

Application Report Wero Swiss, Wernli AG  
How the fluidic muscle optimises textile machines

## Clever solution for yarn tension

How can a company in a high-wage country like Switzerland still manufacture textiles profitably? Wernli AG, also known under the label Wero Swiss, shows how it is done – with clever solutions for bandages and dressing materials. An equally clever solution from Festo helps out: the fluidic muscle DMSP.



Pneumatic spring for tensioning warp beams in looms. Innovative solution consisting of fluidic muscle and pressure regulator.

Wernli was the first textile manufacturer in the world to produce coloured dressing materials. Now it's cohesive and adhesive elastic bandages as well as compression bandages that are securing the company a leading position on the world markets. Exceptional innovations like bandages with sensors, for example for measuring fever or for therapeutic pressure regulation – coupled with an app for intuitive operation – will enable the textile manufacturer to continue to compete on the hard-fought world markets despite an exchange rate for the Swiss franc that makes exports challenging.

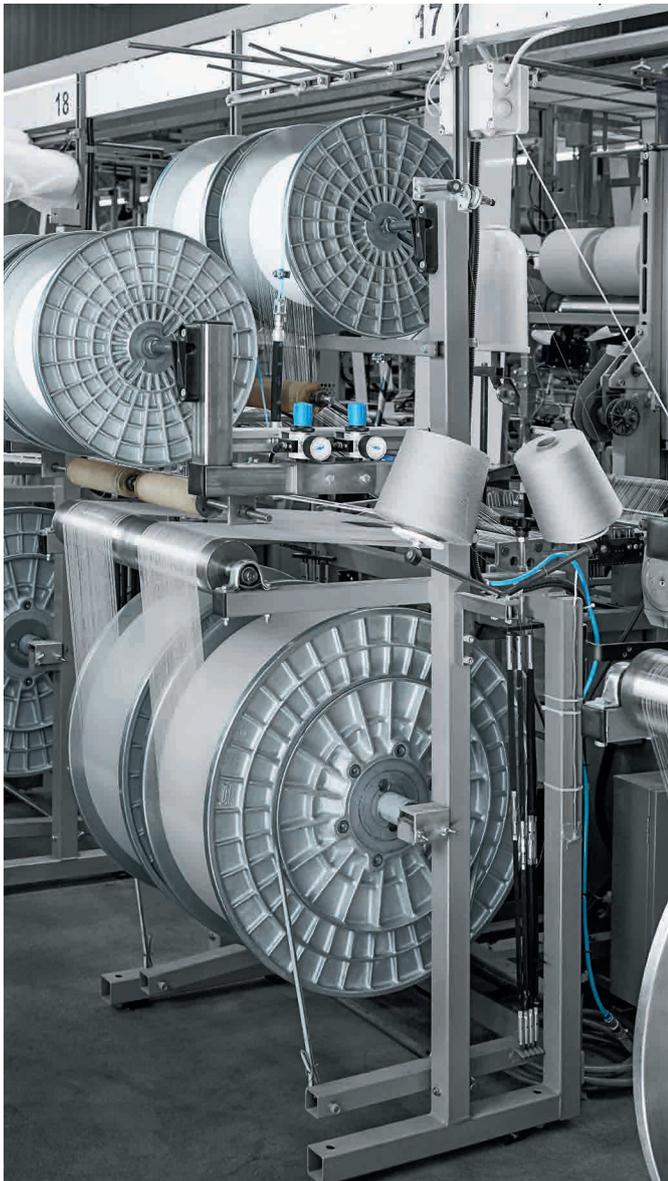
#### **Innovations in small-scale series**

“This not only includes product innovations, but also our flexibility to custom-manufacture small-scale series and above all deliver quickly,” explains Ruedi Leutert, Head of Prework/Weaving and Yarn Purchasing at Wernli. Thus 85% of the 10 million bandages produced each year are exported. The goods are shipped to 27 countries, with Germany accounting for the largest share at present. The company processed 336 tonnes of yarn in 2014. Laid end to end, the finished bandages would reach over 51,000 km or more than once around the Equator.

Add to this the company's readiness to also keep innovating its production processes. Walking through the factory halls with Mr Leutert, it is astonishing to see the potential for improvement the textile engineer manages to find in even tried and tested machines and systems that have been used thousands of times. He implements these improvements step by step. This was the case with the looms for the Bi-Flex type bandages, which need to be elastic both lengthways and crossways.

#### **Constant yarn tension**

In order to achieve this elasticity, the warp beams from which the yarn is continuously unwound must move under constant tension. As more yarn is unwound, the speed of the warp beams would increase and produce an unevenly elastic bandage fabric. Employees therefore had to hang lead weights weighing between 2.5 and 15 kg on the warp beams. The more the yarn was unwound, the more the weight on the warp beams had to be compensated. This was cumbersome, imprecise and prone to accidents because the weights sometimes moved and soiled the yarn or even ripped it midway through the weaving process.



In the past lead weights weighing between 2.5 and 15 kg had to be hung on the warp beams of a loom – Now the job of the weights is done by a smart solution from Festo.

