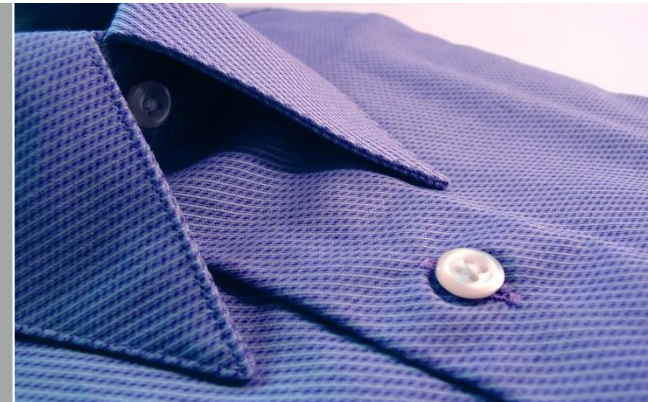




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Shirt Interlining – Finishing and Function



Shirt Interlining



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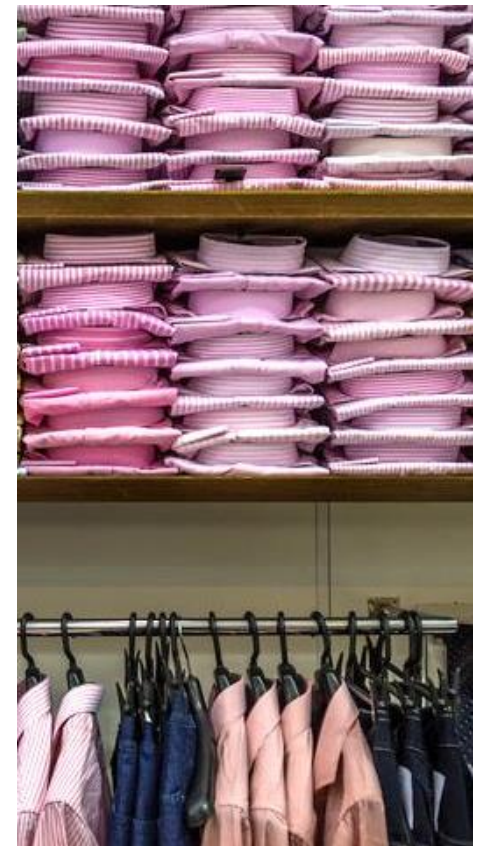
- inside collar, cuffs and front placket (seam)
- essential part of every shirt
- invisible, but influences the visual appearance and gives a unique look (handle, volume, shape, design)
- a failure in the interlining, esp. at the collar makes the shirt unusable



Shirt production figures

The biggest countries of woven shirt production (in million shirts)

top 5 countries	Exports to EU 2011	Exports to US 2011	total	%
China	123	127	250	
Bangladesh	116	115	231	
India	51	31	82	
Indonesia	17	45	62	
Vietnam	21	38	59	
			684	68 %
Turkey	26	2		
Honduras	0	22		
others	172	103		
total	526	483	1009	100 %



