

Personal Protection Textiles

Fabrics for harsh, hazardous and
hostile environments · 2nd edition



Claudia Ollenhauer

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Fabrics for harsh, hazardous
and hostile environments

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Introduction

Demand continues to grow worldwide for speciality products for personal protection equipment (PPE), and seem to resist any global financial crisis. The key drivers for this market are the emerging countries, where PPE is finding application in the fast growing industrial sector.

Insiders, such as Transparency Market Research, expect the market to reach US\$20bn globally by 2018, which includes all PPE ready to wear from head to toe. The current size of the PPE market in the EU is estimated by the European Commission at €9.5-10.0bn, accounting for around 200,000 jobs, directly or indirectly. The high growth forecast in certain parts of the world suggests that EU exports of PPE could grow by about 50% over the next few years.

This report focuses on suppliers of fabrics for PPE garments, including workwear and, to some extent, institutional wear (corporate fashion).

Drivers of development

Unfortunately, there are no valid figures about market growth for PPE in emerging countries; none of the sources consulted have more than vague estimations. However, a key factor is international pressure on working conditions, particularly in China, regarding exported products. Meanwhile, all new EU countries (and those applying for EU membership) have to adopt EU regulations regarding workplace safety. As a result, international economic pressure is forcing the private and public sectors to invest in workplace safety and, thus, in PPE.

As is so often the case in other sectors, the military is a principal driver in the development of PPE: well-trained soldiers (and paramilitary personnel) are human capital, which has to be protected. This is a general fact worldwide – also for nations not actively involved in warfare. Civil forces, such as police and fire brigades, have taken advantage of military developments in PPE.

Besides the growth of emerging countries, other factors driving the growth of the PPE market include the following:

- the cost of job-related injuries is generally much higher than the cost of providing PPE for workers: indemnity payments, loss of knowledge and skills, training of new employees, overtime to be paid for replacing the injured person and loss of production must be considered;
- labour safety and protection laws are getting stricter worldwide, pushed by labour organisations, the United Nations and its affiliated organisations, and – to some extent – also by consumers, who expect good working conditions wherever the product has been produced. Both the protection of workers from danger and protection of the product from contamination by human beings have to be taken into consideration;
- military, paramilitary and police force employees have to be protected against

Ames Europe

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CB Enschede, Netherlands. Tel: +31 53 484 8111. Fax: +31 53 484 8129.
Email: info.nl@ames-europe.com Web: www.ames-europe.com**

Privately-owned Ames Europe is headquartered in Enschede, Netherlands, and produces knitted fabrics for several markets, including protective clothing. Turnover and workforce are not disclosed.

Main activities

Ames Europe is a producer of carrier material for polyvinyl chloride (PVC), polyurethane (PU) and thermoplastic polyolefin (TPO) coatings, and high-quality knitted technical fabrics used as laminate backing. The products are developed in close co-operation with customers and are made to specification. The company's fabrics are typically used for the following applications:

- automotive industry: car interiors;
- protective clothing: jackets, trousers, military clothing;
- healthcare: mattresses, incontinence material;
- fashion and luggage: swimwear, bags, footwear;
- building and construction: roofing applications.

In all these end-uses, new knitting techniques combined with the right materials are leading to innovative, economical and ecologically friendly solutions, the company says.

Main departments

Ames Europe has a research and development department and a circular knitting plant, which is equipped for a fully-integrated production process. Finishing facilities include washing, bleaching, heat-setting (the controlled application of heat adds dimensional stability and wrinkle resistance), brushing and dyeing.

The company also offers chemical surface finishes for water repellent (hydrophobic), absorbing (hydrophilic), antimicrobial, antistatic and anti-ultraviolet properties or (semi-permanent) fire retardancy.

Activities in the PPE sector

Ames Europe is an important player in the protective clothing market as a development partner and producer of substrates for PVC and PU coatings and linings.

High-quality knitted fabrics have been developed for the protective clothing sector with (semi)-permanent flame retardant (FR), antibacterial or antistatic prop-

Klopman

Klopman International, European Sales & Marketing Office, Berliner Strasse 101, D-40880 Ratingen, Germany. Tel: +49 2102 45230. Fax: +49 2102 452310. Email: sales@klopman.com Web: www.klopman.com

Klopman International is a major European manufacturer of fabrics for image workwear, protective wear and casual apparel. The company describes itself as Europe's leading workwear and protective wear brand with a market share of more than 30% in "blue workwear", over 70% in rental and laundry, and a significant market share in healthcare and food processing. Its annual capacity in 2011 was 50m metres.

