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TEXTILE AUXILIARIES

## Selected Auxiliaries for the Finishing of Wool





Worth knowing

Structure and properties

Species

Statistics

Auxiliaries

Pretreatment

Dyeing

Finishing

## The wool fibre is ...



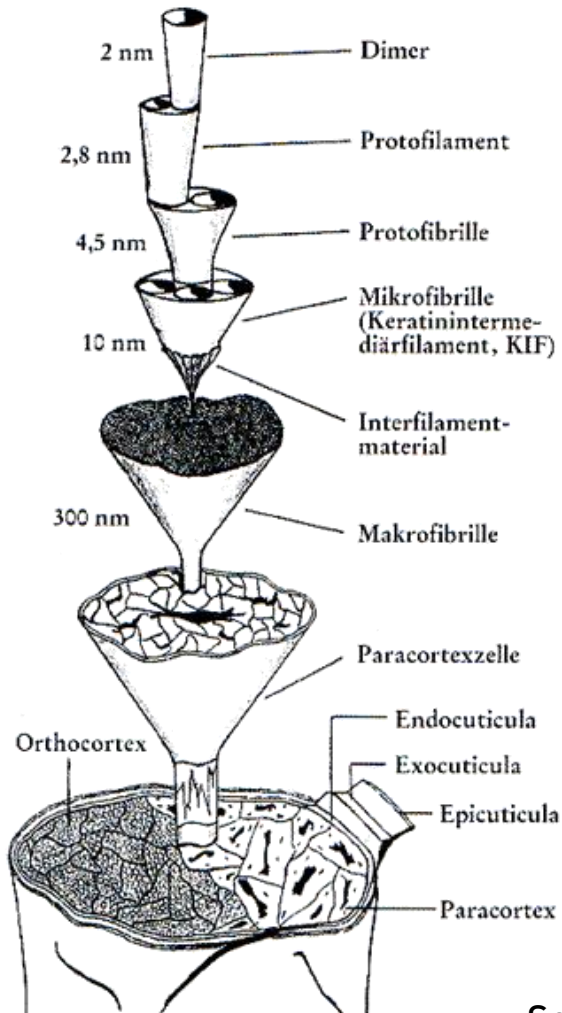
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- a natural, spinnable staple fibre with more or less strong scale structure
- renewable resource, gained from animals (mammal)
- a protein fibre based on keratin
- probably oldest raw fibre, which has been used by humans to make cloths (for more than 9.000 years)
- to this day, despite synthetic fibers and cotton in the international economy of great importance

# Structure of wool (sheep)



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- high-tech keratin composite
- build up as a complex structure, which provide the fibre with impressive properties
- inside: cortex cells (based on hydrophilic keratin filaments)
- outside: multilayer cuticula (hydrophobic, but steam permeable)

Source: H.K. Rouette – Handbuch Textilveredlung

# Properties



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Water resistant	Hydrophobic F-Layer (epicuticula)
Hygroscopic	Carboxyl and amino groups of the keratin can bind water, < 33 % of its own weight – without feeling wet
Good isolating properties	Between the cortex cells space is present, which is filled with air.
Expandable and elastic	Keratin filaments are crosslinked by disulfide (-S-S-) bridges, van der Waals forces and hydrogen bridges between protein chains.

## Good dyeable

Because of the amino groups, which are protonated under acid conditions ( $-\text{NH}_2 + \text{H}^+ \rightarrow \text{NH}_3^+$ ), anionic dyes interact and can form stable salt bindings.

## Flame retardant properties

Keratin contains high amounts of nitrogen and sulfur 3 – 4 % (amino acids, cystine). After ignition the flame will extinguish rapidly.



**Sweat absorbing properties**

Salts are bindet by amino and carboxyl groups. Smell is signifcantly lower e.g. compared with cotton or synthetics.

**Can bind harmful**

Formaldehyde and other gases harmful gases can be absorbed and bound chemically by the fibre. A woolen carpet keeps the air in rooms clean.

## Sensitive to alkaline



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- Depends on
- type of alkali and quantity
  - temperature
  - time

The use of small amounts of ammonia and soda ash (pH < 9) at max 50 °C causes little fibre damage, only.

**Strong alkali** (pH > 9) in combination with higher temperatures (> 60 °C) will split the bonds of the peptid chains (hydrolisation). Then the wool is heavy damaged or destroyed completely.