Quality characteristics



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high and stable
whiteness



low shrinkage

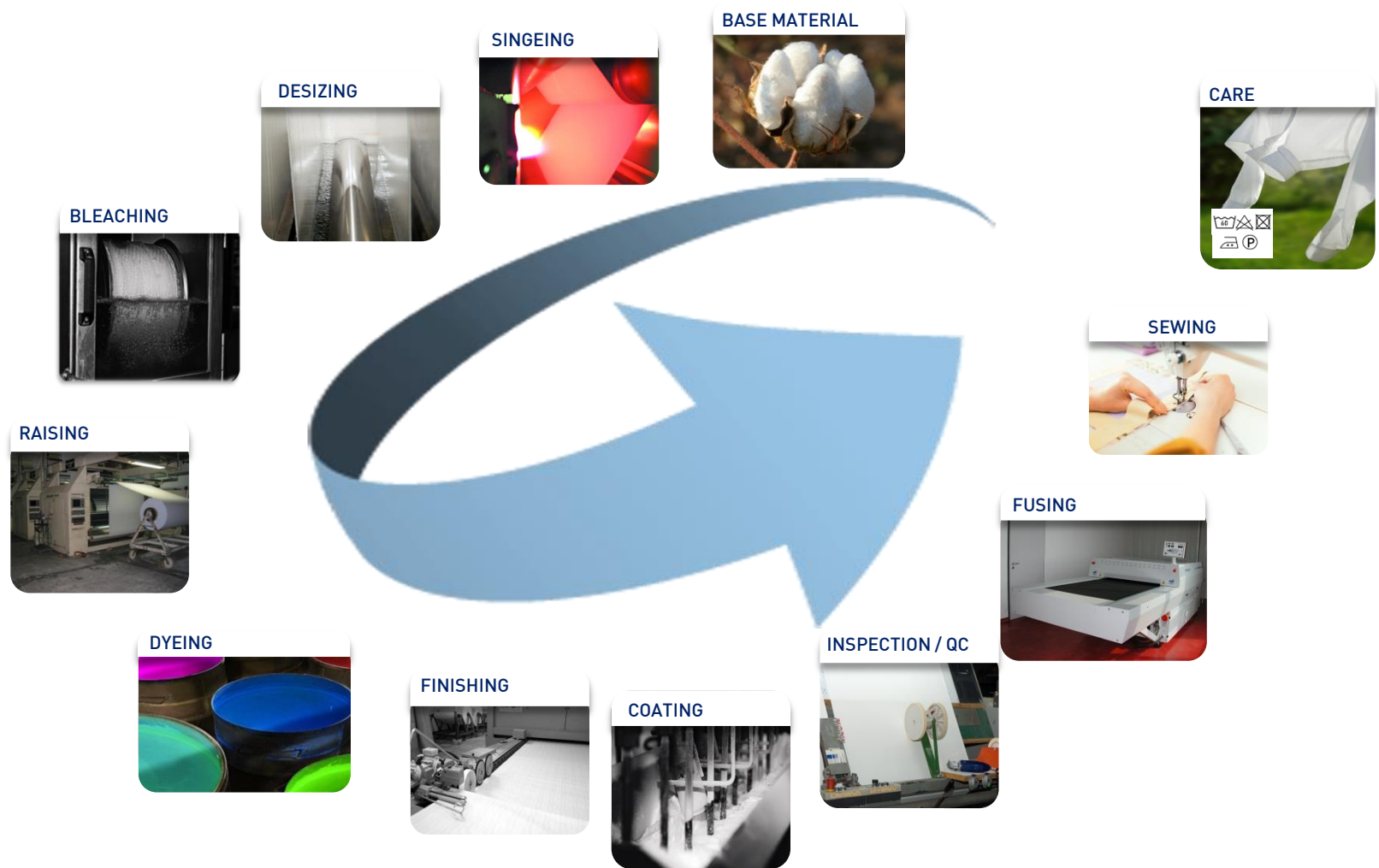


perfect coating

Production steps



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Base material



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- **cotton, woven**
more than 95 % of the shirt interlining articles are made of woven cotton fabrics due to handle (voluminous), shrinkage properties, washability
- **polyamide / polyester**
woven or weft insert for light-weight interlining articles



