

ADVANCED MODULAR ARMOUR PROTECTION

PASSION FOR **TECHNOLOGY.**

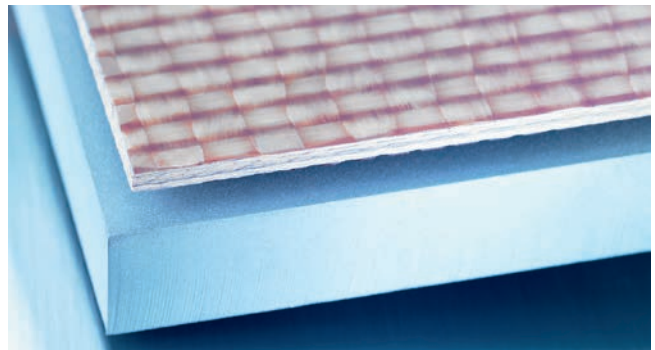
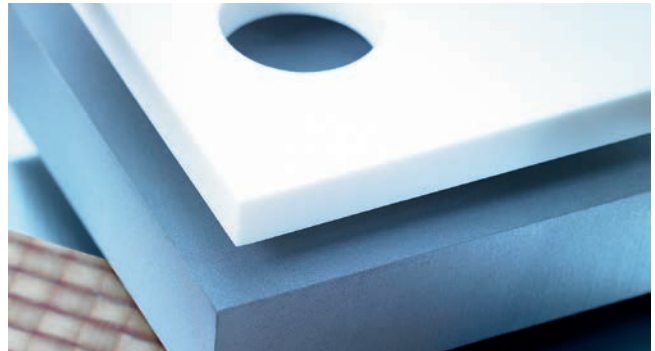
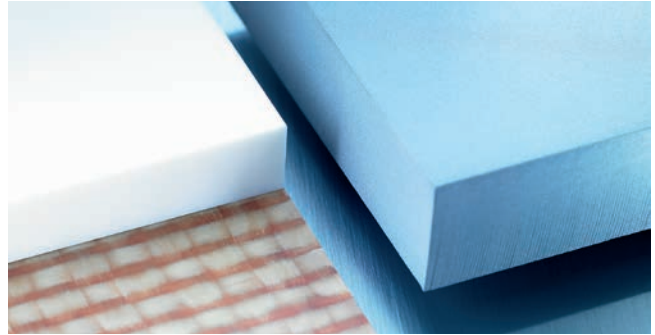


COMPETENCE IN PASSIVE PROTECTION SYSTEMS

Recent robust efforts by the international community to bring stability to crisis-torn regions of the globe resulted in the deployment of large number of troops, police and other personnel to potentially very dangerous places. In carrying out their daily tasks, they face a wide range of symmetric and asymmetric threats: an RPG7 rocket propelled grenade or a mine going off under an all-terrain vehicle, the ubiquitous and growing threat to passing convoys from roadside IEDs.

Effective protection systems play a vital role in safeguarding military and civilian personnel deployed in hazardous areas of operation.

Rheinmetall is one of the world's leading producers of passive protection systems for wheeled and tracked armoured vehicles. In recent years, more than 40,000 vehicles have been equipped with sophisticated protection technology from Rheinmetall. Efficiently structured processes and cutting-edge manufacturing technology enable fast production and customer-specific solutions that can also be integrated in theatre. Confidential treatment of customer information and data is a matter of course.



THE THREATS

Military personnel deployed in post-conflict peacekeeping and peace enforcement missions face symmetric and asymmetric threats comparable to those found in high-intensity combat operations, as do humanitarian aid workers and civilian contractors:

- Symmetric threats
- The ballistic threat
 - Kinetic energy (KE) projectiles
 - High explosive (HE) projectiles
 - Shaped charge rounds
- The landmine threat
 - Antitank mines
 - Anti-personnel mines
 - Explosively formed projectile mines
- Asymmetric threats (IEDs)

Improvised explosive devices, often known simply as IEDs, have emerged as the principle asymmetric threat, and the weapon of choice for insurgents and terrorists, who regularly use them to ambush civilian, military and law enforcement targets.

