

## General

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When producing garments from fabrics containing Ingeo™ fiber, the manufacturing specification will generally reflect that for a fabric of similar construction/weight containing traditional fiber types. However there are certain key operations where the melting point of Ingeo™ fiber (170°C) needs to be taken into account.

In order to provide recommendations for these stages, specific research has been carried out. This was done by Jeanologia s.l., Valencia, Spain, a company who specialise in research in garment making and finishing.

The primary fabrics assessed were a 100% Ingeo™ 1/40Ne 24gg knitted interlock and a cotton rich/Ingeo™ blend woven denim. This gave examples at each end of the spectrum from the point of view of fiber composition, fabric construction, fabric weight and garment construction methods. Fiber composition is considered to be the most important criteria and therefore issues raised may be less significant where the Ingeo™ content is less than 100%.

This information is contained within the following guidelines. These guidelines are not exhaustive and will be added to as experiences increase.

### Preparation/cutting

#### laying up:

Equipment: Automatic or semi automatic equipment is recommended.

Fabric Direction: One way, not lapped for knits. Lapped acceptable for wovens where fabric design etc permits.

Maximum Height: Knit fabric - 80 plies, with tissue every 10 plies. Woven fabric – 160 plies

N.B. A fabric relaxation time of approximately 8 hours should be allowed for knitted fabrics.

#### marker fixing::

All methods are suitable, but if using staples these should be placed in waste areas and not on panel pieces.

#### cutting::

As for similarly constructed fabrics of other fiber composition.

Speeds should be controlled however, to avoid high degrees of friction which could cause fusing of edges. Maximum speed recommended for automatic cutting is 3500RPM.

It is essential that the blades are kept sharp at all times for the same reason.

## panel marking:

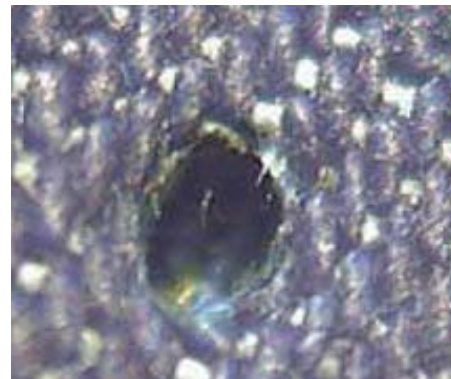
Drill holes are UNACCEPTABLE as they may melt the Ingeo™ fiber causing fusing of the plies and a permanently fused hole in the panel.

Templates and marker pens are recommended or the use of positioning lights where available on automated equipment.

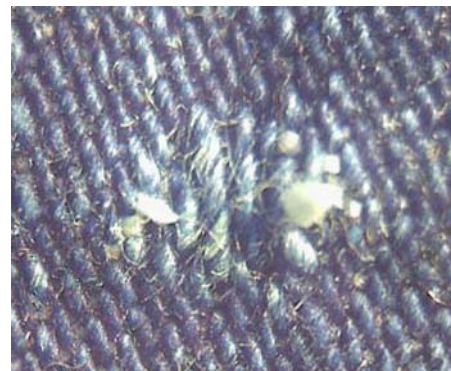
100 % Ingeo™ knit



Ingeo™ - Cotton Denim blend



Before washing



After washing

## fusing::

Low melt point adhesives are required on fusible interlinings e.g. power dot from Vilene.

Knit fabric - pressure of up to 50p.s.i. for 13 seconds with a fusing temperature of 127°C and glue line of 116°C has been successful on knits.

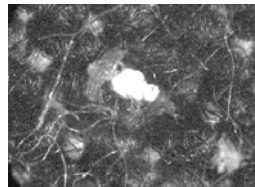
Woven fabric - pressure of up to 80p.s.i. for 15 seconds with a fusing temperature of 127°C and glue line of 116°C has been successful on woven blends.

(Tested to washing temperature of 60°C for 15mins and tumble dried)

Each individual fabric and garment type should be assessed for its own requirements.

## Sewing/ Assembly:

High levels of friction at the needle point may cause sufficient heat to produce permanently fused needle holes. This could be a particular problem with relation to repairing faults/rework.



Holes cause by the needle  
(fibre melting)

## Sewing needle:

The finest size needle possible should be used:

Knit fabric - SES system/ ball point

Woven fabric - SUK

The following table can be used as a guide only and will be influenced by the number of plies being sewn:

Fabric weight- knits (expressed as machine gauge)	needle size:
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14 – 20 gauge	80
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22 – 28 gauge	70
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over 28 gauge	60
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Permanent stitch line

Each individual fabric and seam type should be assessed in order to produce a detailed sewing specification, with attention paid to stitch type requirement and number of plies incorporated into the seam. The following general rules should, however, be applied:

## Thread tension

To be reduced to the minimum possible, as tight tensions can lead to further distortion at the point of needle penetration.