Singeing

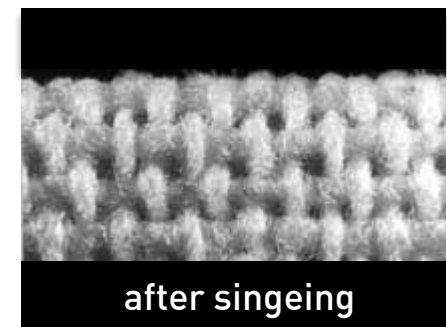
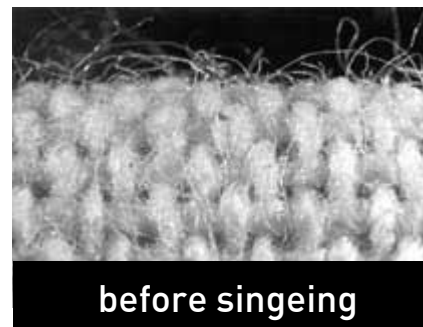
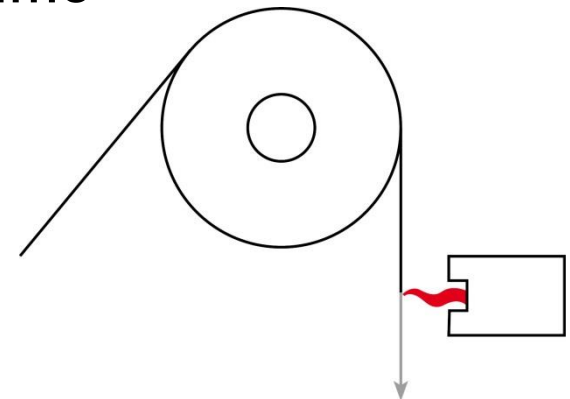


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During the singeing process, protruding fibre ends are removed by burning down with a gas flame

Advantages of singed fabrics are

- smooth and fibre free surface
- increased and even wettability
- even surface after dyeing
- improved coating result



Desizing



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Size improves the running properties of the warp during weaving.

Before finishing this size has to be removed to ensure:

- perfect bleaching result / high level of whiteness
- even dyeing
- soft handle
- good absorbency



General recommendations for desizing

All types of synthetic sizes need time for absorbing water and for swelling.

The dwelling time for good degradation increases if:

- solubility and water penetration is reduced in case of
 - additionally used sizing assistants (fats, additives)
 - blends of size with different water absorption
- penetration is low because the sized warp yarn was overdried

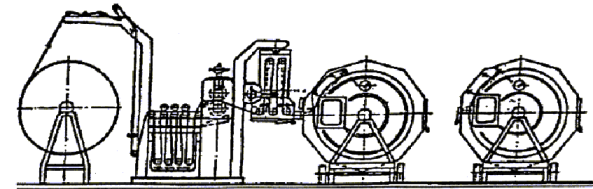
Starch and modified starch sizes can be desized with amylases (cold or hot) or with persulphates in a cold pad batch process

Desizing – Starch size



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Pad batch / pad roll starch size



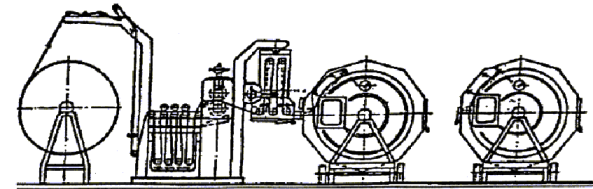
padding	6 – 10 g/l	PERIZYM TAW D.C. (80 – 90 °C)
dwelling	4 – 8 h	
rinsing	1 ml/l	NaOH 48 °Bé
		or
	2 g/l	soda ash
		2 – 4 chambers hot / warm

Desizing – PVA sizes



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Pad batch / pad roll PVA sizes



padding

2 g/l

PERLAVIN NIC

0.5 g/l

PERIQUEST BSD

dwelling

4 – 10 h

rinsing

1 g/l

PERLAVIN NIC

0.5 g/l

PERIQUEST BSD

pH 8 – 8.5

Alkaline pretreatment



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- removing of cotton accompanying substances (fats, waxes, hemicelluloses, pectines)
- better rewetting properties
- swelling of the fibre
- increases the degree of whiteness during subsequent bleaching

Common recipe for wet-in-wet: 1 – 2 g/l PERLAVIN NIC
40 ml/l NaOH 50 %

Important: Minimum rinsing temperature = 80 °C

This avoids the redeposition of the already dissolved impurities

Bleaching



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- removing of coloured impurities
- removing of the seed coats
- good dyeability
- reproducible degree of whiteness

There are various possibilities to bleach interlining articles...