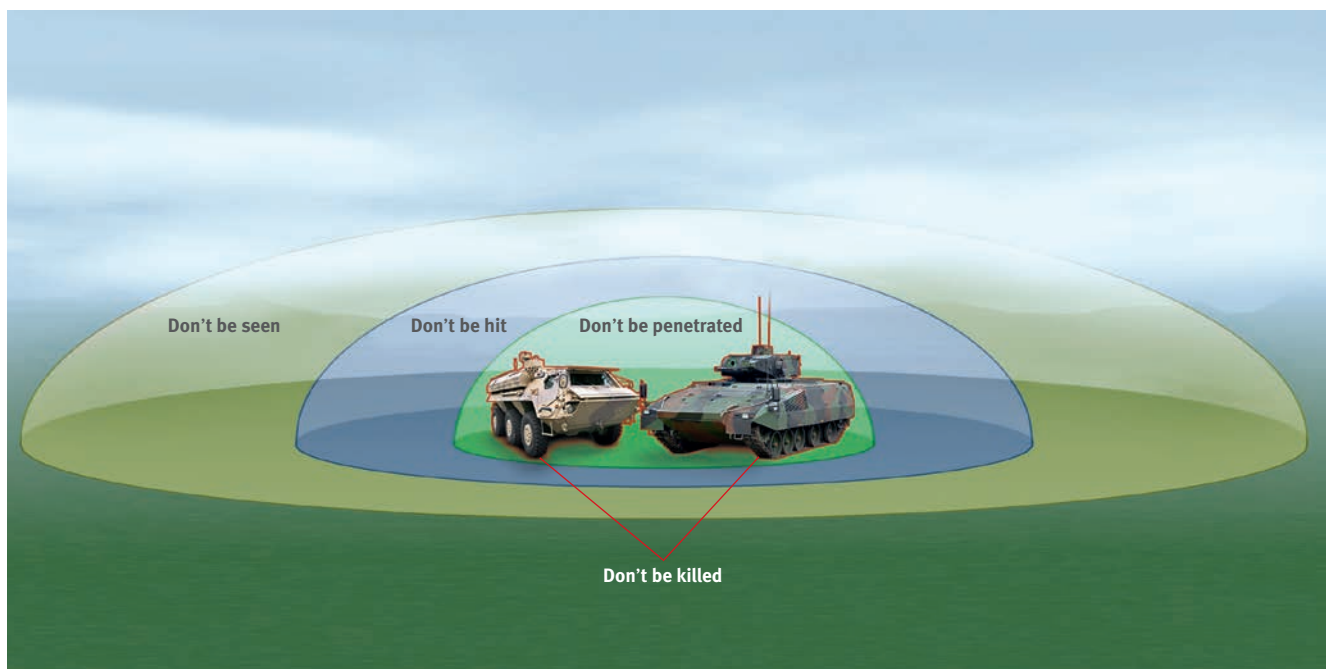
IEDs

- Blast
- Fragmentation
- Single and multiple charges
- Electrically or manually detonated

THE SOLUTION

As one of the world's leading suppliers of passive protection systems for wheel and track armoured vehicles, in recent years Rheinmetall has equipped more than 40,000 vehicles with state-of-the-art protection technology. The company has unparalleled experience in developing and manufacturing of a wide variety of different protection solutions.

These solutions basically fall into two categories: protection for new generations of vehicles, and retrofits for legacy platforms.



PROTECTION FOR NEW GENERATIONS OF VEHICLES

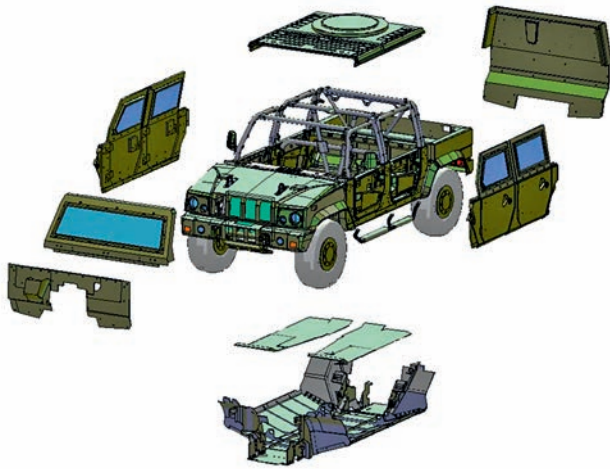
When protection components are integrated into a new vehicle during the development phase, they can be perfectly adapted to the vehicle right from the start, which also ensures optimum weight ratios. Moreover, taking this track means that the materials employed can be used in the best possible way. To cite just one example, Rheinmetall is currently equipping the production series of the Bundeswehr's new Puma infantry fighting vehicle with highly advanced protection systems.

