

Permal Gloucester Limited - Leading Composite Defence Solutions

Permal Gloucester Limited, established since 1937, manufactures fibre-reinforced composite materials used in a wide range of product solutions for Air, Land, Sea and infrastructure platforms.

Extensive Market Experience

Other markets in which Permal's products are used include:

- Aerospace;
- Medical;
- Automotive;
- Rail.

Defence

Permal have designed, developed and supplied light weight composite solutions for a wide range of defence programmes including:

- CVR(T) reconnaissance vehicle appliqué armour.
- Warthog and Viking vehicle appliqué armour and spall liners.
- Panther vehicle moulded composite roof.
- Titan & Trojan Armoured vehicle spall liners.
- WMIK Land Rover moulded composite floor.
- Nexter VBCI spall liners, thermal insulation and floor panels.
- Explosive Ordnance Disposal (EOD) vehicle protection kits.
- Chinook, Merlin and Sea King cockpit and cabin armour.
- UK and overseas surface ship stanchions and safety net systems.
- Ballistic protection panels and shields.

The company operates from a 10,500 m² facility to the south of Gloucester city centre and close to the M5 motorway. Permal is a security cleared organisation.

Defence Products

The range of Permal Defence products include:

- Ballistic armour systems including appliqué armour, spall liners and shields;
- Structural sandwich panels;
- Fire resistant, low smoke interior panelling;
- Structural and insulating foams;
- Stanchions and flight deck safety net systems;
- Structural, blast and ballistic composite mouldings;
- Polyurethane films and spray coatings.

Manufacturing

Permal operates an integrated composites manufacturing facility, with the ability to process glass, aramid, UHMWPE and other fibres, as well as a wide range of resins and thermoplastic matrices.

In-house capabilities include:

- Resin impregnation of glass and aramid fabrics.
- Press lamination of flat panels (including high pressure pressing of UHMWPE).
- Moulding and vacuum bag bonding of complex composite shapes.
- Ceramic tile encapsulation and metallic combinations.
- Resin infusion moulding and resin transfer moulding
- Precision 5 axis and 3 axis CNC machining.
- Waterjet cutting.
- Bonding and assembly operations.
- Polyurethane spray coating.
- Polyurethane blown film manufacture.

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Research, Design & Development

Permal operates a process of continuous R&D and material development to meet the current and future needs of our customers.

Prototyping and pilot scale manufacturing allows material solutions to be quickly developed, and an on-site laboratory allows for most mechanical and flammability testing to be performed in-house.

Ballistic and mine blast testing is performed at a number of independent and approved test ranges.

Permal has 2D and 3D CAD facilities and the ability to exchange CAD data with most of the major CAD packages used by our customers and suppliers.

Current Developments

Based on our experience and expertise, and using in-house R&D processes, Permal have developed and tested the following high TRL solutions:

- Composites for use as vehicle structures and primary mine blast protection;
- High performance ceramic solutions for heavy machine gun protection;
- Ultra lightweight ceramic armour for aircraft applications;
- Infrastructure protection panels.

Quality

Permal are AS9100 and ISO 9001:2008 registered and operate an approved quality controlled design and manufacturing process.

Permal are a long established supplier to the UK MOD and various international prime contractors.

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