## Thread lubrication:

This will help to reduce friction and therefore minimise potential fiber fusing. All good quality sewing threads incorporate silicone and/or wax lubricants: however further lubrication can be applied to the point of sewing at the needle. This needs to be assessed by fabric as there is a risk of marking the garment.

## maximum stitch density:

Lockstitch constructions - 3 stitches per cm  
 Overlock constructions – 3 stitches per cm  
 Bartack – maximum length 1cm, no of stitches 36  
 Maximum number of plies – 6

N.B. Bartack and buttonhole constructions assessed on wovens only.

## Sewing speed:

To be reduced as appropriate to the fabric and to the seam type.

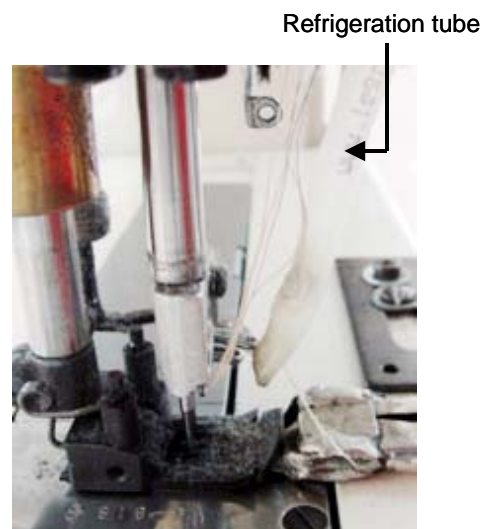
The following table can be used as a guide only and relates to speeds when flat seaming:

FABRIC WEIGHT	SEAM TYPE	MAX SEWING SPEED
<u>KNITS:</u>		
Up to 150 gm per sq m	flat	1000rpm
Over 150 gm per sq m	flat	3000rpm
<u>WOVENS:</u>		
100Z	Lockstitch	3000rpm
	Over-edge	2000rpm
	Twin-needle	600rpm
	Bartack	1960rpm
	Buttonhole	2800rpm

## Needle cooling:

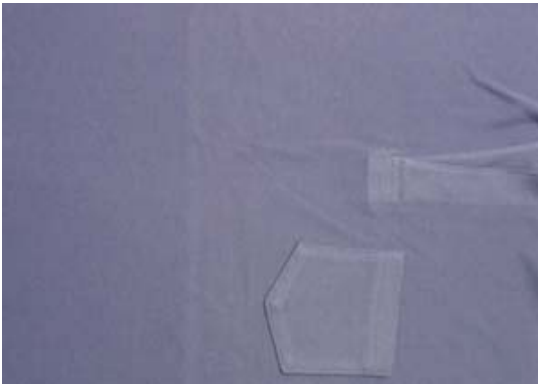
The most significant effect will be made by the use of needle cooling. This can be achieved by the attachment of a fine tube blowing compressed air at the needle point and reduces the need to amend sewing speeds.

A further development of this principle is needle freezing: by attaching ready made units to each individual machine, could eliminate the need to make any reduction in sewing speed.



## Pressing/ Finishing:

Due to the melt point of Ingeo™ there is the potential to create impressions, colour change or fabric damage during the finishing process if sufficient care is not taken.



To overcome this issue the following recommendations are made:

### Temperatures:

To be 90°C for 20 – 40 seconds when using a press and 110°C when using a hand iron. Iron must be in continuous movement over the fabric surface and not held stationary for more than 5 seconds in any one position.

### steam:

To be used only in conjunction with a hand iron held away from the garment. No contact to be made.

### Teflon plates/ protective gauzes:

The use of Teflon plates or protective gauzes is recommended to eliminate both colour change and impressions. This also allows for an increased iron temperature in the case of protective gauze only. (Up to 150°C)

### FURTHER POINTS OF REFERENCE

Jeanologia s.l. - [www.jeanologia.com](http://www.jeanologia.com)

Vilene Interlinings – [vilene@freudenberg.co.uk](mailto:vilene@freudenberg.co.uk)

Schmetz needles – [info@schmetz.com](mailto:info@schmetz.com)

Les Gent of Leicester (needle cooling/freezing) - [www.lgent.co.uk](http://www.lgent.co.uk)

Coats Threads, Loughborough, England +44 (0)1509 552602