

# Loepfe: Triboelectric Yarn Clearing

Prevention of standstills during sectional warping and beam warping as well as the following production steps reduces costs and increases efficiency. However, machine standstills and the resulting quality defects in the finished product can never be 100% prevented, whereas standstills caused by deficient yarn can be prevented. With the efficient triboelectric yarn clearer "YarnMaster Zenit FP", contaminations can be prevented and thus expensive faults in the finished product.

Equivalent to foreign matter detection in the nineties, PP (polypropylene) cleared yarn is becoming the prerequisite for a high quality standard. More and more markets specifically demand yarn cleared from PP from their suppliers.

## The problem

Cotton bales contaminated with synthetic foreign matter result mainly from contaminated cotton fields and packaging remnants. During processing in the spinning preparatory factory, they are reduced to small pieces and evenly distributed during folding. Foreign matter elimination when opening the bale reduces the cutting count in the winding process by only approx. 10 percent.

Experience shows that every fifth machine stop during sectional warping and beam warping is caused by PP contamination (Fig. 1). Yarn strength is essentially reduced (Fig. 2) because there are fewer fibers in the cross-section which causes yarn breaks in further processing. In addition, hooking can also cause machine standstills. The later the standstills occur in the process, the higher the costs thereby incurred. For example, raw-white PP becomes visible only after dyeing (Fig. 3). Clearing this foreign matter improves the yarn stan-

dard considerably and prevents costly complaints concerning the dyed end product.

## Correct method of detection

Polypropylene (PP) and other synthetic foreign matter that is transparent and identical in color with cotton/wool can hardly be recognized with conventional, optical foreign fiber clearing.

To solve this problem, LOEPFE developed the "YarnMaster Zenit FP" triboelectric sensor. This sensor detects synthetic foreign matter independent of the color of the yarn and of the foreign matter, for example white and transparent polypropylene in raw-white yarn as well as finest foreign fibers and operates with maximum reliability thanks to many years of practical experience.

## Functional principle

When the triboelectric measuring principle is used, variable amplifiers adjust the signal to a normalized level. While the yarn passes the sensor, the fibers exchange electrons with the sensor. This effect is referred to as the "triboelectric effect". It is continuously measured by state-of-the-art electronics. When a synthetic fiber passes the electrode of the sensor, it is detected because of the triboelectric voltage difference. The YarnMaster ZENIT FP yarn clearer thus detects synthetic foreign fiber matter, such as polypropylene, polyethylene, polyamide (nylon), etc.

## Defined applications

Cotton and blends are tested, depending on material and blending ratio, in various yarn counts. The elimination of 128 defined sources of error as well as IPI imperfections according to international standards can be achieved. Desired effects are maintained as non-disturbing. Reference lengths can be selected. The classification of the splice connections is performed



TK YM ZENIT FP 21C

relative to groups and also to spindles. In addition to diameter-related imperfections, the SFI and SFI/D surface characteristics developed by Loepfe are also monitored around the clock.

## The advantages

Materials testing with the efficient "YarnMaster Zenit FP" triboelectric yarn clearer can prevent contaminations and eliminate expensive faults in the finished product. This clearly increases efficiency of downstream processes of the spinning mill. In this production stage, undyed yarn particles would result in costly faults. The yarn clearer reduces complaints caused by foreign matter in the dyed end product.

## Optimum solution

A non-optical measuring system causes erroneous results in the detection and clearing of yarn faults as well as foreign fibers with different colors. The application of a measuring system with limited possibilities and low reliability is inadequate and therefore too expensive in any case.

The reference of all measuring systems is the human eye. The finished yarn and the textile surface produced from it meet the quality criteria of the human eye.

In higher market segments, yarns that are free from PP are a basic requirement for success. Perfect yarn clearing allows the producers access to these markets and more attractive prices. With the optical and triboelectric measuring method, Loepfe provides optimum solutions with high economic efficiency. ♦



Fig. 1: A Polypropylene in carded cotton Ne 28



Fig. 2: B Polypropylene in combed cotton Ne 155



Fig. 3: A+B= costly polypropylene fault in the dyed end product