Possible bleaching routes



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full white interlining articles

2 step bleaching

cold pad batch
bleaching with desizing

pad steam bleaching

resin finish

coloured interlining articles

cold pad batch

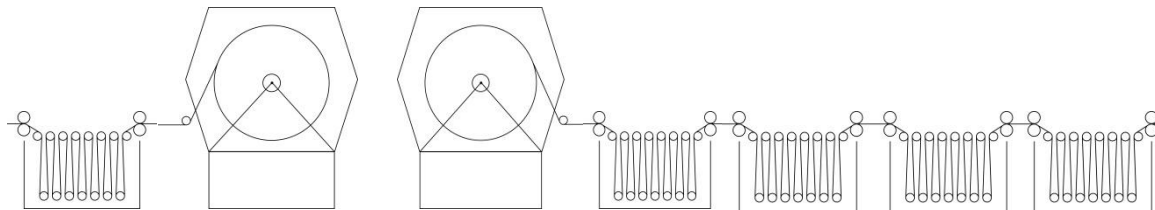
reactive dyeing

resin finish

Bleaching with desizing – Cold pad batch



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padding	4 – 8 g/l	PERLAVIN NIC
	4 – 6 g/l	PERISTAL PD (or PERISTAL PSK conc.)
	20 – 40 ml/l	NaOH 50 %
	40 – 80 ml/l	H ₂ O ₂ 50 %
	4 g/l	persulphate (optional for starch size)
dwelling	18 – 24 hours	
washing	95 °C / 95 °C / 80 °C / 60 °C / 30 °C	

for high degree of whiteness a second bleaching process has to follow

Bleaching – Pad steam bleaching



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impregnation wet-in-wet

- 2 – 4 ml/kg PERLAVIN NIC
- 6 – 10 ml/kg PERISTAL PSK conc.
- 15 – 40 ml/l NaOH 50 %
- 25 – 40 ml/l H₂O₂ 50 %

dwelling (saturated steam)

10 – 20 min at 102 °C

washing

85 – 95 °C / 85 – 95 °C /
70 °C / 30°C



Raising

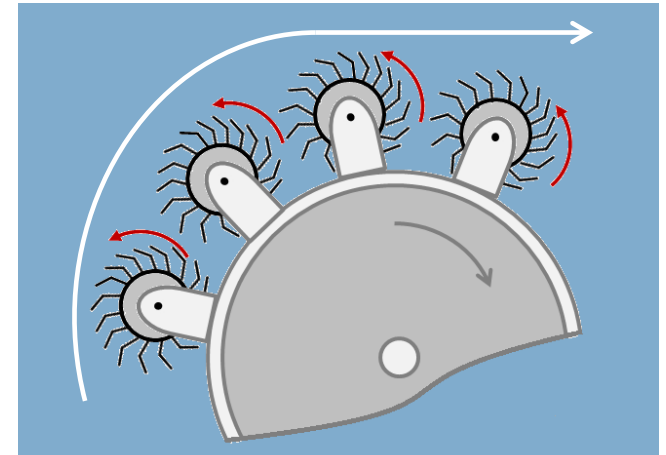


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→ for a voluminous and soft handle

Raising machine

- teases out the ends of the fibers in the cloth to produce a nap
- has a large main roller with several small ones positioned around it
The small one (raising card with metal bristles) rotate quickly, in either the same direction or opposite of that of the cloth.



A wide range of dyeing processes are possible, depending e.g. on the available machinery, the used reactive dyes, depth of colour shade, types of salt and alkali.

Product recommendation for cold pad batch dyeing:

dyeing	1 – 4 g/l	PERIWET ELB NEW
	1 – 2 g/l	PERIQUEST BSD
soaping	1 – 2 g/l	PERLAVIN SRD
fixing	10 – 30 g/l	PERFIXAN AMZ

Finishing of the shirt interlining fabric



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- dyeing
- optical brightening
 - high and stable whiteness
- handle modification e.g. soft or hard
- shrinkage stability (by resin finish)
 - low washing shrinkage
 - low heat shrinkage
- smoothness after washing (by resin finish)

