PROCESSING ROUTE OF JERSEY KNIT IN LENZING VISCOSE® WITH ELASTANE

DYEING / FINISHING

PROCESSING GUIDELINES

Recommendation for the finishing of Jersey knits in Lenzing Viscose®, with and without elastane.

1. Processing route

1.1a. Open the tube (Blends with elastane (1:1)

Once the knitting procedure is complete, immediately cut the fabrics, and roll at open width to avoid permanent creases of the centre fold line.

1.1b. 100% Lenzing Viscose and blends with Elastane (2 cellulose : 1 elastane)

In opposite to Jersey knits made of 100% and blends with elastane with construction 2 courses Viscose yarn and 1 course elastane filament will stay in tubular because the Elastane filaments cannot be fused whilst the heatsetting process. Fusing is only possible by 1:1

1.2. Preparing the lot:

Only process fabrics from one and the same knitting batch.

1.3. Evaluation of the dimension stability in advance:

As a first step it is important to determine the dimensional stability the 100% greige fabric. This can best be done by drawing a shrinkage square on the fabric or by accurately measuring the greige width before washing a cutting of the fabric at 90°C with subsequent tumble drying. The shrinkage values obtained here can be subsequently used to set the correct width and overfeed at the drying and finishing stages.

Depending on the structure of the fabric, the final finished width should only be approx. 5% greater than the value obtained from the shrinkage test.

1.4. Heat-setting: (see also 1.1b.)

Padding the Viscose fabric at the heat-setting step should be the first relaxing step for the fabric to achieve the best possible shrinkage for the final product.
In the case of jersey knits it is important to use the lowest possible lengthwise tensions to give optimum dimensional stability. This should be considered when processing fabrics in tubular form on jet dyeing machines.
We recommend pre-wetting the fabrics on the pad mangle with a wetting agent 1 – 2 g/l and a washing detergent 1 – 2 g/l, then drying it on a pin stenter and heat-setting this at the same step (190 – 195°C; 374-383°F 45 sec.).
Make sure that the heat-setting time is only calculated once drying is complete (residual moisture approx. 0 %). Instead of pre- wetting sensitive fabrics also can be compacted with pre-steaming.

Depending on the structure of the fabric, the heat-setting width should be approx. 5% wider than the desired finished width.

The overfeed should be set as high as possible – this means that the knitter can correctly set the fabric in terms of the finished weight.

Therefore, it is a good idea to perform a shrink test to ascertain the „zero point“ of the fabric as well as to obtain information about the shrinkage/ extension of the greige cloth. (shrinkage square on fabric to control the dimension stability)

To glue the selvedge is the best choice when the fabric can be dyed without sewing in tube as a result of the structure of the fabric or the machine in use.

Otherwise we recommend sewing the tube prior to dyeing.

1.5. Dyeing of Lenzing Viscose® (CV) jersey knits:

1.5.1. Fabric Scouring (prewashing):

The liquor temperature should be 50 / 60°C (122°F / 140°F) before loading the fabric, to counter the inherent “wet stiffness“ of regenerated cellulose. For the same reason, any crease preventing lubricant should be added to the scour bath before loading.

General recipe: approximately

1	g/l	soda ash
1	g/l	washing agent (possibly additional washing agent for elastane blends)
x	g/l	sequestering agent (advantageous for elastane blends)
x	g/l	preventive against running creases (lubricant)

Load at 50-60°C (122-140°F), heat to approximately 85°C (185°F) @ 1°C/min, hold 20 min. Follow with 2 x warm rinses and then neutralise.

1.5.2. Dyeing:

All dyestuff ranges normally used on cotton can be used on Lenzing Viscose®. Dyeing is normally performed with reactive dyestuffs with preference given to hot-dyeing reactive dyestuffs. Depending on the fastness requirements, direct dyestuffs can be used for light to medium shades.

Depending on the machine type, care should be taken that the liquor ratio is as high as possible (1 : 10 – 1 : 15).

The machine should be loaded at about 20 – 25 % under its nominal “cotton” capacity to ensure even dyeing results, due to the strong swelling of regenerated cellulose.

The speed of fabric circulation should be as low as possible within the limitations of achieving an even dyeing. (Dyeing should be *“As slow as possible, as quick as necessary”*)

In general, dyeing should be performed as “gently” as possible to prevent surface work up and minimise fabric extension. The jet nozzle should be opened as wide as possible and minimum nozzle pressure used. Machines with a high lift between the liquor surface and the guiding winch wheel are not recommended due to high fabric extension.