#### **Closed-loop control with proportional valve technology**

Proportional valves allow different control characteristics to be set. This is often necessary in handling and assembly technology or in the furniture industry, where machine cycle times with lower drive speeds must be applied. Proportional valves are also used by automotive parts suppliers and in manufacturing technology, conveyor systems or test engineering for travel to individual acceleration ramps in cases where pneumatic drives must approach delicate goods gently. The variable flow rates of the proportional valves adapt the cylinder speeds to the manufacturing process. The valves control the contact force during polishing or friction welding and the internal pressure for the extrusion of tubing. They also control the torque in the case of pneumatic impact wrenches.

“Our Festo technical consultant told me about the fluidic muscle DMSP,” says Leutert. Thanks to the fluidic muscle there is no longer a need for the weights and the yarn tension is set precisely using pressure regulators at the pressure gauge. The innovative pneumatic drive has clear advantages for this application compared with a conventional pneumatic cylinder: since it does not have a piston rod, friction and therefore the stick-slip effect are not a problem. Quite simply, the movement is completely jerk-free. Together with the precise closed-loop control, the yarns are now optimally tensioned. This guarantees the high quality of the finished bandages.

### Sturdy and precise fluidic muscle

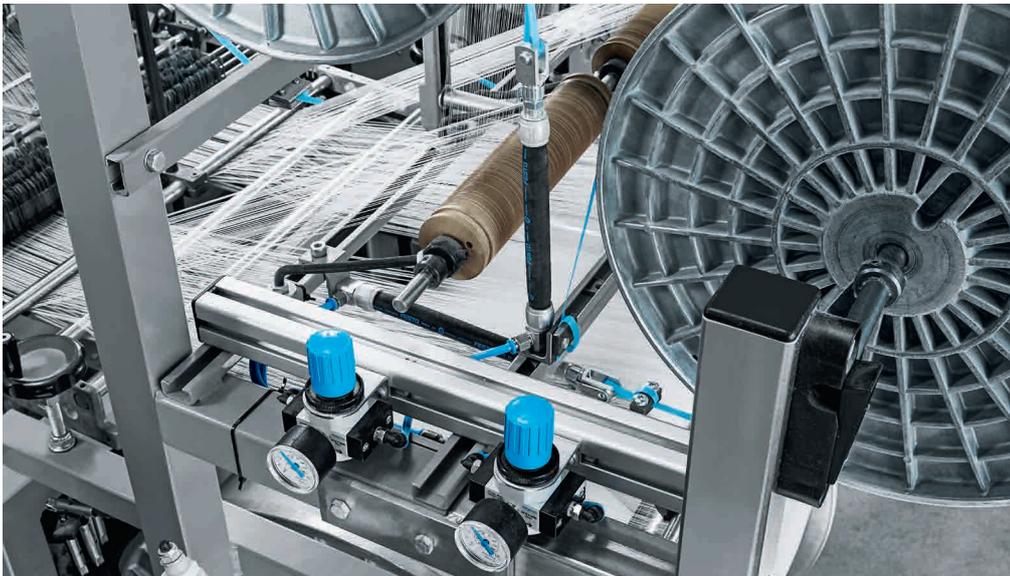
The force of the fluidic muscle is also many times greater than that of a cylinder of comparable size. As a hermetically sealed tube, the muscle is also insensitive to particles and dirt, which is important in the dusty environment of a textile factory. In addition to improving the quality of the products, the risk of accident is reduced: employees no longer have to worry about bumping into the weights as they walk past them or injuring themselves as they attach or remove them. A

further advantage is that the fluidic muscle needs much less installation space compared with the weights.

Textile expert Mr Leutert can also see further optimisation potential for this clever solution: the fully automatic closed-loop control using the proportional valve VPPM and corresponding sensors could replace the manual adjustment of the muscle at the pressure gauge: “I’d be very interested in having the Festo experts give me a quotation.”

In fact, the proportional valve VPPM is a suitable closed-loop controller for different pneumatic applications, thanks to its ability to control the movements of the actuator with different speeds or forces. For each individual application, users can select the appropriate parameters from three presets (fast, universal and precise) at the touch of a button. An optional LCD indicates the pressure and offers diagnostic functions on site. A further clever solution would therefore increase the competitiveness of Wernli.

[www.weroswiss.ch](http://www.weroswiss.ch)



Clever solution: Thanks to the fluidic muscle, there is no longer a need for weights and the yarn tension is set precisely using pressure regulators at the pressure gauge.



Success with textiles despite high wages and a strong Swiss franc: Ruedi Leutert, Head of Prework/Weaving and Yarn Purchasing at Wernli/Wero Swiss.



### **About Festo:**

Festo AG is a global player and an independent family-owned company with headquarters in Esslingen, Germany. The company supplies pneumatic and electric automation technology to 300,000 customers in the fields of factory and process automation in over 200 industry segments. Products and services are available in 176 countries around the world.

The company has around 17,800 employees in 61 national companies worldwide and generated a turnover of some €2.45 billion in 2014. More than 7% of this turnover is invested each year in research and development. 1.5% of this learning company's turnover is invested in basic and further training. However, training services are not only provided for Festo's own staff – Festo Didactic GmbH also supplies basic and further training programmes in the field of automation technology for customers, students and trainees.

**[www.festo.com/textile](http://www.festo.com/textile)**

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