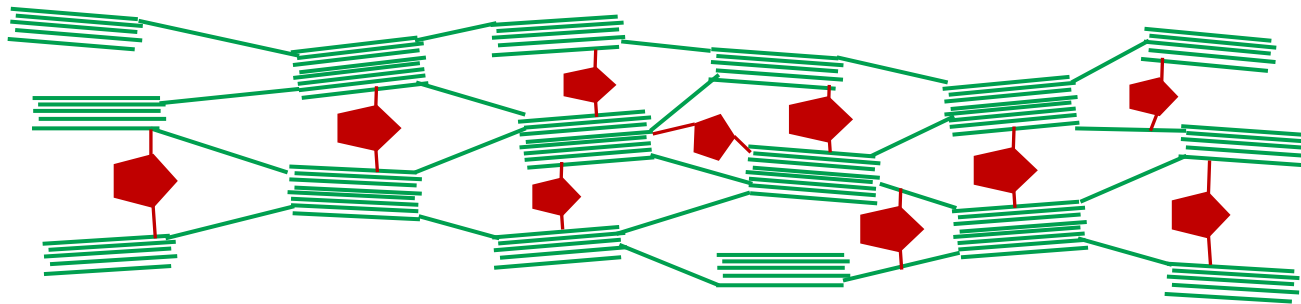


Resin finish - Crosslinking



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- the applied **resin** reacts with the **cotton**
 - the **cotton** molecules are crosslinked by the **resin**
 - these crosslinked cotton molecules can not move anymore during washing
- smoothness after washing and shrinkage stability

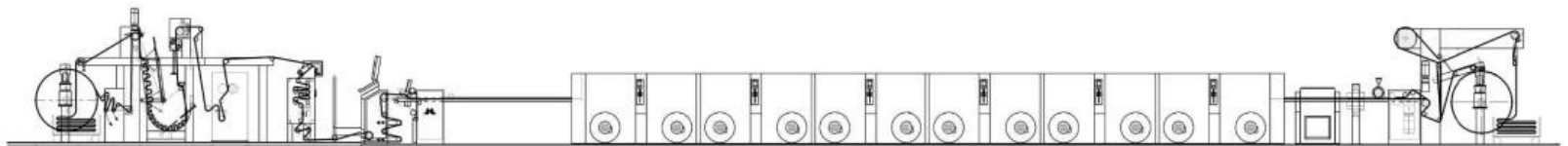


Finishing at the stenter



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- application of the finishing chemicals at the padder (e.g. optical brightener, handle-imparting agents, resin finish)
- drying and curing e.g. shock curing at the stenter



Resin finish – Soft handle



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50 – 100	g/l	PERFIXAN CLY		
		light weight fabric:	50 – 70	g/l
		heavy weight fabric:	70 – 100	g/l
20 – 50	g/l	PERISTAL KSV		
0.5 – 1.0	g/l	PERIWET ELR		
12 – 15	g/l	Optical brightener, e.g. PERIBLANC BN liq.		
20 – 30	g/l	Softener, not yellowing, e.g.	PERISOFT NIS/R	
			PERISOFT NANO	
			PERISOFT SML	

drying, curing: 3 min at 140 °C

Resin finish – Hard handle



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80 – 100	g/l	PERFIXAN CLY
30 – 50	g/l	PERISTAL KSV
0.5 – 1.0	g/l	PERIWET ELR
12 – 15	g/l	Optical brightener, e.g. PERIBLANC BN liq.
140 – 150	g/l	PERICOAT VA 150 NEW