# Species of wool



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- sheep
- goat
- camel
- lama
- rabbit

# Merino



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**Origin**

Australia, New Zealand, worldwide

**Characteristics**

- short staple fibre,
- very soft and elastic,
- with strong natural crimp,
- used for high quality outerwear



**Origin**

**Great Britain, Australia, New Zealand, USA**

**Characteristics**

- long and thick staple fibre,
- hard and stiff handle,
- low natural crimp,
- mainly used for carpets, upholstery,
- technical application (felts, insulators)



# Crossbred

**Origin**

worldwide

**Characteristics**

- crossing between merino and cheviot
- medium staple fibre
- medium soft, with natural crimp,
- used for clothes, felts, upholstery



# Specifications of wool fibers



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Fiber length	40 – 120 mm (merino) up to 400 mm (cheviot)
Fiber diameter	15 – 120 $\mu\text{m}$ (human hair: 30 $\mu\text{m}$ )
Density	1.32 g/cm <sup>3</sup>
Tensile strength	130 – 210 N/mm
Elongation	28 – 48 %

# Cashmere (goat)



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**Origin**

China, Nepal, Mongolia, Afghanistan, Iran

**Characteristics**

- only 100 g per animal/year,
- very fine, light, soft fibre with elegant lustre
- high thermal insulation properties
- used for luxury scarves, blankets and clothes (often blended with other fibres)



# Angora (goat)



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Origin

Turkey, South Africa, USA (Texas)

Characteristics

- fibre is called **mohair**,
- similar properties like merino wool, but lower tendency for felting, mainly used for clothes, home textiles, toys (plush)



# Camel



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**Origin**

**Arabia, Africa**

**Characteristics**

- heavy duty
- high tensile strength
- for apparel fluffy fibres are used, kempy wool for felt, blanket, belts





# Alpaca (camel)



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**Origin**

**South America (Andes)**

**Characteristics**

- very light, smooth and very soft fibre, with silky shine
- 5-times higher thermal insulation than wool
- low natural crimp
- mainly used for knitted clothes, blankets



# Vikunja (camel)



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**Origin**

**Peru, Bolivia, Chile**

**Characteristics**

- finest fibre, very thin, soft and light,
- most rare and expensive wool in the world, pullover > 3.000 €, pair of socks > 700 €



# Lama



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**Origin**

**South America (Andes)**

**Characteristics**

- light, smooth and soft fibre
- good isolating properties
- non-sensitive to soil
- yarn used for knits and woven outerwear, blankets



# Guanako (lama)



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**Origin**

**Peru, Ecuador, Bolivia, Chile, Argentina**

**Characteristics**

- silky, smooth and very soft fibre
- mainly used for high quality yarns for knits and woven outer wear, fine blankets



# Angora (rabbit)



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**Origin**

**China, Europe, South America**

**Characteristics**

- very soft and warm fibre
- high sweat adsorbing properties
- high tendency to felt
- excellent warming properties
- well known for rheumatism underwear



Source of all animal pictures: Wikipedia

## Top raw wool producers



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- worldwide in nearly 100 countries almost 2.2 million tons of raw wool are produced
- biggest producers (more than 50.000 tons)

Australia

China

New Zealand

South Africa

Argentina

India

Great Britain and North Ireland

...

