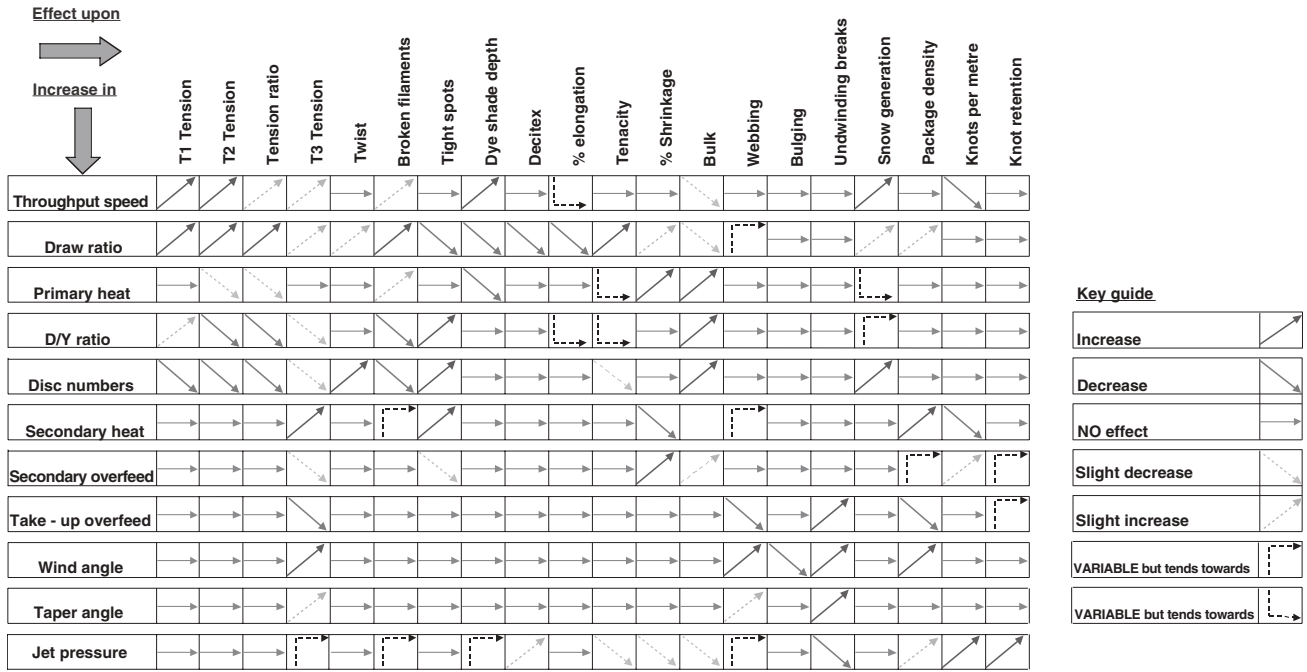
Appendix 1

Textured condition reference chart



Appendix 2

Machine speed and general calculations

D/Y ratio

$$\text{D/Y ratio} = \frac{\text{disc dia.(meters)} \times \pi \times \text{disc rpm.}}{\text{throughput speed}}$$

Disc rpm

$$\text{disc rpm} = \frac{\text{throughput speed} \times \text{D/Y ratio}}{\text{disc dia(meters)} \times \pi}$$

Input shaft speed

$$\text{input shaft speed} = \frac{\text{centre shaft speed}}{\text{draw ratio}} \text{ m/min}$$

Bottom shaft speed

$$\text{bottom shaft speed} = \text{centre shaft speed} \times \frac{(100 - \text{SH overfeed \%})}{100}$$

Take up shaft speed

$$\text{take up shaft speed} = \text{centre shaft speed} \times \frac{(100 - \text{take up overfeed \%})}{100}$$

Traverse rate

$$\text{traverse rate} = 2 \times \tan(\text{wind angle}) \times \text{take up speed}$$