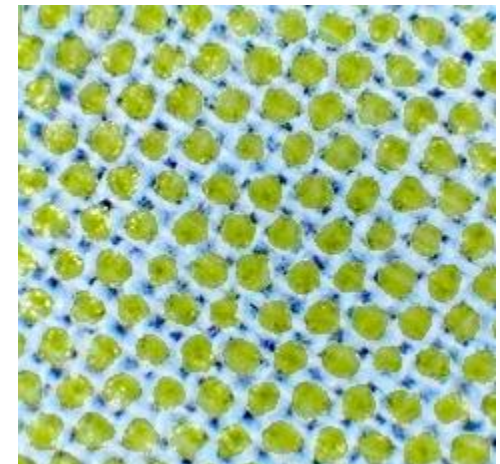
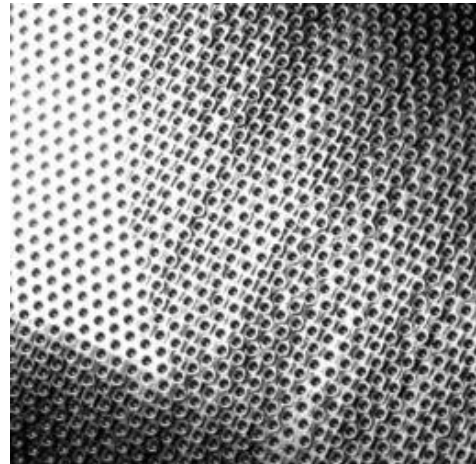
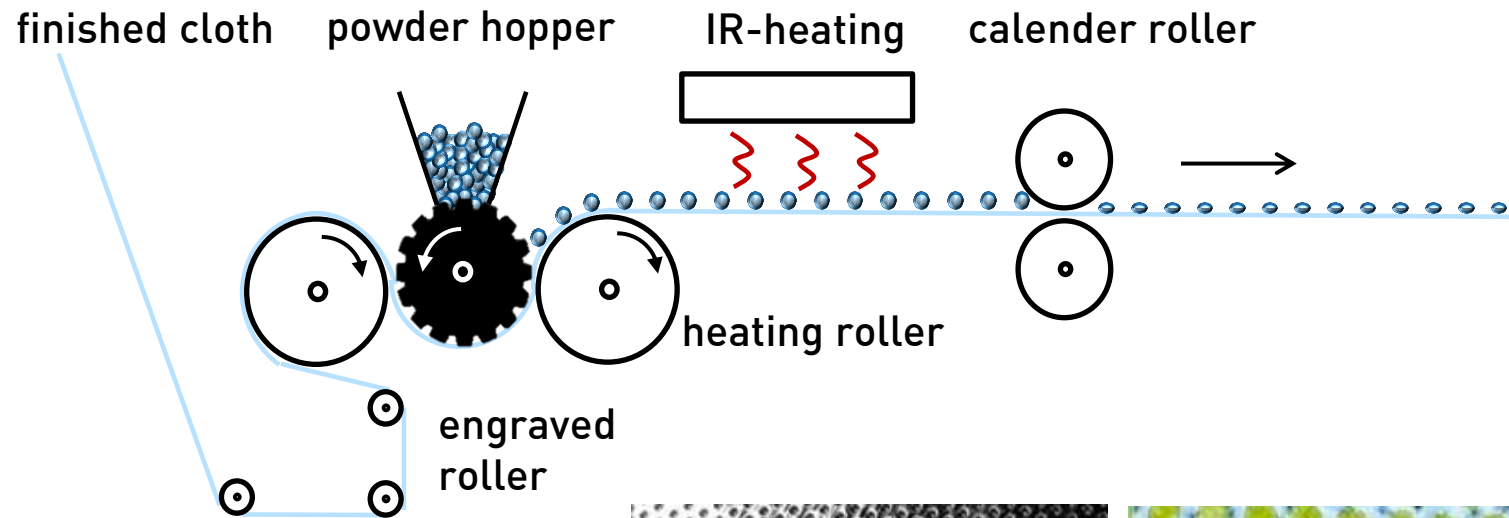
Shock curing at 170 °C

For hard interlining articles with a fabric weight > 130 g/m²

Powder-dot coating



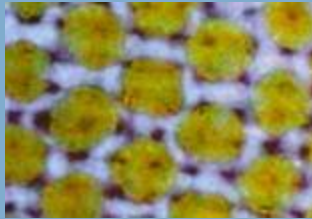
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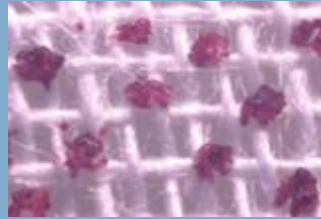
Coating powder



