If coming home safely depends on surviving the unexpected, you better be sure.
Difficult situations call for innovative solutions. In particular, the performance of ballistic protective clothing can make all the difference. Today’s body armor applications not only need to provide outstanding resistance against bullets and fragments; they must also deliver the comfort, lightness and agility that professionals need to move, work and react freely in hostile environments. Only then can they perform when the bullets are flying and when the pressure is at its highest. Only then can they truly be sure.

Providing you with the ultimate protection without compromising on mobility.

“...we receive from Teijin Aramid – they’re always looking to work with us when we look for specific solutions.”

David Bilton
Business Manager Hellweg International

Read more on our website www.teijinaramid.com/ballisticvests

Key benefits when using Twaron® and Endumax® in ballistic protective vests:

- Low weight, excellent comfort and long-term stability
- Low backface deformation
- Protects against bullets, fragments and cold weapons
- Solutions tailored to specific requirements
- Excellent performance-to-price ratio

Every day, across the globe, people’s lives are at risk in hostile environments, whether in combat situations, unstable urban environments or crime zones. As we move further into the 21st century, the hazards facing military and law enforcement professionals are becoming more diverse, more unpredictable, more life-threatening. Different kinds of bullets and fragments, high-velocity firing rounds, stabbing with sharp objects – the threat to life has never been greater nor as complex. And it’s not only soldiers and policemen who are at risk. First responders, prison guards, cash carriers and private individuals all need to be kept safe from harm.

Difficult situations call for innovative solutions. In particular, the performance of ballistic protective clothing can make all the difference. Today’s body armor applications not only need to provide outstanding resistance against bullets and fragments; they must also deliver the comfort, lightness and agility that professionals need to move, work and react freely in hostile environments. Only then can they perform when the bullets are flying and when the pressure is at its highest. Only then can they truly be sure.
Get serious about safety with Twaron® and Endumax®

Around the world, a growing proportion of ballistic protective vests are now made with Twaron®. The reason? The unique qualities of our para-aramid yarn deliver enhanced protection, greater comfort and advantageous performance-weight ratios. And behind our solution is more than three decades’ worth of Teijin Aramid experience in developing advanced Twaron®-based ballistic solutions. Our innovation is enabling the production of lighter, stronger, and more comfortable ballistic protective vests – essential equipment supporting the critical safety needs of wearers around the world.

For body armor inserts, our high-performance Endumax® SHIELD materials are capable of protecting individuals against high-velocity rounds, both monolithic and in combination with ceramic strike face. It does this while helping to significantly reduce the weight of protective gear.

“Thanks to the integrated Twaron®, our vests can withstand the toughest conditions and offer extreme protection.”

Albert Hellweg | Managing Director
Hellweg International

Headquartered in Melbourne, Australia, Hellweg International is a market leader in personal ballistic protection solutions. Over the years, Hellweg’s success has been built on a simple premise: with personal protection products, only the very highest quality is acceptable. And that’s also why they have partnered with Teijin Aramid for over 25 years. With Twaron® fiber at the heart of its products – such as its high-performance loadbearing systems and protective body armor vests – every day, Hellweg is helping to deliver high levels of protection to people around the world, when protection is most needed.

Protection gets agile

Conventional ballistic protective vests are heavy, uncomfortable and restrict movement. Vests based on Twaron® and Endumax® are different. Leveraging the superior strength, durability and low weight of our high-performance aramid fiber, we’ve created materials with a unique soft textile-like texture. For wearers, it means maximum protection against hazards, but also freedom of movement. Lighter and more comfortable, Twaron®- and Endumax®-based vests allow users to move, work and perform as they need to – when it matters most.

Our experts have extensive knowledge of our materials and ballistic solutions that match the diverse application needs of different high-risk professionals. Combining the perfect combination of fabrics, coated fabrics and unidirectional laminates, we can co-develop custom-built solutions that match the exact safety needs of your users.
Meeting tomorrow’s technical requirements, today
Our intense innovation focus has led us to develop advanced new materials such as the Laminated Fabric Technology (LFT) in our Twaron® ComForte product line. This innovative solution combines the softness and comfort of microfilament fabrics with the superior low-weight qualities of cross-plied UD materials. We’ve also developed fabric constructions for protection against knives (Twaron® SRM) and spikes (Twaron® Microflex).

Trust in our expertise
Our deep insight into production processes means we can offer unrivaled value-added technical support to our global customers. Thanks to our extensive know-how, we can help you strike the right balance between protection and comfort – and identify the right solution for a particular application. Trust in our expertise, and let us add value to your product development – so you can add value to your customers and end-users, now and in the future.

Durable, cost-effective, state-of-the-art solutions
Tough situations call for tough solutions. Ballistic protective vests made with Twaron® and Endumax® offer excellent lifetime durability – retaining their outstanding protective properties and maintaining the highest levels of performance, day after day, year after year. If you’re looking for stable protection at low weight, Twaron® and Endumax® are the answer. What’s more, Twaron®-based fabrics and Endumax® laminates enable solutions with the best performance-price ratio.