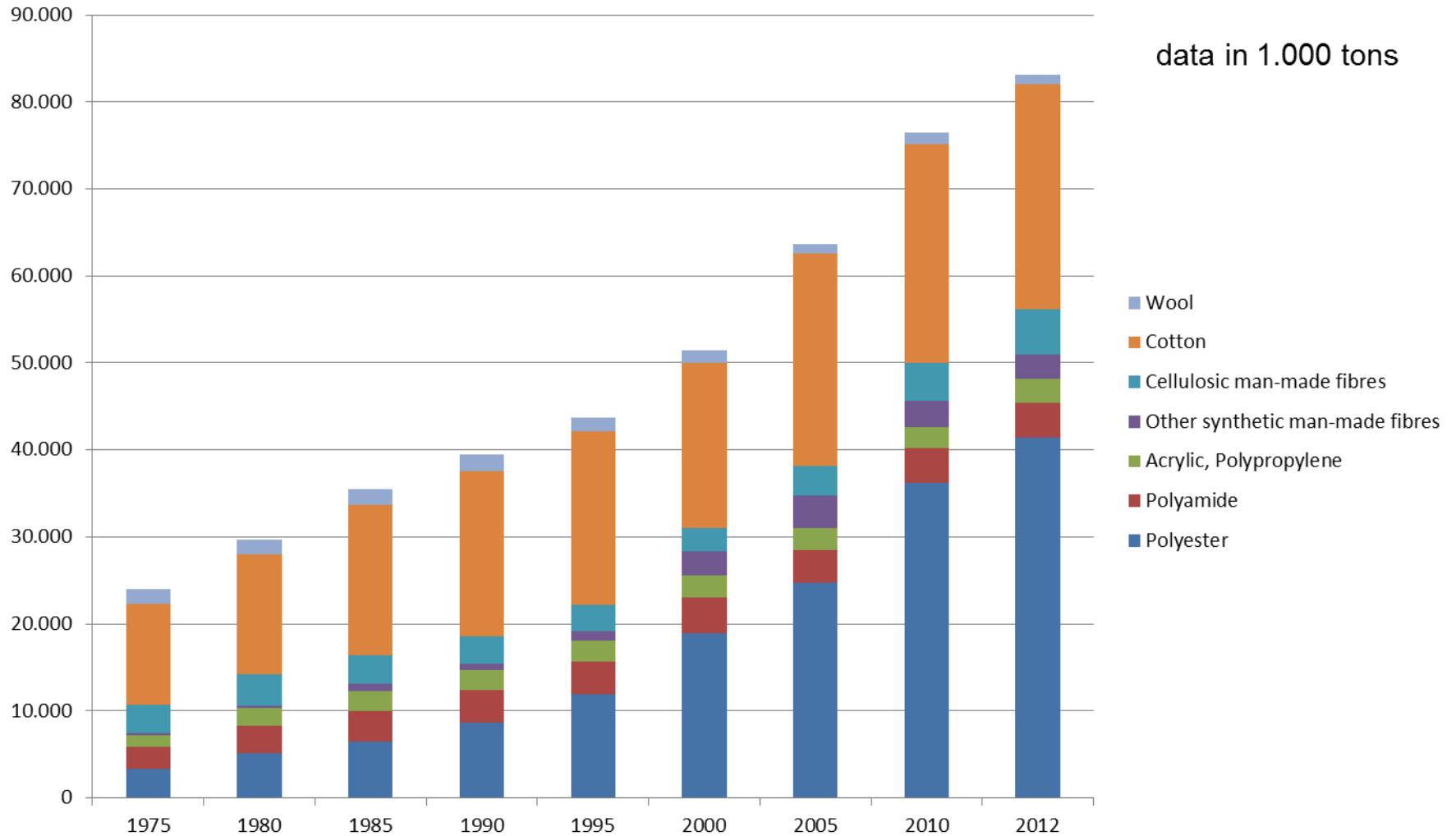
Germany only 8.000 tons

Source: Wikipedia

# World fibre production (1975 – 2012)



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# World fibre production (1975 – 2012)



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	1975	1980	1985	1990	1995	2000	2005	2010	2012
Polyester	3.370	5.130	6.500	8.670	11.950	18.900	24.700	36.210	41.440
Polyamide	2.490	3.150	3.450	3.740	3.740	4.120	3.800	3.970	3.920
Acrylic, Polypropylene	1.390	2.060	2.380	2.320	2.440	2.530	2.500	2.480	2.800
Other synthetic m-m fibres	190	290	790	640	1.060	2.850	3.800	2.970	2.800
Cellulosic man-made fibres	3.200	3.560	3.220	3.150	3.010	2.640	3.300	4.400	5.200
Cotton	11.720	13.840	17.380	19.000	19.960	19.000	24.440	25.100	25.900
<b>Wool</b>	<b>1.580</b>	<b>1.600</b>	<b>1.740</b>	<b>1.930</b>	<b>1.490</b>	<b>1.400</b>	<b>1.100</b>	<b>1.300</b>	<b>1.100</b>
Total of all fibres	23.940	29.630	35.460	39.450	43.650	51.440	63.640	76.430	83.160
Percentage of Wool from Total	6,60	5,40	4,91	4,89	3,41	2,72	1,73	1,70	1,32

data in 1.000 tons

source: IVC (Industrievereinigung Chemiefaser e.V.)