Main activities

Klopman consists of an extensive pan-European network of dedicated and strategically located sales representatives, agents and distributors, together with management and marketing headquarters in London, UK; integrated manufacturing and sourcing facilities in Frosinone, Italy; greige production facilities in Monastir, Tunisia; and European sales headquarters in Düsseldorf, Germany, as well as an extensive network of agents outside Europe.

Klopman has three ranges targeted at distinct markets:

Corporate wear

This range includes 65% polyester/35% cotton fabrics, cotton-rich fabrics including 100% cotton and 60% cotton/40% polyester blends, stretch fabrics both in cotton-rich and polyester/cotton blends, as well as a range of printed fabrics and denims.

Protective wear

Klopman has developed a range of advanced protective wear fabrics and finishes, all of which have been specifically designed to perform in excess of established industry and European standards.

Workwear

This range, which forms part of the image workwear range, offers specialist protection from such hazards as electromagnetic radiation, static and liquid chemical splash. Optional finishes include antimicrobial and Sanitized. Main materials are blends in cotton/polyester, cotton-rich, nylon/cotton and Tencel/polyester.

The company runs an online store (www.klopmanstore.com) that sells stock material by the roll.

Safety Components International

**Safety Components International Inc, 41 Stevens Street, Greenville,
SC 29605, USA. Tel: +1 864 240 2600. Fax: +1 864 240 2728.
Web: www.safetycomponents.com**

Safety Components International (SCI), a member of the International Textile Group (ITG), is a low-cost supplier of automotive airbag fabric and cushions and technical fabrics, with operations in North America, Europe, Asia and South Africa.

SCI entered the structural fire-fighting market in 1997 with a range of fabric solutions that are said to significantly enhance the protective capacity and durability of outershell and thermal liner products. In 2012, ITG employed around 6,000 people worldwide.

Main activities

SCI sells airbag fabric in the US and cushions worldwide to the major airbag module integrators. The company is also a leading manufacturer of value-added synthetic fabrics used in a variety of niche industrial and commercial applications, such as ballistics, material for luggage, filtration, military tents and fire-service apparel.

Activities in the PPE sector

Since its market entry in 1997, SCI has manufactured fabrics for battle dress uniforms (camouflage), which are sold primarily to the US government and to government contractors. The company is also a significant producer of military prints that are used to service the battle dress uniform business primarily for the US government, but also for other governments and commercial interests. The company believes it is one of the largest commission printers and finishers in North America. Commission textile dyeing, printing and finishing services are also provided for decorative fabrics and speciality prints. SCI's capabilities in this business include preparation, surface enhancement, dyeing and finishing services.

Fire-fighting

Outershells

SCI produces a range of performance outershell fabrics with durable water repellency using solution dyed fibres for colourfastness and a ripstop weave for improve abrasion and tearing resistance. Improved durability is provided by Kevlar fibres.

Appendix IV: Standards

Leading associations for standards

- ASTM International, West Conshohocken, Pennsylvania; USA, www.astm.org
- CEN, Committee for European Standardization, Brussels, Belgium; www.cen.eu
- EPA, US Environmental Protection Agency, Washington, DC, USA; www.epa.gov
- European Agency for Safety and Health at Work, Bilbao, Spain; www.osha.europa.eu
- IEC, International Electrotechnical Commission, Geneva, Switzerland; www.iec.ch
- IEEE, Standards Association, New York, NY, USA; www.standards.ieee.org
- ILO, International Labour Organization, Geneva, Switzerland; www.ilo.org
- ISO, International Organization for Standardization, Geneva, Switzerland; www.iso.org
- NESC, US National Electrical Safety Code, New York, NY, USA; www.standards.ieee.org/nesc
- NFPA, National Fire Protection Association, Quincy, Massachusetts, USA; www.nfpa.org
- Oeko-Tex Association, Zürich, Switzerland; www.oeko-tex.com
- OSHA, Occupational Safety & Health Administration, Washington, DC, USA; www.osha.gov
- WHO, World Health Organization, Geneva, Switzerland, www.who.int/topics/occupational_health/en/

Important European standards

- DIN EN 100015 – Basic specification: protection of electrostatic sensitive devices
- DIN EN 25077 – Textiles: determination of dimensional change in washing and drying (ISO 5077)
- EN 340 – Protective clothing: general requirements
- EN 342 – Protective clothing: protection against cold
- EN 343 – Protective clothing: protection against bad weather
- EN 348 – Protective clothing: determination of behaviour of materials on impact of small splashes of molten metal

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