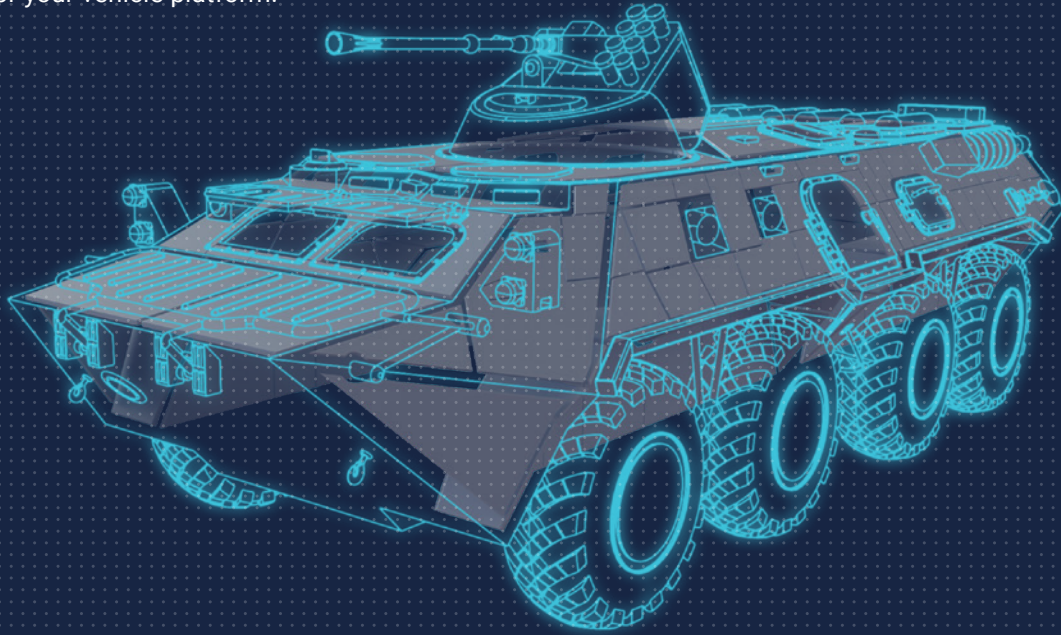


## SPALL LINER

### Internal ballistic fragment and blast protection

Bespoke ballistic solutions specially designed and optimised to provide ultimate overmatch protection for your vehicle platform.



#### Features and benefits

##### **ENHANCED SURVIVABILITY**

- Increased protection against metal fragmentation spalling injuries to the occupants of military armoured vehicles from land mines/IEDs or attack by an opponent with superior firepower.

##### **OPTIMISED LIGHTWEIGHTING**

- A range of battle proven material solutions allow for light weight designs while maintaining highest protection levels.

##### **ENVIRONMENTAL RESISTANCE**

- Optional EMI/RFI protection
- NBC clean down chemical resistance
- Thermal & acoustic insulation
- Fire resistance

##### **IMPROVED COST EFFECTIVENESS**

- Recent Permali innovation providing enhanced protection at a lower cost per square metre.
- Cost savings of 29% over off the shelf grades.

##### **EASY TO INSTALL**

- Carefully designed for easy installation and manufactured to precise tolerances.

##### **MATERIAL OPTIONS**

- Polyethylenes (UHMWPE)
- Aramids
- Glasses
- Coatings

Manufactured using advanced composite materials, Permal's Permaglass® spall lining grades are proven to significantly reduce the amount of spall debris entering an armoured vehicle, minimising serious injury to military personnel and helping to prevent fatal casualties.

Permal manufactures bespoke sheet and moulded components with a range of areal densities which are specifically designed to fit the vehicle interior maximising the area of coverage providing optimal survivability.

Lightweight Permaglass® composite sandwich design panels are also produced for spall liners and armour systems with high pressure laminated UHMWPE cores.

Specialty prepreg fibre reinforcement and thermoplastic materials used by Permal for Permaglass® composite armour and spall liners include:

- Woven and non-woven S2 and E glass fibre fabrics
- Kevlar® and Twaron® aramid fibres
- Ballistic grade UHMWPE fibres, including DSM Dyneema® and Honeywell Spectra Shield®

To find out more about our Spall Liner solutions, scan the QR code. To speak to one of our experts call us on +44 (0)1452 528282 or email [sales@permali.co.uk](mailto:sales@permali.co.uk)



## Cone angle reduction

Permal spall lining solutions provides reduction on number of occupant casualties



## Providing defence solutions since 1937

Permal specialises in the design and manufacture of anti-ballistic armour and blast protection advanced composite materials, fabricated panels and complete armour systems which meet EU, US, MOD and NATO ballistic, safety and environmental standards.

Products supplied by Permal to the land defence sector includes: appliqué armour panels, underfloor blast resistant armour, fuel tank liners, dust skirts and internal spall liner panels.