

# DRAW FRAME

## TASKS OF DRAWFRAME

Through doubling the slivers are made even  
doubling results in homogenization (blending)  
through draft fibres get parallelised  
hooks created in the card are straightened  
through the suction, intensive dust removal is achieved  
autoleveller maintains absolute sliver fineness

Quality of the drawframe sliver determines the yarn quality.

Drawing is the final process of quality improvement in the spinning mill

Drafting is the process of elongating a strand of fibres, with the intention of orienting the fibres in the direction of the strand and reducing its linear density. In a roller drafting system, the strand is passed through a series of sets of rollers, each successive set rotating at a surface velocity greater than that of the previous set. During drafting, the fibres must be moved relative to each other as uniformly as possible by overcoming the cohesive friction. Uniformity implies in this context that all fibres are controllably rearranged with a shift relative to each other equal to the degree of draft.

In drawframe, the rollers are so rotated that their peripheral speed in the throughflow direction increases from roller pair to roller pair, then the drawing part of the fibres, i.e. the draft, takes place. Draft is defined as the ratio of the delivered length to the feed length or the ratio of the corresponding peripheral speeds.

Drawing apart of the fibres is effected by fibres being carried along with the roller surfaces. For this to occur, the fibres must move with the peripheral speed of the rollers. This transfer of the roller speed to the fibres represents one of the problems of drafting operation. The transfer can be effected only by friction, but the fibre strand is fairly thick and only its outer layers have contact with the rollers, and furthermore various, non-constant forces act on the fibres.

Roller drafting adds irregularities in the strand. Lamb states that, though an irregularity causing mechanism does exist in drafting, drafting also actually reduced the strand irregularities by breaking down the fibre groups.

Drafting is accompanied by doubling on the drawframe, this offsets the added irregularity.

$\text{Variance}(\text{sliver out}) = \text{Variance}(\text{sliver in}) + \text{Variance}(\text{added by } m/c)$

In Statistics, Variance is the square of standard deviation

Two passages of drawing with eight ends created each time would produce a single sliver consisting of 64 ribbons of fibre in close contact with each other. In the ultimate product, each ribbon may be only a few fibres thick, and thus the materials of the input slivers are dispersed by the drawing process. The term doubling is also used to describe this aspect of drawing

Drafting arrangement is the heart of the drawframe. The drafting arrangement should be simple

stable design with smooth running of rollers

able to run at higher speeds and produce high quality product

flexible i.e. suitable to process different materials, fibre lengths and sliver hanks

able to have good fibre control

easy to adjust

Roller drafting causes irregularities in the drafted strand since there is incomplete control of the motion of each individual fibre or fibre group. The uniformity of the drafted strand is determined by

draft ratio

roller settings

material characteristics

pressure exerted by the top roller

hardness of top roller

fluting of the bottom rollers

distribution of draft between the various drafting stages

drafting is affected by the following raw material factors

no. of fibres in the cross section

fibre fineness

degree of parallelisation of the fibres

compactness of the fibre strand

fibre cohesion which depends on

surface structure

crimp  
lubrication  
compression of the strand  
fibre length  
twist in the fibre  
distribution of fibre length

3-over-3 roller drafting arrangements with pressure bar is widely used in the modern drawframes. Bigger front rollers are stable and operated at lower speeds of revolution, this necessitated pressure bar arrangement for better control of fibres. Some drawframes are with 4-over-3 drafting arrangement, but strictly speaking it behaves like a 3-over-3 drafting system except for the fact that fourth roller helps to guide the sliver directly into the delivery trumpet.

#### **DRAFTING WAVE:**

Floating fibres are subject to two sets of forces acting in opposite directions. The more number of fibres which are moving slowly because of the contact with the back rollers restrain the floating fibres from accelerating. The long fibres in contact with the front rollers tend to accelerate the floating fibres to the higher speed. As the floating fibres move away from the back roller, the restraining force by back roller held fibres reduces, and the front roller influence increases. At some balance point, a fibre accelerates suddenly from low to high speed. This balance point is compounded by the laws of friction, static friction being higher than dynamic friction. When one floating fibre accelerates, the neighbouring shorter fibres suddenly feel one more element tending to accelerate them and one fewer trying to restrain them. Thus there may be an avalanche effect which results in drafting wave.