Recycled yarn – the future reality now

Uster outlines the challenges, and solutions

Uster, Switzerland, 29th March 2023 – Spinning yarn blends of virgin and recycled fibers is a much bigger challenge than any other commonly used blend. But the results can still be acceptable with comprehensive quality testing, know-how and experience – as well as the new Uster Statistics 2023 edition as a vital benchmarking tool.

The European Union has defined a strategy for sustainable and circular textile production, to make the sector greener and more competitive. Part of this 2030 Vision for Textiles calls for all textile products on the EU market to be durable, repairable and recyclable – and largely made of recycled fibers. Many leading retailers are also championing the use of recycled materials from 2030 onwards.

The use of mechanically recycled fibers in spinning has specific quality considerations: such fibers have a higher short fiber and nep content and may often be colored, particularly if post-consumer material is used. It's also true that recycled yarns have limitations in terms of fineness. Officially, a yarn can only be branded `recycled´ when spun with more than 20% recycled fibers. This is set by the Global Recycled Standard (GRS), a voluntary product specification for tracking and verifying the recycled content of materials in a final product.

Spinning recycled yarns

Blending virgin and recycled cotton together is well known as a challenge for spinners. The smartest spinners and world-class processes simply can't overcome the fact that some important quality parameters will be adversely affected. It's clear that the use of recycled cotton in a blend with new fiber will impact on both the overall yarn strength and its CV%. Even the most sophisticated spinning machinery won't fix the problem.

Awareness of the risk of yarn quality deterioration with recycled fiber blends means that quality control is the only way to assure customer satisfaction. Even then, the task is far from simple. When spinning new materials, Uster strongly recommends taking both numeric test results and graphic evaluations into account, to eliminate the risk of problems in further processing.

Avoiding fabric defects

Spinners face major difficulties because of the high proportion of short fibers in recycled cotton (CO-R) and the fact that, when mixing with virgin cotton (CO), the fiber length distribution is sometimes suboptimal. This results, for example, in incorrect guidance of short fibers in the drafting system and potential draft errors.

In tests, a Ne 20 rotor yarn of 75% CO and 25% CO-R was compared with a 100% cotton yarn. The values for evenness, imperfections and hairiness were measured and produced a CVm% of 22% in Uster Statistics, which might appear to indicate excellent quality for the recycled yarn if relying on numeric values alone. In fact, closer analysis with Uster Tester spectrograms showed a

draft error at the draw frame. In this case, the problem was detected before causing an uneven structure in the subsequent fabric made from the yarn.

Samples of mechanically recycled yarn

Common language for better communication

It is an unavoidable fact that blending virgin and recycled cotton will make some quality parameters worse. Using recycled fiber is often desirable, but it creates a new reality for the industry. To cope with the risks, better communication and a common understanding are needed throughout the textile value chain.

Uster's common language of quality will be – once more – vital in improving communication throughout the textile industry. For 66 years, Uster Statistics have been the only globally-accepted quality benchmark and the foundation for industry-wide quality improvement. The new edition, to be launched at ITMA 2023, includes for the first time a section for recycled yarn.

The Uster Statistics 2023 edition features an extended range of fiber data, supporting sustainability goals. An ideal fiber mix – with or without recycled content – also ensures meeting quality requirements for least waste. Fiber graphs will be newly available for every process step.

The new reality

Spinners need to find a way to transform their mills to a more sustainable future. The challenge of spinning recycled yarns must be acknowledged, and the big goal here is to succeed with it. Spinners already have the tools they need, allowing them to benefit from both laboratory instruments and quality monitoring systems to optimize quality and productivity. Their experience, combined with Uster knowledge and latest technology in quality control and analysis systems, are a promising basis for a sustainable future for the textile industry.

The new reality of the need for closer communication and cooperation will include all players from fiber to fabric. It's an essential debate for everyone – and Uster is ready to take the lead.