## PRACTICAL CASE

Preventing wrong twist levels at winding with Uster Quantum 4.0

Can Uster Quantum 4.0 detect distinctive differences in twist? Uster Quantum 4.0 with its new density feature closes a gap in quality assurance.



A customer in China, producing Ne 24 yarn from 65/35% PES/cotton on different unlinked ring spinning machines, discovered that one of its machines was outputting yarn with high twist, due to a technical malfunction. This yarn was becoming mixed in with normal yarn at the winding stage, without being noticed by the operators.

## Uster solution

The new density feature in Uster Quantum 4.0, detects distinctive differences in twist which are reflected in the compactness of the yarn. The density channel is active after the splice over a defined reference length (Fig. 1). With the help of this density feature, the customer was able to rewind the yarn and reliably separate the higher twist yarn. This avoided a potential loss of USD 51,000.

Previously it was impossible to distinguish different twists in the yarn with the naked eye, or even with the help of the yarn clearer. In this case, the fault was initially detected in the laboratory through manual yarn twist testing. (Fig. 2) Packages totaling 1.21 tons out of a production of 5.0 tons were found to be affected by the different twist levels.

Yarn produced up to that point was contaminated and unusable for further processing. The spinner would have to scrap it and replace it with new production. This would be a financial loss for the spinner, and prevent delivery on the promised date, damaging the spinner's reputation.





Fig. 1: Picture of the CCU screen with the density settings

Fig. 2: Reference cops and high twisted cops

After analyzing the cause and the yarn defect, a long-term solution for such problems was discussed with the customer.

With Uster Quantum 4.0, the new 'density' feature combines the capacitive and optical sensor signals in the same measuring head. Different twist levels then show up in the compactness of the yarn. The density channel works after the splice, over a reference length. Continuous density is also measured in a second channel. The customer installed the new yarn clearer on a winding machine and then rewound the same yarn. The density feature enabled the customer to be confident that the higher twist yarn would be identified. This meant that 1.08 tons out of the total of 1.21 tons of yarn was saved, reducing the loss to only 130 kg.

This was the best solution for the customer. Removing the high twist yarn saved 1.08 tons of yarn which would have otherwise been disposed of, resulting in a high financial loss.

- 1.08 tons of yarn were saved and sold at the normal price level (18,000 RMB/t = 2,830 USD/t)
- If this yarn had been sold to the weaver, it would have contaminated a total supply of 5.0 tons of yarn, worth USD 14,150
- This would have resulted in more quality claims from the weaver, costing more than the price of the yarn itself.

## **Financial impact**

Calculating the cost of a possible claim made the advantages clear – looking at the best and worst possible outcomes if customer did not have Uster Quantum 4.0 and its density channel.

The basis for the calculation was:

- Article : 65/35% PES/CV
- Yarn count : Ne 24
- Total quantity : 5.0 tons, out of which 1.21 tons had quality problems
- Production cost : 2,540 USD/ton
- Selling price : 2,830 USD/ton

The best-case scenario would be if the customer discovered the quality problem and could sort out the affected 1.21 tons. The result was that the customer incurred USD 3,073 in manufacturing costs and a loss of USD 3,424 of revenue - as the 1.21 tons of yarn could not be sold.

The worst-case scenario would be that the customer did not notice the quality problem at all and sold the 5.0 tons of yarn with the wrong twist to the weaving mill for processing as warp supply. Taking typical yarn quantities in warp and weft and a fabric weight of 250 g/m<sup>2</sup>, this resulted in a total production of 40,000 m<sup>2</sup> of fabric without taking waste into account. At a fabric price of 2.55 USD/m<sup>2</sup>, this gave a total value of USD 102,000 for the fabric. Since the defect was in the warp, the entire product would have to be classified as second quality. The discount for might be 50% or even higher, resulting in a calculated loss of USD 51,000.

## **Conclusion and Summary**

- Uster Quantum 4.0 with its new density feature closes a gap in quality assurance. With the density measurement, differences in twist can be detected. This allows problems in the compact units to be identified, or a mix-up of blends with the same or different fineness to be detected at the winder.
- From a financial point of view, in this case, if the entire quantity had been shipped out, a total loss of about USD 51,000 would have been incurred. Whereas, if the customer had discovered the error

early enough to sort out the second quality yarn, the loss would have been considerably less, but still calculated to be 3,424 USD.

- Using Uster Quantum 4.0 and the density feature, the total damage was reduced to 130 kg of defective yarn worth USD 225. The fast reaction time is critical, detecting the deviation as soon as the first defective yarn reaches the winding machine. Uster Quantum 4.0 immediately gives the appropriate quality alarm, so that rapid action can be taken to prevent further damage.

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