

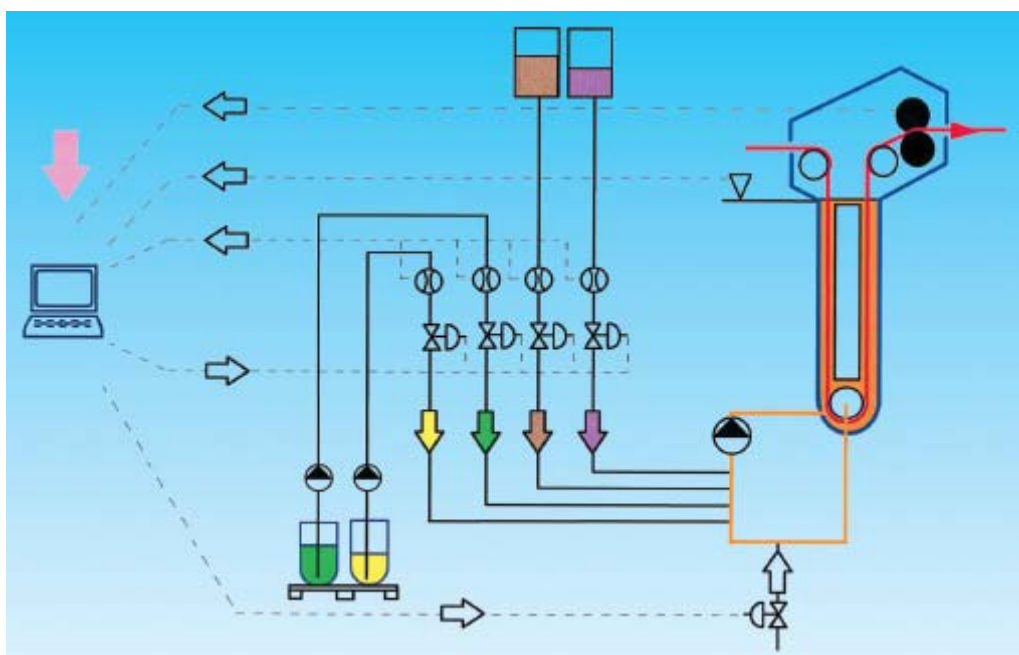
## Improving the efficiency of textile machinery with intelligent data management

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**For outfitters of technical equipment and suppliers to the automotive industry alike, it has now become the norm to keep accurate records of all parameters during individual process steps in order to provide the end customer with a detailed picture of the correct process in the textile value creation chain. While data management already plays a major role in shaping our everyday lives, much of the textile industry is still much too cautious about using this instrument and is failing to take advantage of its potential for reducing costs and increasing production output.**

Today, nearly every vehicle on the road is equipped with data management systems which keep the driver informed about the current fuel consumption, the average consumption for the last few miles and what the remaining range is with the fuel that is left in the tank. A small computer also provides information about the average vehicle speed, the temperatures inside the vehicle and outside, the tyre pressures and engine faults of any kind. It warns the driver if there is a risk of black ice or if the washer fluid in the windscreen washer is about to run out. In short, the computer makes driving not only easier, but also safer.

Even though this type of information could make the day-to-day work of a production manager safer and easier and simplify everyday decision-making processes, to date this type of system has barely made its way into the production plants of the textile industry. Despite this, the parameters which are applied during the different process steps in the individual modules are crucial for attaining production targets. Or to put it differently: only the sum of correctly executed individual processes can ensure that the overall production result is successful.



Data management at IMPACTA

Here, the following parameters play a more important role: quantities of chemicals, pH value, water quantity, temperature and reaction time. For many products (particularly in the area of knitwear) the fabric tension also plays a decisive role. By now, it should be standard for modern machine builders in the textiles sector to accurately measure and document these values in order to ensure long-term process reliability both internally (cost reductions, quality assurance) and externally (reliability for customers, handling of complaints).

Here, the chemical metering system offers the greatest potential for savings. Inductive flow rate meters ensure that the precious additives are dosed with millilitre accuracy on their way into the impregnating bath. Reproducibility can also be increased with the aid of impregnation compartments with a low liquor content and a rapid rate of liquor exchange - such as the Impacta system. With a lower liquor volume, not only is it possible to register volume fluctuations more quickly than with conventional impregnation compartments, but it is also possible for chemical losses to be reduced by up to 80% when changing the bath. Every millilitre of dosed additive is transmitted to the main computer, where the information can then be accessed by the machine operator as a real-time value. In the event of discrepancies from the specified standard, the colour of the display is automatically changed from "green" to "red", and it is also possible to have the system trigger an alarm. An assessment of the combined value of these costs serves the controlling department as a key decision-making aid for pricing and helps corporate development in general.

Modern databases for recipes or formulas also make the day-to-day work of machine operators easier: not only are corresponding recipes saved for all product groups, but these recipes can also be extrapolated for the specific fabric weight. The result: reproducibility and quality of the highest order. The water quantity, temperature, fabric tension and pH value remain a key factor in these recipes. In Europe, water quantities of between 4 and a maximum of 20 litres of water per kilogram of fabric (depending on the process) are now the norm. Without a detailed understanding of individual values this value can increase by as much as a factor of 10 without any improvement in the overall result. One example is washing of reactive dyes: apart from the neutralisation process with around 2 to 3 litres of water per kilogram of fabric, soaping and rinsing are the key contributors with approximately 12 to 18 litres. This amount of water is directed back upstream in a counter-flow arrangement, where it is then available for use in further processes. The water management is, of course, controlled via automatic valve control and stored in the recipe management. If individual parameters are unknown the machine operator would follow the principle of "if in doubt - add more" and feed as much water as possible into each washing compartment, before then discharging it directly into the drain.

The result: in addition to uncontrolled high water consumption and waste water levels, steam consumption escalates to astronomic heights. In the worst case scenario, the amount of energy being pumped into the system may no longer be enough to heat the bath up to the required soaping temperature. As a consequence, this would result in a product with poor washing fastness - despite the use of vast quantities of water and steam - and give rise to claims for compensation. This scenario can, however, be countered through rigorous implementation of the new technology along with simple process monitoring systems.

The same applies accordingly to all other processes in wet finishing. Whatever the process - removing wax and grease, breaking down size or swelling cotton fibres during the mercerisation process - all processes in the textile value creation chain are subject to accurate requirements which must be met without fail (within certain limits) in order to obtain a satisfactory final result. In this context, Benninger supplies not just the technology needed to attain the overall objectives in accordance with the latest findings and developments in

textile technology, but the company also ensures that the quality which is achieved is delivered in a reproducible fashion.

One of the key factors for data management is the sensor systems which are integrated in the machine. The process can only be started and realised correctly if the data which are produced are 100% reliable. If a temperature sensor indicates an incorrect value then no data management system in the world will be able to save the overall result. Therefore continuous monitoring of the "eyes and ears" of a system is still the best insurance policy for ensuring that, once selected, the parameters are maintained in the long term. As well as temperature monitoring with an external thermometer (or alternatively a second sensor), regular determination of the pH value via titration or via the Morapex process, checking of the flow meters through capacity gauging and constant checking of bearings and drives are all important factors for guaranteeing constant fabric tension.

Consequently, once modern technology is in place and correctly set up, the monitoring capabilities and process reliability of a state-of-the-art data management system thus make it possible to deliver top quality in a cost-optimised framework.

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