# YARN EVENNESS Tester

**DIAGRAM**

The mass variations or weight per unit length variations are recorded and printed as a Diagram by the Evenness tester. The diagram is an extremely important part of evenness testing. It contains a large amount of information which cannot be provided by the wavelength spectrum, U% value, and the imperfections. Diagrams help to understand the following seldom occurring events long wave-length variations periodic mass variations with wave-lengths which are longer than 40m(which can not be confirmed by the spectrogram. extreme thick and thin places randomly occurring thick and thin places which tend to be available in batches. slow changes in the mean value step changes in the mean value with periodic faults, it can be determined whether the fault is permanently available or occurs only in batches with measurements "within a bobbin", seldom occurring events can be found and changes in the mean value taking place over a number of kilometers can be confirmed. with unusual measured values, it can be proved in many cases by means of the diagram whether these refer to a faulty or to a correct measurement.

**RELATIVE COUNT:**

It is a measure used to calculate the count variations using capacitance method of USTER TESTER. It calculates a value called "Average Value Factor AF". This factor is proportional to the mean count of the tested sample length.

The relative count describes the variation of count between separate measurements within a sample. The single values are calculated such that they are in direct reference to the mean value of the sample which is always considered to be 100%. The relative count is always estimated with reference to a test length of 100m or 100 yards.

From the single-overall report, it is possible to recognize immediately which samples are lying above or below the mean value. The standard deviation provides a reference to the variation in count between samples. As the mean value is always 100%, the standard deviation also provides a reference to the coefficient of variation. If the samples are from the same bobbin this would indicate the "within bobbin" variation and if the samples are from the same bobbin this would indicate the "within bobbin" variation and if the samples are from different bobbins this would indicate "between bobbin" variation.

**VARIANCE LENGTH CURVE:**

The variance-length curve is generally regarded as the most useful technique for expressing the yarn irregularity data. Any fibre assembly has a TOTAL IRREGULARITY CV(T), and this coefficient of variation is made up of two terms. These are the coefficient of variation within length ,CV(L) and the coefficient of variation between lengths CB(L). The co-efficient of variation at different cut lengths provided by the evenness testers provide invaluable information with regard to the variations prevalent at the specific cut lengths. Therefore independently, the shor, medium and long term variations could be studied by estimating the coefficient of variation of the required length. However, such numerical values, cannot directly provide complete information on the source of faults. The spectrogram provides a possibility of localizing the source of fault but with a spectrogram, only faults of periodic nature could be identified and that too, in most cases, only if proceeded by some other means of identifying the machine / processing stage responsible for the fault. When the variations prevailing at different cut lengths are simultaneously represented graphically, it provides the possibility of segregating cut lengths at which abnormal variations occur and consequently identify the process stage which is most likely to be responsible. This is made possible by the "Variance Length Curve" which is a standard feature of most evenness testers.

A variance-length curve can be set out in quite a simple manner by cutting a fibre assembly into pieces and determining gravimetrically the mass of these pieces. The CV value is then calculated from each of these separate values. If this procedure is repeated for various cut lengths and the CV value drawn out, one obtains the variance-length curve. Uster tester can be used to obtain the curve in a much shorter time than is possible by manual analysis. For constructing the variance length, the measuring field length is taken as the basic cut length at which the CV is calculated and plotted. For variations at other cut lengths, the mass of successive portion of material are added up and the CV calculated.

Strictly speaking, the variance-length curve is only a straight line on double logarithmic paper in the medium length range of approx.1 cm to 100m. For cut lengths shorter than 1 cm and longer than 100m, the variance-length curve tends to become flatter. One can easily comprehend that the curve for the same raw material and same ideal processing conditions will always be a straight line with an unchanged angle of inclination. Deviations from the straight line must therefore indicate problems due to the machine or the raw material.

**THEORETICAL LIMIT FOR IRREGULARITY:**

The spinning process is based primarily on a procedure which evenly mixes the fibre, separates each fibre from its neighbors, lays the fibres parallel to each other and draws these out to produce a ? final count. The mixing leads, however, to the fact that each single fibre has the same probability of appearing in any chosen section of the fibre mass. The fibres are therefore equally distributed in the fibre assemblies.

The number of fibres in any section considered is dependent on random variations.

The fibres overlap each other and result, even under the best conditions, in a spun material which has a certain minimum irregularity. With the natural fibres, in contrast to the synthetic staple fibres, there is an additional irregularity because the single fibres themselves have differences in their fibre corss sectional size.

The theoretical investigations have helped to arrive at a formula which will help us to calculate the limiting irregularity.

CV(lim) = 100 /(sqrt(N)

where,

N = mean number of fibres in the cross section.

CALCULATION OF NUMBER OF FIBRES IN THE YARN CROSS-SECTION:

The number of fibres in the cross section of a yarn can be calculated if the fibre fineness and yarn count in tex are available, or can be converted into tex(gram per 1000m)

N = T/Tf

where,

N = number of fibres in the cross section

T = count of the fibre material in TEX

Tf= Fibre fineness in TEX

**INERT TEST:**

The uster evenness testing installations offer two possible modes of operation which are referred to as the

Normal test

Inert test With the "NORMAL TEST" , a signal is obtained from the tested masterial which is in reference to the measuring field length of the applied measuring slot.

In the operating mode "INERT TEST", the signal obtained from the test material is passed through an electrical filter arrangement. Normally, the signal from the test material consists of short and long-term variations which are superimposed on each other. By means of this filter procedure, the shorter-term variations are suppressed in a certain manner, so that only the mean value variations, i.e the long-term mass variations, will be traced out in the diagram. This testg serves primarily to provide,

an indication of the random mean value variations in the test material

a means of localizing and indicating long term periodic variations in the test material

a means of facilitating the setting of the mean value at the yarn signal instrument.

If medium-term varitaions appear in a diagram, one can make these more distinctive by choosing a suitable diagram feed and suitable material speed and operating with the mode Inert test.