RETROFITTING EXISTING VEHICLE SYSTEMS

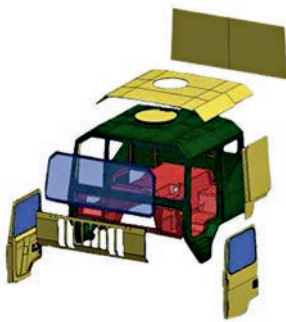
Many of the world's armed forces face the challenge of adapting their capabilities to meet new and generally higher requirements, especially when it comes to force protection in the context of expeditionary warfare. In most cases, the time and cost involved rules out the introduction of newly developed vehicles. The answer here is to equip legacy vehicles with modern protection systems. For example, Rheinmetall has retrofitted the M113 armoured personnel carriers with new mine protection technology, a performance upgrade that allows this veteran vehicle to contend with the latest threats to battlefield mobility. Very short reaction times from prototyping to series delivery is one of Rheinmetall's strengths.

PASSIVE PROTECTION SYSTEMS

Rheinmetall supplies passive protection systems that effectively counter the constantly changing threats. The experience of more than three decades has taught us that a single protective element is normally not enough. Only the combination of advanced materials, e.g. steel armour, ceramic composite systems, liners ensure that high-level and system compatible solutions can be designed.



Regardless of the system, we invariably take user-specific protection into account when developing technical solutions. Rheinmetall can equip vehicles ranging in size and complexity from modified SUVs to main battle tanks with protection according to customer requirements.



ADVANCED MODULAR ARMOUR PROTECTION

Advanced Modular Armour Protection is Rheinmetall latest family of products, delivering comprehensive protection in the following areas:

BALLISTIC PROTECTION

Our products offer ballistic protection against all relevant KE- and shaped charge threats. Depending on the desired protection level, our solutions conform to STANAG levels 1 – 6 and are certified accordingly. Sophisticated design and tight tolerance in the production result in a high coverage of the overall ballistic protection.

The high protection performance of all Rheinmetall products result from the combination of high-tech materials, e.g. steel armour and ceramic composite products, which provide excellent survivability at reduced weight. Particularly when developing new generations of vehicles, the savings in weight open up numerous possibilities. This technology also offers clear advantages when upgrading the combat performance of in service systems.

Our products can withstand multiple hits; if damaged, they can be repaired in the field using standard tools.

KEY CHARACTERISTICS

- Ballistic protection against all types of projectiles (KE rounds, rockets, etc.)
- Composites offer reduced weight with optimum protection (STANAG levels 1 – 6)
- Multi hit capability
- Repair of damaged models possible under field conditions within a few hours



MINE PROTECTION

Regardless whether the task is a UN peace-keeping operation, a combat mission or a humanitarian relief effort: vehicles deployed in dangerous places today require protection from landmines. Even in regions that are considered to be peaceful or pacified, the latent threat from these weapons is omnipresent.



Rheinmetall has successfully demonstrated the effectiveness and reliability of its mine protection technology in numerous new vehicles and retrofit programmes. So far, the company has equipped and retrofitted more than 1,200 vehicles with this protection system. Action reports from users prove that the Rheinmetall systems offer significantly better protection than conventional mine protection products, even in over-match situations.

IMPROVED MINE PROTECTION

Rheinmetall Mine Protection solutions start with the analysis of the vehicle architecture. With the reinforcement of the vehicle hull and the combination of high strength and ductile materials outstanding protection performance even under exceptional mine blasts has been achieved.



IED PROTECTION

The Rheinmetall IED protection provides special protection against improvised explosive devices. Physically, IEDs behave differently than conventional projectiles, making a special protection technology necessary. The Rheinmetall IED protection system keeps crews safe from roadside bombs.