Driving progress for our customers
At Teijin Aramid, innovation and product development never stop. Right now, our weaving experts and the experts at our Application Competence Center in Wuppertal, Germany are working closely with customers to develop new products and solutions. Their work is supported by world-class research laboratories and testing sites – including fabric-testing facilities, helmet pressing and a state-of-the-art shooting range. Our technicians, who are well up to date on worldwide used ballistic standards, are frequently responding to various requests from all around the globe. Meanwhile, our material research facilities in Arnhem, the Netherlands, are leading the way by developing cutting-edge aramid and Ultra High Molecular Weight Polyethylene (UHMWPE) materials. Solutions that add value to ballistic protective clothing applications worldwide.
Performance when it counts

High-performance Twaron® microfilament fibers are already changing lives – maximizing safety and comfort for military and law enforcement professionals around the world. Teijin Aramid has developed Twaron® Ultra Micro – a 550 dtex yarn comprised of 1,000 individual filaments, taking low-weight protection to a whole new level. This revolutionary yarn, the world’s first and only ultra-microfilament para-aramid fiber, offers higher fragment resistance than any other para-aramid yarn on the market today. Strength and protection have never been this lightweight. Of that you can be sure.

Enhancing early bullet deformation

Bullet deformation is key to effective ballistics protection. Twaron® Platin PT900 is the best-in-class product for the strike face of hybrid ballistic packs. It combines the ballistic effectiveness of open satin weaves with the structural integrity of plain weaves. This patent protected make-up makes Twaron® Platin PT900 ideal for early bullet deformation, helping to improve ballistic limit while also enhancing trauma attenuation.

### Weight for STANAG 2920 1.1g FSP

Twaron CT 608 versus CT 612

<table>
<thead>
<tr>
<th>Panel weight</th>
<th>V50 STANAG 2920 1.1g FSP</th>
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</thead>
<tbody>
<tr>
<td>Twaron CT 612</td>
<td>120g/m² 550 dtex f500</td>
</tr>
<tr>
<td>Twaron CT 608</td>
<td>120g/m² 550 dtex f1000</td>
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<tr>
<td>100%</td>
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<tr>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>50%</td>
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</tr>
</tbody>
</table>

Platin PT900 supports much faster energy dissipation, as can be seen by the faster enlargement of the yellow circle.

Twaron® Ultra Micro

Twaron® Platin PT900
Be mobile, stay safe

The Endumax® SHIELD product family is based on Ultra High Molecular Weight Polyethylene (UHMWPE) cross ply sheets, developed for hard armoring, including inserts. XF33 is the second generation of the Endumax® SHIELD family. It has an inherently low areal density based on low resin contents, enabling a superior performance-to-weight balance for ballistic solutions. Ultimately, it means that using Endumax® SHIELD XF33 in inserts enables weight reduction, driving comfort, agility and mobility for wearers.

When it comes to body armor, safety, comfort and agility are crucial. No ifs, no buts, no maybes. Built with our unique Twaron® Ultra Micro yarn, Teijin Aramid’s Twaron® ComForte SB3 solution enables lighter body armor that offers ultimate flexibility, long-term performance consistency and trauma control without the use of a stiff anti-trauma liner. It allows wearers to move and perform with ease while keeping them fully protected at all times. What’s more, by combining the ballistic efficiency of a unidirectional laminate with ultimate body armor flexibility, Twaron® ComForte SB3 enables body armor to be better shaped to the body’s curves.

Taking body armor to the next level

Because of this, it allows law enforcement personnel – including a growing number of female professionals – maximum comfort. But, above all, Twaron® ComForte SB3 provides excellent bullet deformation in response to projectiles, including .357 JSP and .44 MAG SJHP.

Flexibility Test

- **ComForte SB3**: (5.5 kg/m²)
- **CT709 wrt**: (5.7 kg/m²)
- **GF4**: (4.9 kg/m²)
- **UHMWPE UD**: (4.9 kg/m²)

Flexibility test done in accordance with ASTM D4032-92 for multiple layers instead of a single layer: the less force (N) needed, the more flexible the panel is.

<table>
<thead>
<tr>
<th>Style</th>
<th>Endumax® film type</th>
<th>Total weight (g/m²)</th>
<th>Construction</th>
</tr>
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<tbody>
<tr>
<td>XF33</td>
<td>TA33</td>
<td>146</td>
<td>Laminated UHMWPE Film, Cross-ply 2-layered BRICK W/ cross 2-layered BRICK</td>
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<tr>
<td>XF23</td>
<td>TA23</td>
<td>197</td>
<td>Laminated UHMWPE Film, Cross-ply 2-layered BRICK W/ cross 2-layered BRICK</td>
</tr>
</tbody>
</table>
At Teijin Aramid, everything we do is guided by our ambition to shape a better future for generations to come. Day after day, we move forward, continuously improving our processes, our technology and ourselves. As market leaders, we drive progress through collaboration and set new standards for high performance. We connect with our customers at every level, wherever they are in the world. Because we believe that, together, we can be something bigger. Together, we can challenge conformity.

From automotive and oil & gas, to civil engineering, ballistic protection and beyond, our products are empowering excellence in diverse markets and applications around the globe. By enabling lighter, stronger and more resistant materials. And by taking durability, protection and efficiency to new levels. Whether you choose Twaron®, Teijinconex®, Technora® or Endumax®, our high-performance materials are an enduring guarantee of reliability. You can be sure of that.

For more information
Please e-mail us at:
ballistics@teijinaramid.com
or visit
www.teijinaramid.com/ballisticvests
for a complete overview of all our ballistic products in our Ballistic materials handbook.