As stated above, it is important to use the lowest possible lengthwise tension for jersey knits. For this reason the use of Soft-flow machines for scouring and dyeing is of advantage as they exert the lowest lengthwise fabric tension.

1.6. Unloading of dyed fabrics:

Fabrics should ideally be processed immediately after unloading from the dyeing machine. If the fabrics are stored for too long wet in rope form, permanent creases can form which cannot be subsequently removed. Dewatering by nip or suction slot is preferred as centrifuging the wet fabric often results in creases.

1.7. Drying of Lenzing Viscose® jersey knits:

Before drying the fabric, reference should be made to the greige fabric shrinkage result (as detailed earlier) to determine the correct width and overfeed required to optimise the final dimensional stability of the fabric.

Lenzing Viscose® should be dried at no greater than 130°C (266°F). To achieve the best possible fabric stability it is generally better to dry the fabrics on a relaxed or belt dryer (e.g. Santex relax dryer). The optimum equipment for drying jersey knits is considered to be a belt relaxed dryer with width control / overfeed capacity at the entrance. This allows the fabric to enter the relaxed drying zone slightly over wet width (approx. 5%) and with maximum overfeed.

If drying on a standard stenter frame, the maximum possible overfeed is generally required to achieve correct fabric shrinkage. The fabric width is generally set greater than wet width at the stenter mouth.

Fabrics can be padded with softener, before drying, to achieve an even moisture content throughout the fabric piece and to guarantee an equal drying and shrinkage effect.

1.8. Finishing of Lenzing® Viscose (CV) jersey knits:

Finishing with a cross-linking resin is highly recommended as this improves dimensional stability and reduces the tendency to pill.
Example for a high-grade-finishing recipe:

approx.	80 – 100	g/l	of low formaldehyde (DMDHEU)
approx.	24 – 30	g/l	catalyst ($MgCl_2$) – approx. 30 % of the resin amount
approx.	20	g/l	polyethylene emulsion
approx.	20	g/l	softener

pH of bath approx. 5.5 – 6.5

Large quantities of silicone softeners often have a negative impact on pilling behaviour.

Pick up approx. 70 %
Drying and curing for 3 – 4 min. at 150°C (302°F) or
45 – 60 sec. at 170°C (340°F)

1.9. Final finish:

Compacting gives greater dimensional stability and imparts a special handle and sheen. The essential pre-requisite for compacting is a residual fabric moisture content of 11 – 13 %. Fabrics which are too dry tend to loose the compacting effect after processing

1.10. Material testing – fabric performance values:

As detailed in the previous sections, efforts should be maintained to control the fabric tensions and set widths throughout the processing route to achieve optimum dimension stability.

For 100% Viscose fabrics it is even harder to achieve a good dimension stability, therefore it is important to work at the lowest possible tensions and especially for the first contact of the greige fabric with liquor (water) it is important to give Viscose the possibility to relax (shrink).
Viscose is well known for the so called “memory effect” which means if Viscose is treated from the beginning with high tensions it will remember this tension till the end of the finishing route. The shrinkage values could possibly not be good enough later on.

In general, blends of Lenzing Viscose® with elastane tend to give improved dimensional stability.

2. Summary: Processing Jersey knits in Lenzing Viscose® (CV)

Knitting construction, -Blends with elastane, Heat-setting

Test shrinkage behaviour of greige fabric in advance.

Minimise tension in preparation and dyeing (low elongation)

Drying and Relaxing: Belt dryers, relax dryers recommended

Finishing: Improved fabric stability and less creases / washing appearance / pilling performance

Compacting: Check correct moisture content before processing

The information published here is given in good faith and is based upon our experience to date when processing Lenzing Fibers. However these recommendations should be regarded as guidelines only, and it is the responsibility of the user to test the suitability of processes or products for a specific application.

CONTACT

Lenzing Fibers: Lenzing Aktiengesellschaft, Technical Marketing Department, A-4860 Lenzing - Austria
Tel: +43 7672 701 3448, Fax: +42003 7672 918 3448, e-mail: tech.marketing@lenzing.com

Hong Kong: Lenzing Fibers (Hong Kong) Ltd., 26 Harbour Road, Wanchai, Hong Kong
Tel: +852 (2827) 6055, Fax: +852 (2827) 9591, e-mail: hongkong@lenzing.com