Press release

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Hohenstein and DuPont develop reliable assessment of body armour wearability

Innovative comfort and mobility tests for ballistic protection

BOENNIGHEIM (cs/msc) Testing laboratory Hohenstein and DuPont have collaborated to develop three innovative and reliable test methods for soft ballistic inserts. Maximizing the comfort and mobility of body armour, such as bulletproof vests, is key to the performance and endurance for law enforcement and military personnel. The new methods address the disconnect in existing tests with real body movements and positions.

An interdisciplinary and intercompany team of DuPont and Hohenstein experts developed the test methods, which guarantee a reliable assessment of the specific ergonomic comfort characteristics. *“It is in the DNA of Hohenstein to get as close as possible to the user’s reality,”* said Dr. Jan Beringer, Senior Scientific Expert at Hohenstein. *“With dedicated wear trials, possible discomfort and movement restrictions were determined. Then, leveraging on decades of expertise, tests and equipment to simulate the wearer's experience were designed, in close collaboration between DuPont and Hohenstein.”*

"To meet the critical needs of law enforcement and military personnel, maximizing comfort and flexibility in soft ballistic solutions is essential. Developing test methods to evaluate pain and mobility constraints is an important first step. By leveraging Hohenstein's recognized expertise in textile and wearability, we can advance these solutions to the industry and enhance wearer comfort, allowing

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personnel to perform their duties with greater efficiency," said Christophe Djololian, Global Market Development Leader at DuPont.

Three Comfort and Mobility Tests

- The **Lower Costal Bending (LCB) test** replicates the bending movement of an upper body. On duty, movements involving multiple bends lead to energy loss and accelerated exhaustion for the wearer. The LCB test quantifies lost energy due to the stiffness of a ballistic garment.
- To maximize mobility, ballistic solutions must adapt to the wearer's body. The **Double Curvature Compression (DCC) test** replicates the shape of a curved torso and uses digital imaging to assess the gear's adaptability and mobility in applicable user situations.
- Where the edges of a ballistic vest meet the body - on the lower abdomen, neck or arm - the pressure can cause discomfort. The **Edge Pressure (EP) test** replicates the shape of the arm and the curvature of a ballistic vest. The EP test quantifies discomfort generated at localised pressure points.

The three test methods to characterize Comfort & Mobility constraint for soft ballistic applications are available from Hohenstein. *"Depending on the requirements, we offer different solutions,"* explains Dr. Jan Beringer. "*Certified third party and independent testing can be carried out by the experts in Hohenstein's PPE labs, on specially designed equipment. The test devices are also available for purchase to facilitate product development by body armour manufacturers and solution assessment by end-users."*

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About Hohenstein

Hohenstein is a family-owned company with more than 75 years of experience in testing, certification and research. With roots in the textile sector, the Hohenstein testing portfolio now includes softlines, hardlines and medical products. Around the globe, more than 1,200 employees work on testing and service offerings such as testing for harmful substances, performance testing or fit testing. Customers from all over the world receive everything from a single source: Hohenstein supports companies along the entire value chain, from the testing process and certification to the marketing of their products. The Hohenstein experts are experienced partners for more-sustainable materials, products and processes. As a founding member, Hohenstein is one of the most important laboratories for OEKO-TEX®, the world's leading certifier of textile and leather goods. For training and further education, the Hohenstein Academy provides online and classroom courses.

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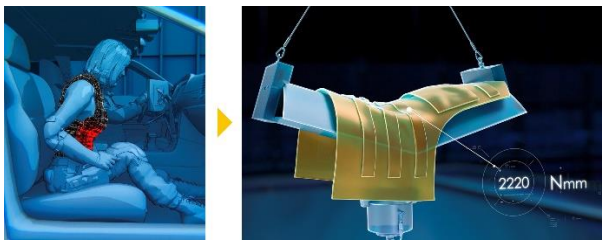
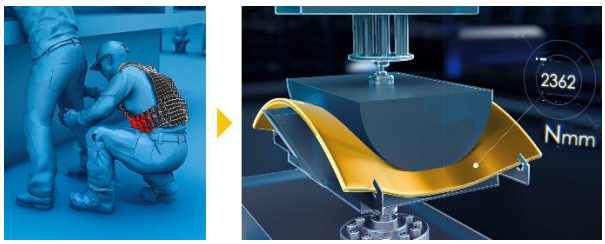


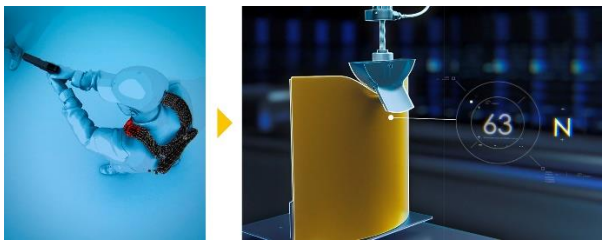
The Lower Costal Bending (LCB) test replicates the bending movement of an upper body. That allows to quantify lost energy due to the stiffness of a ballistic solution.

Pictures: Courtesy of DuPont ©2024



The Double Curvature Compression (DCC) test replicates the shape of a bent torso and allows to observe the adaptability of ballistic material solutions.

Pictures: Courtesy of DuPont ©2024



The Edge Pressure (EP) test replicates the shape of the arm and the curvature of a ballistic solution. The EP test allows to quantify discomfort generated at localised pressure points.

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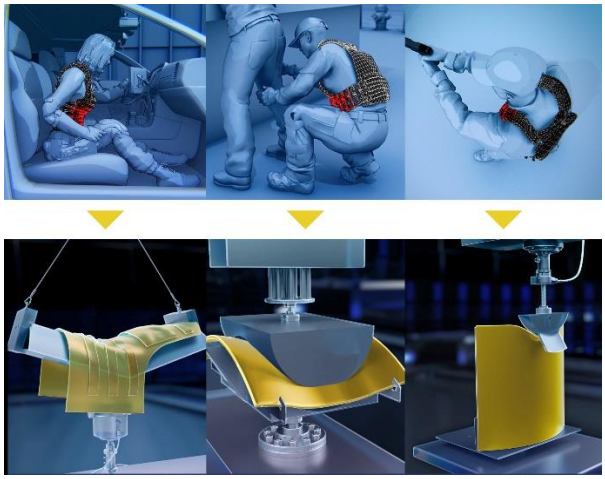

Testing laboratory Hohenstein and DuPont have collaborated to develop three innovative and reliable test methods for soft ballistic inserts: The Lower Costal Bending (LCB) test, the Double Curvature Compression (DCC) test and the Edge Pressure (EP) test.

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