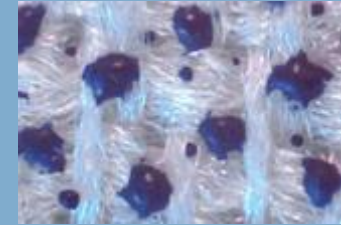
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Polyethylen
(HDPE)



Polyester
(PES)



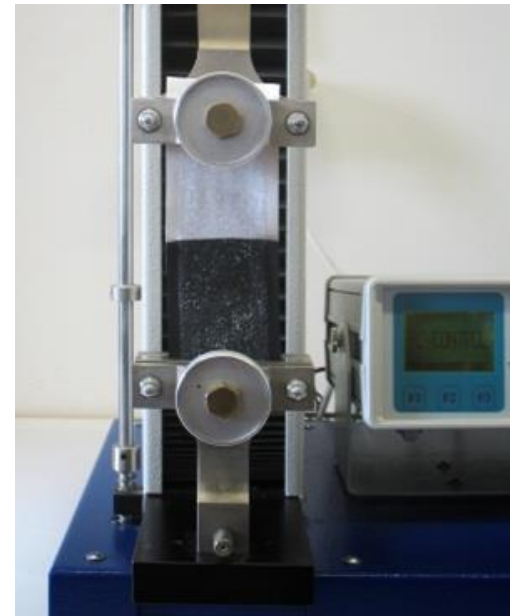
Polyamide
(PA)
PERICOAT MELT PA 11

First control of grey cloth

Intermediate controls between the individual steps of finishing

Final control e.g.

- inspection of rolls
- shade of white / colour
- handle
- wash shrinkage & heat shrinkage
- bond strength values & coating
- weight /sqm & construction
- width



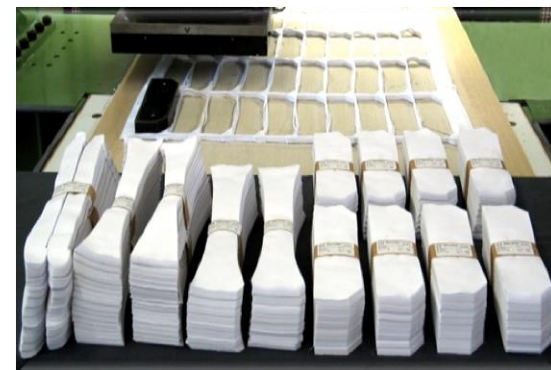
Production of the fused collar



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Step 1: Cutting

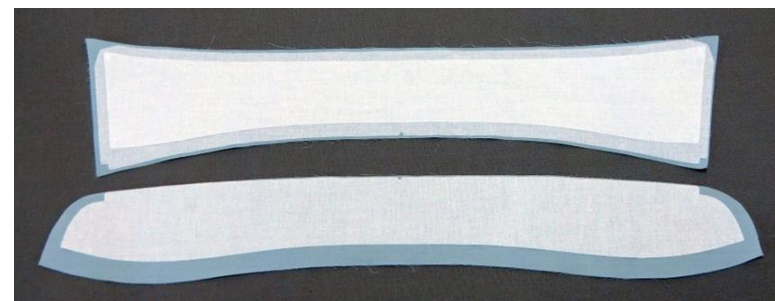
- cutting the interlining parts of the collar (basic, patch, collar band)
- cutting the shirt collar (2 x collar, 2 x collar band)



Step 2: Fusing

- the interlining parts are positioned on the shirt fabric in compliances with the seam distances and fused together on the fusing press