CREW COMPARTMENT PROTECTION

The Rheinmetall Crew Compartment Protection is designed to absorb high energy levels, thus providing improved protection.

A specially developed high-tech liner is fitted to the interior of the vehicle, where it forms the final structural element of various protective modules. Serving as a last defensive layer, the Rheinmetall Crew Compartment Protection redirects energies that have penetrated the vehicle's outer protective modules. These energies can include primary and secondary fragments, the shock wave, a fireball and/or acoustic pressure. It even supports reduction of thermal and acoustic signature.

The material composition and thickness of the liner depends on the required level of protection and the structure of the

vehicle. The high-tech liner can be easily and inexpensively retrofitted, making it a highly efficient system for extending the service life and survivability of legacy vehicles.



MAIN FEATURES OF RHEINMETALL LINER TECHNOLOGY

Improved protection of the existing basic structure

- Protection against fireballs
- Protection from blast waves
- Protection from secondary fragments
- Reduction from acoustic pressure
- If a hit penetrates the interior, 70% reduction of the fragmentation cone is achieved.

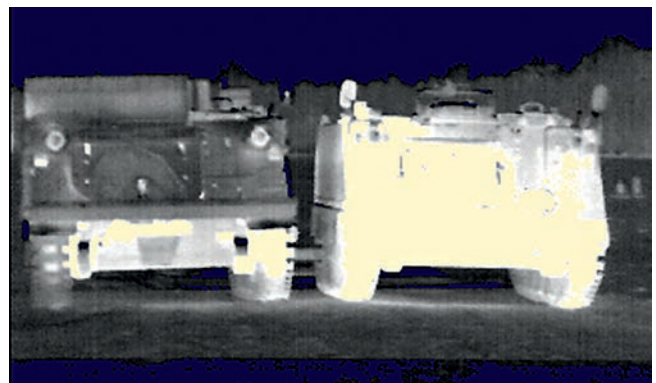
TRANSPARENT PROTECTION

Protective glass systems combine ballistic protection with excellent visibility.

Mounted in special frames, the windows are protected against vibration, shocks and mechanical effects. Transparent protection can be provided according to STANAG 4569, levels 1–4.

PROTECTION FROM SHAPED CHARGES

The product offers protection from modern shaped charge projectiles such as anti-tank rounds and precision guided munitions. Moreover, it protects vehicles from rocket-propelled grenades (RPG).



PROTECTION FOR MILITARY OPERATIONS IN URBAN TERRAIN

Modern armies increasingly find themselves having to operate in urban terrain, often in so-called “three block scenarios”, in which soldiers may have to engage in high-intensity combat operations, conduct peacekeeping duties and provide humanitarian relief – all within the space of three contiguous blocks.



In special situations like these, combat vehicles need to be able to contend with a multitude of rapidly altering symmetric and asymmetric threats.

Protective equipment applications for tactical law enforcement units also impose special requirements. Rheinmetall's protection system meets these needs.

REFERENCES

As one of the world's leading suppliers of passive protection systems for tracked and wheeled armoured vehicles as well as engineering vehicles, in recent years Rheinmetall has equipped more than 40,000 vehicles with state-of-the-art protection technology.

TRACKED ARMoured VEHICLES

Leopard 1	Canada, Norway
Leopard 2	Poland, Germany, Spain, Greece, Sweden
Puma	Germany
PzH 2000	Germany, Netherlands
Ulan	Austria
Bionix	Singapore
PbV302	Sweden
M113	Canada
M113 family	Norway
M 577 family	Norway

WHEELED ARMoured VEHICLES

LAV25	Canada
LAVIII APC	Canada
ASV APC	USA
VAB	France
Stryker (LAV)	USA
AMV 8x8	Sweden, Finland
GTK/MRAV	Germany, Netherlands
Fuchs/Fox APC	Germany
LMV	A, B, NL, UK, I, E, N, CZ, SLO
Pandur EVO	Austria

Rheinmetall Protection Systems GmbH

Pützchens Chaussee 58 a
53227 Bonn, Germany
info-rps@rheinmetall.com
www.rheinmetall.com