

The right fit

Germany-based **Hohenstein Laboratories** provides a comprehensive range of military clothing testing and certification services to armed forces across the globe. Dr Andreas Schmidt, director of the department of function and care, talks to *Defence & Security Systems International* about how the company's innovative approach can increase both the safety and comfort of soldiers on the front line.

How have the functional properties of military clothing changed in recent years?

Dr Andreas Schmidt: The deployment of soldiers to areas with extreme climates has put new demands on the functions of military clothing for weather protection and comfort. Nowadays, military clothing plays a key role in protecting soldiers; it must perform several functions in the most rugged of conditions and has to be adapted to the different fields of operation. At the same time, it must remain durable and, above all, comfortable.

When we take a look at the functional properties of military clothing, there is a clear trend to focus on the increased safety, stamina and survivability of soldiers in the field.

How has Hohenstein adapted its portfolio of services accordingly?

To offer a comprehensive service regarding these issues, our portfolio comprises of testing the fit of uniform components and carrying out serial measurement surveys to assess current body sizes. We also develop technical specifications in close cooperation with the customer, testing the product against quality guidelines. It is also possible to calculate the effect of the clothing systems on the mental performance of troops.

For successful product development, it is an advantage to have an independent verification in the specific product functions such as the antimicrobial, odourless or insect-repellent effects of treatments; as well as the possible skin penetration of harmful substances from treatments or finishing processes.

We can also check other product features, such as the camouflage effect, UV protection, skin friendliness and comfort properties of textiles.

We offer specific support on developing materials with innovative properties and protective functions, such as uniforms that are able to absorb infrared radiation. It is also vital that the clothing system protects the soldier from the impact of the environment, and that heat and moisture is lead away from the body. As a pioneer in the area of clothing physiology, the company has been intensively dealing with the interaction between textiles and the human body for decades. It is only through intensive research and numerous experiments with human test subjects that has made it possible to make the extrapolations required to correlate human experiences with laboratory results. Based on the data gathered, we



Hohenstein carries out extensive tests on materials for use in the field.

created a predictive model, making it is possible to determine precisely the range of practicality and comfort of clothing. Hohenstein is also one of the few institutes in the world to be to test thermal insulation and survival time in immersion suits through using a thermal mannequin.

How does your approach to the military sector differ to the other industries you serve?

Military clothing systems normally have to resist greater strains than normal garments. Materials tend to age much faster in cold conditions and under extreme exposure to the sun. This requires tailor-made individual testing programmes, which we design in close consultation with our clients. Our normal testing range is carried out according to international standards such as DIN, EN and ISO. Military specifications normally set higher standards or require specific modifications.

Geographically, in which markets are you currently present? Do you have plans for further expansion?

The Hohenstein Institute is an internationally operating, German-based testing and service centre with a total of 500 employees and 32 branch offices all over the world. We are present in all countries where textiles are being produced and where high-tech textiles are applied, namely China, India, Russia, the US and many others.

How would you describe your approach to consultancy?

Our aim is to offer an integrated approach. We provide

consultations on everything, from the selection of adequate materials for specific military operational areas to the function of textile, workmanship and fittings, as well as their suitability for reprocessing. Our services also include requirements analysis, elaboration of technical specifications, first-article inspection, selection of suppliers, as well as production controls and final checks.

What testing procedures do you use to ensure the optimum ergonomics and operational capabilities of clothing?

Ill-fitting military clothing can considerably decrease the levels of soldier protection. Taking into account that people are taller and have increased in weight, it is necessary to use representative surveys to redefine clothing sizes. Hohenstein and body scanning specialist Human Solutions have carried out a joint project with industry partners, in which more than 13,000 people were measured using cutting-edge, contact-free 3D body scanning technology.

With the help of virtual duplicates, more than 150 body dimensions were extracted, which served as a basis to define the “standard” woman and man. This obtained data can also be taken as a basis to define the “standard” soldier, which helps to design safer uniforms and reduce procurement costs when the required number of pieces for the individual size groups on stock are known.

In order to ensure the maximum ease of movement and comfort, Hohenstein carries out fitting tests with live models, who then carry out special exercises to determine if the clothing restricts movement.

We carry out tests on ready-made garments, especially in the field of clothing physiology and fitness, as well as on fabrics. On request, we also offer unannounced on-site inspections.

Have you made any recent investments in your lab facilities?

It is our utmost concern to always have state-of-the-art equipment. For this reason, we have just renovated and refurbished some of our laboratories, especially in the field of chemical and clothing physiological testing. We are now in a position to

offer tests on flammability, gloves and the effect of noise emissions from textiles.

What future research activities do you have in the pipeline?

We are currently expanding a research project for noise testing of textiles. Another interesting project we are focusing on concerns reprocessing, such as the washing of combat suits. ■

Further information
Hohenstein Laboratories
www.hohenstein.com



**When clothing systems are a matter of vital importance:
>> We offer support from the fibre to the field of operation**

TESTING & CERTIFICATION	RESEARCH & DEVELOPMENT	CONSULTING
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Hygiene & Biotechnology

- Antimicrobial effects
- Harmful substances
- Protection against insects

Wear Comfort: Important in extreme climates

- Heat and moisture management of clothing
- Skin sensorial properties/perception of textiles on the skin

Textile Resistance

- Colorimetry
- Tensile strength
- Abrasion resistance
- Colour fastness

UV Protection

- Protection against skin cancer
- Protection against hyperthermia of the skin

Fit & Design

- Testing on garment fit
- Tests on workmanship
- Elaboration & examination of Technical Specifications

Reprocessing of Textiles

- Assessment of industrial washing procedures
- Transponder technology

Thermal Insulation & Breathability

- Footwear
- Socks

Immersion Suits/ Sleeping Bags

- Length of survival in immersion suits
- Thermal range of utility of sleeping bags

Photos courtesy of Bundeswehr/Zach/Bienert, U.S. Army, DuPont & Hohenstein Institute

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