Temperature: 160 – 170 °C
Pressure: 18 – 22 N/cm²
Time: 15 – 20 sec

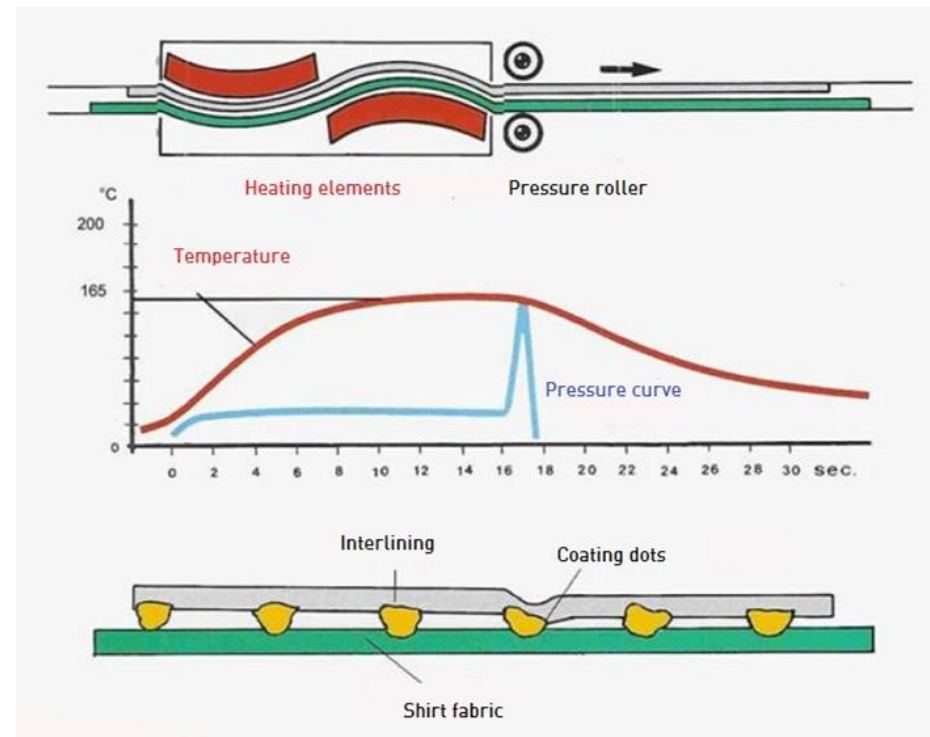


Fusing on the fusing press



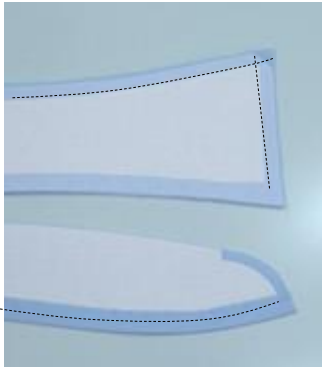
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Fusing is the interaction of
HEAT (= Temperature + Fusing time) and
PRESSURE

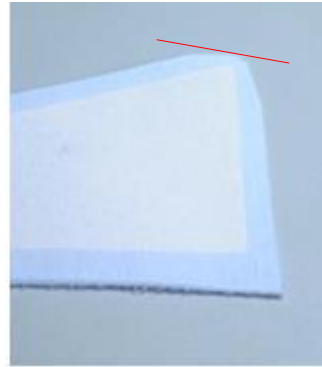


Main steps of sewing the shirt collar

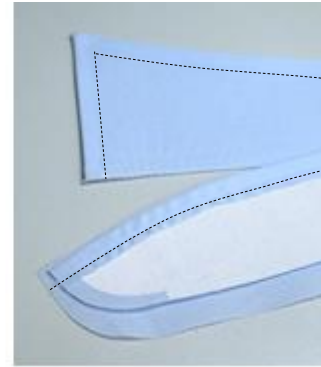
runstitching



cutting



topstitching



sewing



Ironing – Influence of heat

Temperature of the soleplate of a household iron acc. to DIN 44885

Adjustment	Average Temperature °C	Lower limit °C	Upper limit °C
•	95	70	120
••	130	100	160
•••	175	140	210
Maximum	220	180	260



The temperature adjustment for ironing shirts should therefore not exceed the  adjustment.



- This was a short trip into the field of interlining finishing and special requirements regarding interlining articles
- Please feel free to contact us if you
 - come across interlining manufacturers
 - have any questions regarding interlining finishing
 - need information on our corresponding products



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The above indications are based on the latest state of our knowledge. Due to different operational conditions and requirements these are guidelines only. A legally binding assurance cannot be drawn from our indications. Our technical staff will always be at your disposal to support you in testing our auxiliaries and to answer further technical questions.

04/2016