

# The TYT-EW and Textured Yarn: New Quality Control Techniques

*Due to today's global market, there is a constant effort being made to reduce the cost of manufacturing while improving the quality at the same time. This is forcing filament producers to rethink their methods of production and quality control.*

For many years, a typical laboratory setup for a Textured Yarn producer included the traditional skein test for measuring crimp contraction and shrinkage properties because of the strong effect they have on the dyeability of the yarns. For this reason, dynamic testing of crimp, shrinkage and entanglement has emerged as a preferred method by many companies compared to the traditional method used.

There are various methods in use around the world for testing of Total Crimp Contraction, True Crimp and Shrinkage such as specified by ASTM D 4031. The traditional test for measuring crimp and shrinkage is an effective way to characterize crimped filament yarns. However, it has several limitations in its application such as the slowness of the test, the limited statistical representation of the product and the human error.

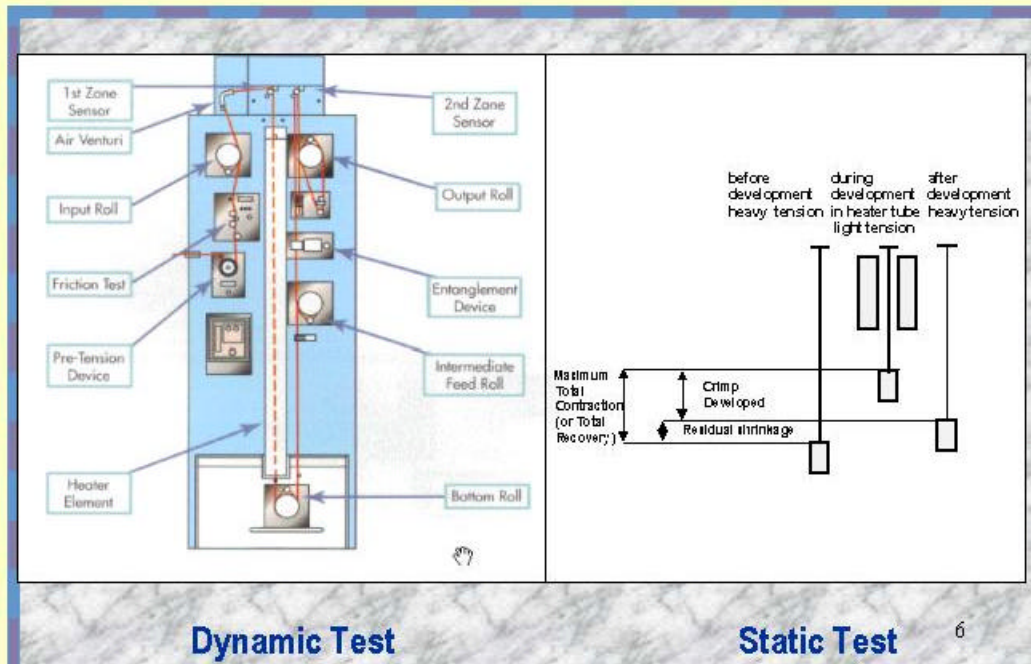
Studies have shown the measurements of crimp are an important factor in controlling streaks in fabrics.<sup>1</sup> This problem is more a concern today because production speeds are higher with doff times becoming faster and faster, increasing the need of higher testing capacity. This is very difficult to overcome with static skein testing. A modern solution is offered with the Textured Yarn Tester (TYT) from Lawson-Hemphill. The TYT employs dynamic testing and is the latest ASTM standard for Textured Yarn titled "Standard Test Method for Textured Yarns Using a Dynamic Textured Yarn Tester". The ASTM designated number is D 6774-02.

Today, many of the texturing machines are equipped with tension control on-line. This is a very helpful addition for process control for detecting intermittent faults throughout the package. However, it offers limited dyeability assurance, as it is not very sensitive to heat related faults (compared to measuring crimp) and will not detect tension related faults after the measurement point.<sup>2</sup> The KDG (knit-dye-grade) method is commonly used for inspection. However, it is slow, laborious, highly subjective, and offers little quality control information. More and more today, yarn producers recognize the measurement of crimp is more important for maintaining quality.

The TYT is unique because it is a two zone measuring system, which separates the true crimp and true shrinkage from the Total Contraction. The principle can easily be understood compared with the skein test. As shown on the next page, the TYT has many similarities to the traditional skein test except the test is performed dynamically. The TYT allows for limits to be set for the properties measured allowing for the faulty position on the machine to be quickly identified. For more detailed information about the information provided in the printout please refer to the printout in .pdf format. The data can be automatically transferred via an Ethernet connection to a LAN system through Windows networking protocol. One factories become used to using the data, they are able to use the TYT effectively as a process control tool for evaluating quality, fixing problems in production quicker, improving quality, provide better analysis of the true production situation, and for R and D with new products. Problems such as aging in nylon can be better understood .



# Comparison of Static and Dynamic Test



The TYT is helpful for designing new products more quickly and for standardizing acceptable quality levels between the mill and the fabric producer. An immediate benefit many mills experience is the analysis of the variability or evenness of the measured properties of bobbins produced on each position reducing the risk of dyeing problems. The TYT-EW is very effective in high speed testing up to 1000 packages in 8 hours. The TYT-EW is recognized as the industry standard with years of proven success. It is the only two-zone test on the market that can truly separate and measure the true crimp and true shrinkage from the Total Contraction while measuring entanglement. The SAK is an industry proven reliable industrial package changer that allows up to 36 ends to be preloaded from a creel directly.

In controlling the various steps of production, the techniques outlined above approach quality in a similar manner as the end user views the supplier's quality. These techniques used with other required tests will greatly enhance efforts in the industry.

## REFERENCES

1. E. Unsal, A. Demir, 2001, "Determination of the dyeability properties of PET textured yarns by TYT equipment", Chemical Fibers International (Vol.51).
2. Prof. Dr. S. Ghosh, K. Carlan, Institute of Textile Technology, "Investigation on the use of on-line tension monitors to detect off-quality textured yarns", Oct. 1996, Chemical Fibers International, Vol. 46.
3. ASTM D-4031-01, "Standard Test Method for Bulk Properties of Textured Yarns".

