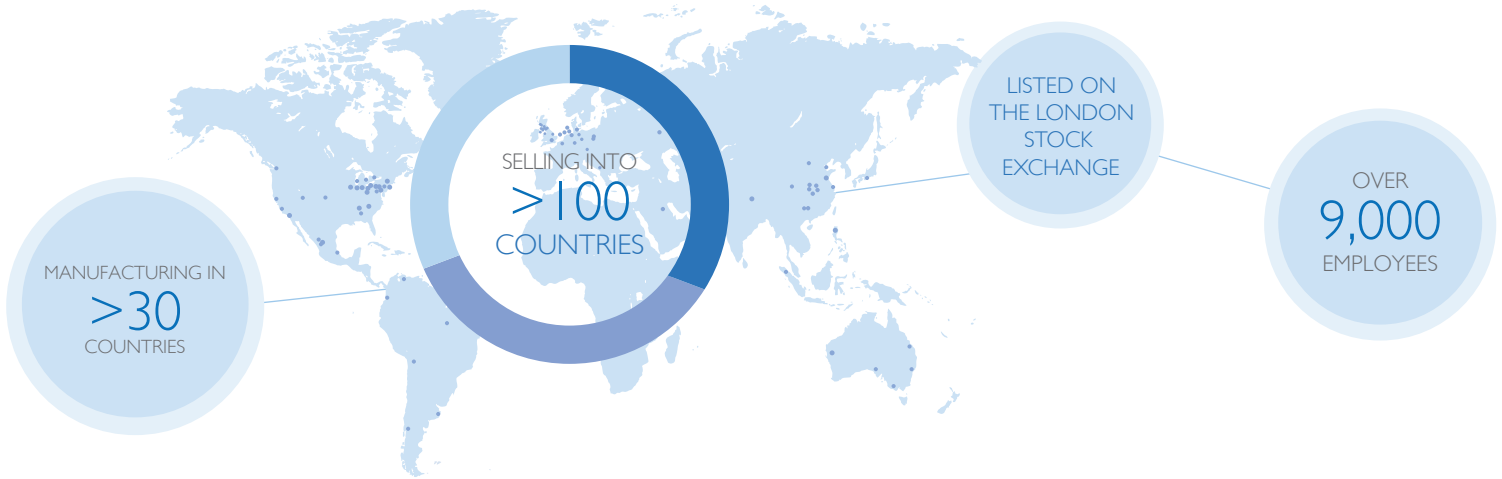
The bags have been extensively tested together with Germanwings, which is part of the Lufthansa group.

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ABOUT MORGAN ADVANCED MATERIALS



Morgan Advanced Materials is a global engineering company offering world-leading competencies in materials science, specialist manufacturing and applications engineering.

We focus our resources on the delivery of products that help our customers to solve technically challenging Problems, enabling them to address global trends such as energy demand, advances in healthcare and environmental sustainability.

What differentiates us?

- Advanced material science and processing capabilities
- Extensive applications engineering experience
- A strong history of innovation and reinvention
- Consistent and reliable performance
- A truly global footprint
- We find and invest in the best people

For all enquiries, please contact our specialist sales and manufacturing sites:

Europe

Morgan Advanced Materials
Morgan Drive
Stourport-on-Severn
Worcestershire DY13 8DW
United Kingdom

T +44 (0) 1299 872210
F +44 (0) 1299 872218
europesales@morganplc.com

North America

Morgan Advanced Materials
4000 Westchase Boulevard
Suite 170, Raleigh,
NC 27607-3970
USA

T +1 (855) 809 9571
F +1 (706) 622 4424
nasales@morganplc.com

South America

Morgan Advanced Materials
Avenida do Taboão 3265- São
Bernardo do Campo - SP
CEP 09656 000
Brasil

T +55 (11) 4075 0400
F +55 (11) 4075 7547
sasales@morganplc.com

Asia

Morgan Advanced Materials
150 Kampong Ampat
05-06A
KA Centre
Singapore 368324

T +65 6595 0000
F +65 6595 0005
asiasales@morganplc.com

Morgan Advanced Materials plc
Quadrant, 55-57 High Street,
Windsor, Berkshire, SL4 1LP United Kingdom