

Sustainability that pays off.

German Technology: Higher Energy Efficiency – Higher Profits

26 per cent less energy
for the production
of textile billboards

Throughout one year warp-knitted fabric of roundabout 400,000 tons is produced worldwide for large-area advertising. This quantity would be sufficient to transform the overall metropolis of Guangzhou – covering at least 3,442 square kilometres – into a giant textile billboard. If German machinery technology of latest generation was used exclusively for the production of these textile advertising media, enormous energy savings would be possible for each individual process step. They sum up to 26 per cent compared with German technology one decade ago! From filament production to finished knit fabrics – German manufacturers of textile machinery, components and accessories make energy costs shrink.



For scarcely two decades they have become trendy: big, huge and over-dimensioned billboards. A particular gigantic textile billboard at Dubai airport covers 20,000 square metres, equal to three soccer fields. The warp-knitted banners are eye catchers at places, façades and highways. Products promoted via these banners are ranging from international sports wear to dairy products - like the portrait of the Chinese actor Jet Li on a complete roof in Xiamen shows.

Large-area advertising has become a growing sales field. The manufacturing volume of warp-knitted advertising media has reached a global annual production volume of 400,000 tons

of raw material. The result of the sustainability analysis conducted by VDMA shows the possibilities to reduce cost.

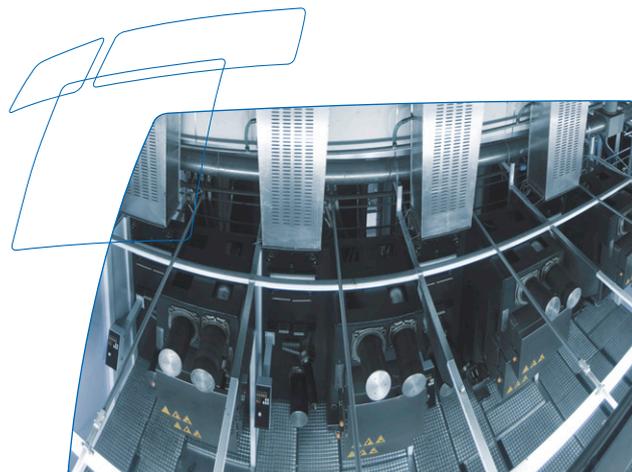
Using today's technology of the German textile machinery industry compared to the machinery offered ten years ago, one quarter of the energy (26 per cent) can be saved for the production of warp-knitted billboards. This is equivalent to 300 billion watt hours (300 GWh) per year and the daily output of the world's biggest hydroelectric power station at the Three Gorges Dam in the Yangtze River!

Back to the global annual production: With an average weight of 125 g/m² of the raw material, the largest place of the world, the Tiananmen-square in Beijing with nearly 40 hectares could be covered more than 8,000 times consecutively with the warp-knitted fabric of polyester filaments. Or in other words: The textile fabric produced annually for advertising purposes would be sufficient to cover completely the special economic zone of Hong Kong three times. The textile fabric produced would also be enough to transform the space of 3,442 square kilometres occupied by the city of Guangzhou in South China with its eleven million inhabitants into a mega-billboard.

Manufacture:
Effective, hard-wearing and cost-efficient

These comparable figures catch the attention and at the same time they should give rise to think about sustainability aspects and options to save costs during the production of these laminated and coated fabrics. Therefore, energy and resource-saving manufacture is in the focus of research and development in the competition for cost-efficient and hard-wearing billboard material.

The textile products used for large-scale publishing have to stand meteorological stress factors, such as wind,



varying temperatures and rain. In Beijing sometimes they have to endure sandy windstorms, in Shanghai humid heat during summer. In addition they have to guarantee quality printing and to be transparent or lightproof on customer demand. The continuously booming market demands for high-quality supporting material, which can be produced effectively and cost-efficiently. Under these circumstances the Asian, European and American manufacturers make use of the warp-knitting technology, which offers high productivity with fabric widths of up to 6,700 mm without additional making-up procedures.