Production rate

$$\text{production in kgs/machine/hour at 100\% efficiency} = \frac{\text{POY decitex} \times \text{input shaft speed} \times \text{no of spindles} \times 60}{10\,000 \times 1000} + \text{\% oil on yarn}$$

Taper angle

$$\text{taper angle} = \tan\left(\frac{\text{yarn depth on package (mm)} \times 2}{(\text{initial stroke} - \text{final stroke}) \text{ mm}}\right)$$

Ribbon phase diameters

$$\text{diameter} = \frac{\text{take up speed (m/min)}}{(\text{Traverse cycles per min.} \times \pi \times N)} \times 1000 \text{ mm}$$

where N is a whole number between 1 and 9

Package density

A = initial stroke length (mm)
B = final stroke length (mm)
C = yarn depth on package (from tube wall to outside of package) (mm)
D = nett weight of package in grams

$$\text{Density} = \frac{954.9297 \times D}{2(AC + 2BC + 112.5A + 112.5B)} (\text{g/cm}^3)$$

To convert rpm to metres per minute

metres per min. = shaft diameter in metres × rpm × π

To convert metres per minute to rpm

$$\text{rpm} = \frac{\text{shaft speed (m/min)}}{\text{shaft diameter in metres} \times \pi}$$

To convert decitex to denier

denier = decitex × 0.9
i.e. 167 dtex = 150.3 denier

To convert denier to decitex

decitex = denier × 1.11
i.e. 70 denier = 77.7 decitex

To convert units of specific stress

$$1\,\text{N/tex} = 10\,\text{cN/dtex} = 11/3\,\text{g/den} = 102\,\text{gf/tex}$$

$$\text{i.e. N/tex} \times 11.3 = \text{g/den} \quad \text{where } 11.3 = \frac{1}{0.9 \times 9.81} \times 1000$$

To calculate mingle air comsumption. m³/hr/JET

Constants
1bar = 14.504 psi
$1\text{m}^3/\text{hr} = 0.588$ cfm
Z = No. of air orifice within jet
D = Diameter of air orifice mm
Pe = operating pressure (bar)

$$\text{Air consumption } \text{m}^3/\text{hr/jet} = (Z^2 \times D \times 0.4648) \times (Pe + 1)$$

To convert to ft^3/min multiply by 0.588

General conversions

To convert metres to yards multiply by 1.0936

e.g. 100 metres × 1.0936 = 109.39 yards

To convert yards to metres multiply by 0.9144

e.g. 500 yards × 0.9144 = 457.2 metres

To convert inches to metres divide by 39.37

e.g. 100 inches/39.37 = 2.54 metres

To convert inches to centimetres multiply by 2.54

e.g. 12 inches × 2.54 = 30.48 centimetres

To convert square yards to square metres multiply by 0.8361

e.g. 8 square yards × 0.8361 = 6.6888 square metres

To convert kilogrammes to lb multiply by 2.2046

e.g. 100 kilogrammes × 2.2046 = 22 046 lb

To convert lb to kilogrammes multiply by 0.4536

e.g. 100 lb × 0.4536 = 45.36 kg

To convert ton to metric tonne multiply by 0.9842

e.g. 2 ton × 0.9842 = 1.9684 metric tonne (i.e. 1 968.4 kg)

To convert gallons to litres multiply by 4.546

e.g. 5 gallons × 4.546 = 22.73 litres

To convert pints to litres multiply by 0.5682

e.g. 5 pints × 0.5682 = 2.841 litres

To convert pressure, in bar, to psi multiply by 14.504

e.g. 2.5 bar × 14.504 = 36.26 psi

To convert flow (air comsumption) from m^3/hr to ft^3/min, multiply by 0.588

e.g. 6.0 m^3/hr × 0.588 = 3.528 ft^3/min

To convert degrees to radians

$$1 \text{ radian} = \frac{\pi}{180} \text{degrees}$$

Index