



# Advancing lightweight protection against emerging threats

## Endumax® Shield XF33

**The performance of armor materials and systems has evolved rapidly over the past decade, driven largely by the proliferation of advanced weapons and tactical changes of modern warfare and terrorism.**

As global security forces experience new and evolving lethal threats, the need to provide enhanced protection at lighter weights has become increasingly important. New armor systems not only have to provide protection to security professionals, but also to the various ground vehicles, maritime platforms, and aircraft used in carrying out the required mission. So how could an ballistic shield solution deliver high levels of protection without compromising user mobility or being too heavy to be integrated into a machine design?

### Key benefits of Endumax® Shield XF33

- Exceptional performance-to-weight ratio
- Wide processing window allows for design freedom and larger monolithic parts
- Improved rigidity over other ultra-high molecular weight polyethylene (UHMWPE) products
- Ideal for weight-sensitive platforms: high-performance hard body armor plates, helmets and rigid panels for vehicle and maritime armor protection.

For over 30 years, Teijin Aramid has been developing high-performance ballistic protection solutions that have saved countless lives. Thanks to the uniquely engineered properties of Endumax, the new Endumax Shield XF33 is the material of choice for improved survivability designed to meet the highest demands in terms of ballistic protection and low weight. In particular, Endumax Shield XF33 has a unique material composition of low resin contents combined with high modulus material characteristics, leading to improved structural stability and overall performance.



### Superior performance to weight balance

Endumax Shield XF33 has an inherently low areal density based on low resin contents, enabling superior performance to weight balance for ballistic and survivability solutions. The use of Endumax Shield XF33 enables weight reduction, leading to enhanced agility and maneuverability, or increased armor protection level with no increase in overall weight.

### Larger panels enable design freedom

Complex shapes of ground and air vehicles or maritime vessels may complicate the armor integration design, potentially increasing the need for seams or joints. Thanks to the high level of ballistic performance achieved even with low processing pressures, the use of Endumax Shield XF33 enables easier fabrication of larger panels with minimum or no seams. As a result, this minimizes potentially vulnerable joints and increases design freedom for optimum panel cuts, thereby making the solution more cost-efficient.



### Stable structure in extreme environments

The combination of light weight, mechanical strength and fewer vulnerable joints delivers structurally reliable protection. Endumax Shield XF33 requires 4-10 times higher mechanical impact energy to deform compared to other UHMWPE materials. In addition, internal testing has shown that Endumax Shield XF33 retains its original form and protection performance levels relatively better after exposure to temperatures and moisture levels outside ambient conditions.

### About Teijin Endumax

Teijin Aramid is a global leader in aramid and UHMWPE technology. Our technology is used by manufacturers worldwide for its high-performance properties and to improve the strength, durability and weight of their products. We are always working together with our customers to develop new products, and we offer tailored technical advice on how to best use our materials. For more information about the contents of this leaflet, please contact your local sales representative at [ballistics@teijinaramid.com](mailto:ballistics@teijinaramid.com).



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