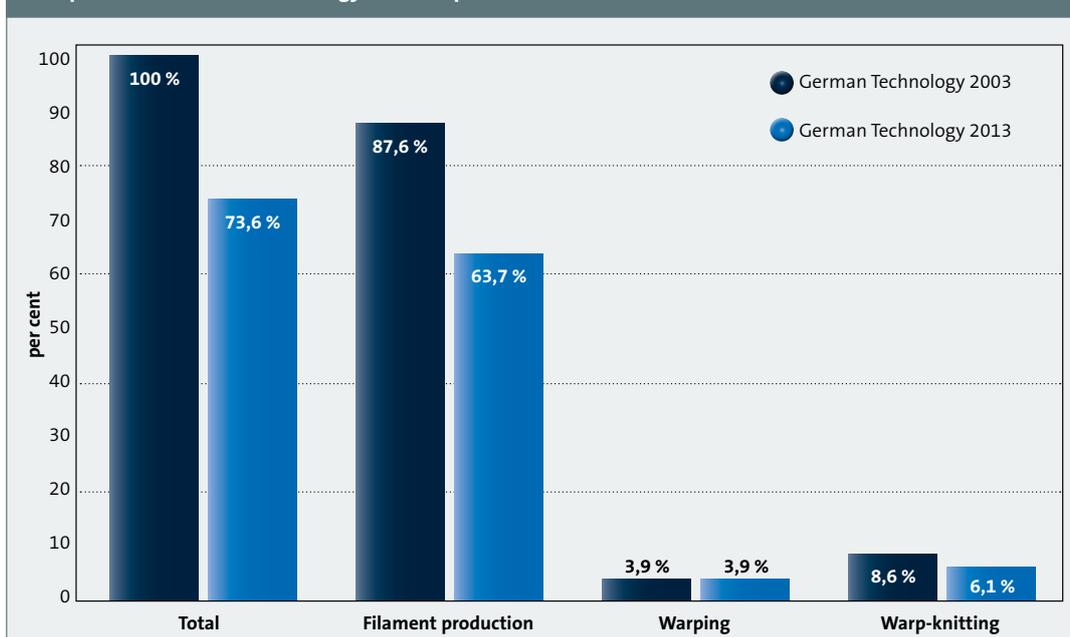
Basis for the calculation of sustainability

Which process steps do these textile advertising materials undergo, that are typically warp-knitted from polyester yarns? In the process step spinning, polyester yarn is manufactured – here the count of dtex 550 f 96 PES serves as comparator basis. As a rule, these threads are used as warp thread in longitudinal direction and as weft

thread in transverse direction. In the next step of warp preparation, the warp threads are warped on sectional beams of 21 inches of outside diameter. For the production of the textile fabrics a warp-knitting machine of 213 inches working width and a machine gauge of E18 (18 warp-knitting needles per inch) has been taken as a basis. Warp and weft thread systems are interlaced with another polyester yarn of PES 76 dtex. The mass per unit area of the reference product is between 60 and 180 gsm; for the calculation an average of 120 gsm has been taken as a basis.

Coating and laminating of the raw material available on rolls varies substantially according to the regions. This process step serves for optical designing of the advertising material and its use in outdoor areas. As for this last step of the value-added chain no standard can be defined, only spinning (filament production), warping of the sectional beams and the warp-knitting process have been taken into consideration for the balance envelope.

Warp-knitted Billboard – Energy Consumption in %



Beside consumption of electrical energy (for filament production, warping and warp-knitting) also the energy required for compressed air and air conditioning for filament production have been studied.

Energy reserves:

More than one quarter of savings

Taking sustainability aspects into consideration, German engineers succeeded in reducing energy consumption

significantly for new machinery. Latest state-of-the-art textile technology generates considerable savings in the process steps yarn manufacturing and warp-knitting as shows the comparison between the level of German technology in 2003 and 2013.

In the overall balance of energy used in the three process steps examined an overall saving of 26 per cent could be obtained. The most important progress has been made in the most energy-intensive step of yarn manufacturing.

Production of filaments – energy-optimised concepts make the difference

Using a 16-thread (formerly 8-thread) spinning system for the spinning process, a significant reduction of energy consumption could be reached at simultaneously increased productivity. As energy and environmental costs in the production of filaments sum up to half of the converting costs in the spinning process, today energy-optimised components are installed in the major parts of the spinning plants. Round spinning beams make save more than 40 per cent of the energy and high-frequency induction heating technology of the godets more than 20 per cent compared to conventional systems.



Warp preparation – high performance and better quality

Modern sectional warping machines as they are produced for warp preparation by German textile machinery manufacturers are characterised by high performance and a significantly improved warping quality. The energy consumption for warping, however, is relatively low compared to the overall process.

Warp-knitting – energy consumption reduced by 29 per cent

In the warp-knitting process a considerably increased production output can be reached with a comparable input of energy using German high-performance machinery. The energy input in kWh per kg of textile fabric can be reduced by 29 per cent. The reduced consumption is among others due to improved gear technology, reduced friction and the reduction of moved mass. Above this, modern warp-knitting machines convince with a low error rate of only 3 errors per 1,000 meters (exceeding this measuring parameter leads to price reductions).

Top rating for German technology

Roland Berger Strategy Consultants, one of the world's leading consultancies had awarded best ratings to the German textile technology for increase of energy efficiency. According to Roland Berger, further development

Facts and figures:

- 26 per cent energy savings (2013/2003 year-on-year)
- increased productivity – the most efficient way to save energy
- high quality for higher profits

of German textile technology should result in an about 15 per cent higher efficiency until 2020. This product-specific comparison along the overall process chain even proves that German technology already today reaches more.

Sources and companies participating

<http://machines-for-textiles.com/blue-competence/stories>

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