



Fire test laboratory at ITV Denkendorf: Depending on their function, such as upholstery covers, safety clothing, decoration, cars, aviation or construction, textiles need to withstand various kinds of flame application – standardised regulations apply for these tests

Brandlabor im ITV Denkendorf: Je nach Anwendung müssen Textilien unterschiedlichster Beflammung standhalten, die in den Normen festgehalten sind (Möbelbezüge, Schutzbekleidung, Dekor, Automobil, Luftfahrt, Bau)

| Photo: ITV

Graphene against fire and smoke

Fire protection in the spotlight of German textile research

A new page has been turned concerning flame retardants and non-flammable fibers. For experts, the special carbon compound is already a miracle. At Hohenstein Institute for Textile Innovation in Bönningheim near Stuttgart, Germany, researchers experiment with a layer of graphene only an atomic diameter thin. This extremely wafer-thin coating produces a physical barrier that holds off heat and gases. Within a European research project, the scientists aim to make the heat resistance of this innovative wear-resistant coating useable for fire protection applications. Up to now graphene – 200 times more resistant to abrasion and fracture than steel – was hardly used in the textile sector.

“GRAFAT” is the German part of the EU-project. The Hohenstein researchers enter completely new territory by modifying the surface of textiles using graphene. “It is our aim to apply watery graphene dispersions permanently on different textiles,” says project manager Dr. Bianca-Michaela Wölfling. She claims that in 2017 a ready-made, extremely lightweight protective equipment would be evidence for the industry that the material can comply with the high expectations in terms of fire protection.

Protech more important for textile applications

Nowadays, users from different sectors such as construction/architecture, work

safety or industrial fire protection can already rely on a wide range of textile pro-tech products. Fiber based materials such as glass and aramid filaments or textile ceramics play an increasing role in fire protection on construction sites. A wide range of technical textiles and composite materials already exists: they are flame retardant, non-flammable at all, do not melt and are highly temperature resistant or hold back smoke.

With “Mtex FTR”, the Frenzelit factory in Bad Berneck introduced the first aluminium coated fabric last year at Techtextil 2015 that meets the highest fire protection requirements. Another innovation with a particularly high fire resistance is “isoGLAS V4A Intum-Gewebe” also developed by Frenzelit. It is reinforced with stainless steel wire. One side is coated with a graphite base which is intumescent (foams up and hardens in case of a fire).

Melamine nonwovens and other fire resistant textiles

A heat resistant nonwoven made of melamine produced single-stage using a cost-effective thermoplastic method originates from the Thuringian Institute of Textile and Plastics Research in Rudolstadt, Germany. The material does not burn or melt. It is chemically stable and resilient to UV rays. Furthermore, it has excellent insulation properties – the perfect material for fire

protection gear as well as for heat and acoustic insulation. In another research project at the ITM at TU Dresden, Germany, high-performance fibers are spun into heat resistant yarn and textile structures to produce fire curtains or flame retardant home textiles (e. g. upholstery fabrics). Another target for the scientists consists of space-enclosing, multifunctional prefabricated parts made of fiber reinforced mineral building composites.

Flame-resistant coatings with a high UV-resistance on a basis of nanoclays in polyurethane finishings and coatings are currently developed at ITCF Denkendorf, Germany. Another important topic for the textile chemists in Denkendorf is fire protection free of formaldehyde and halogen, with the focus on phosphorous compounds.

A completely different approach to fire protection was taken by the textile researchers in Aachen. The innovative fire-fighting gear developed at ITA has a safety rope transmitting data with which firefighters can communicate during a rescue operation. |