# Auxiliaries



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## Selected auxiliaries



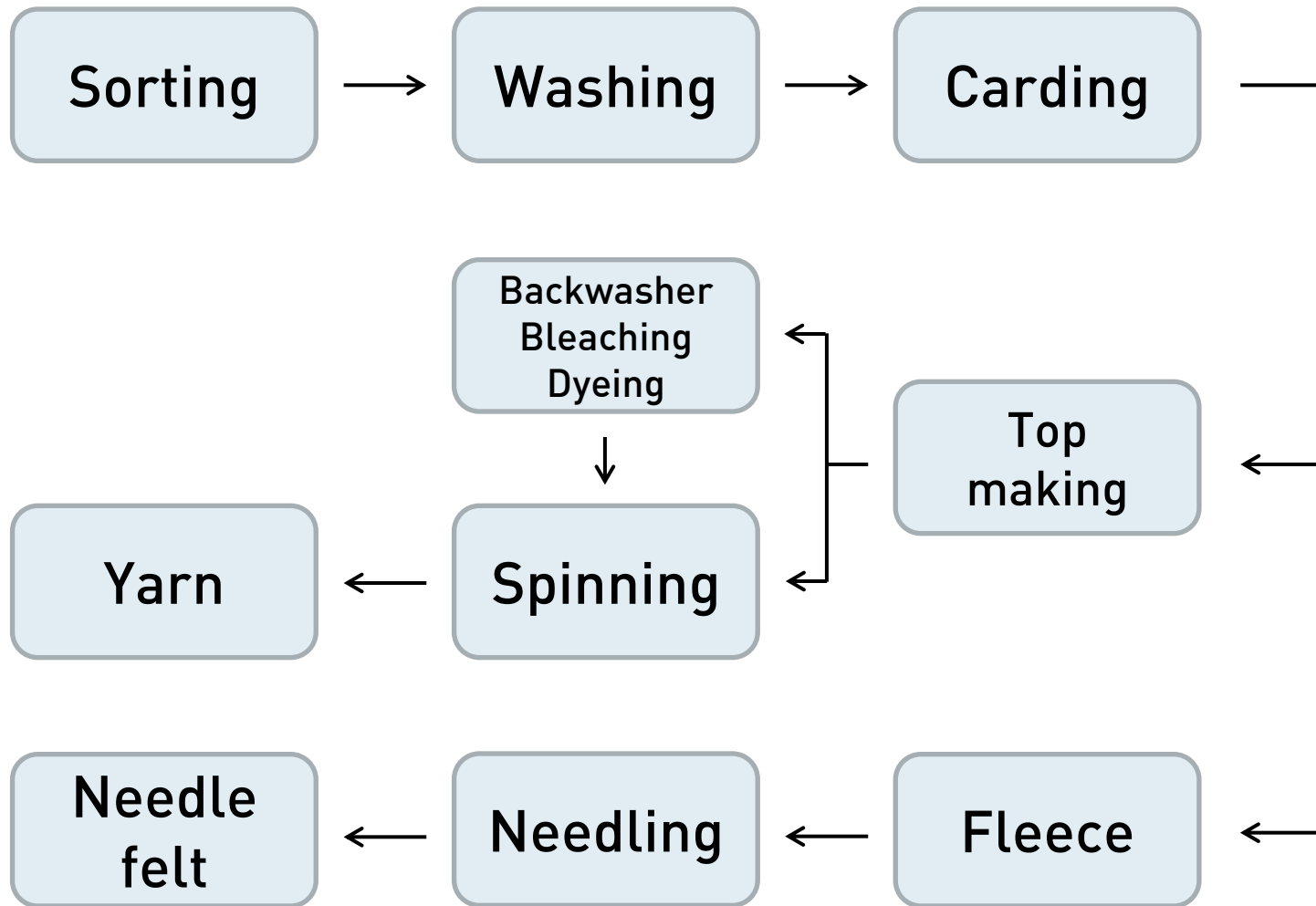
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- raw washing of wool
- pretreatment
- dyeing
- finishing

# Flow chart (simplified)



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# Washing of raw wool



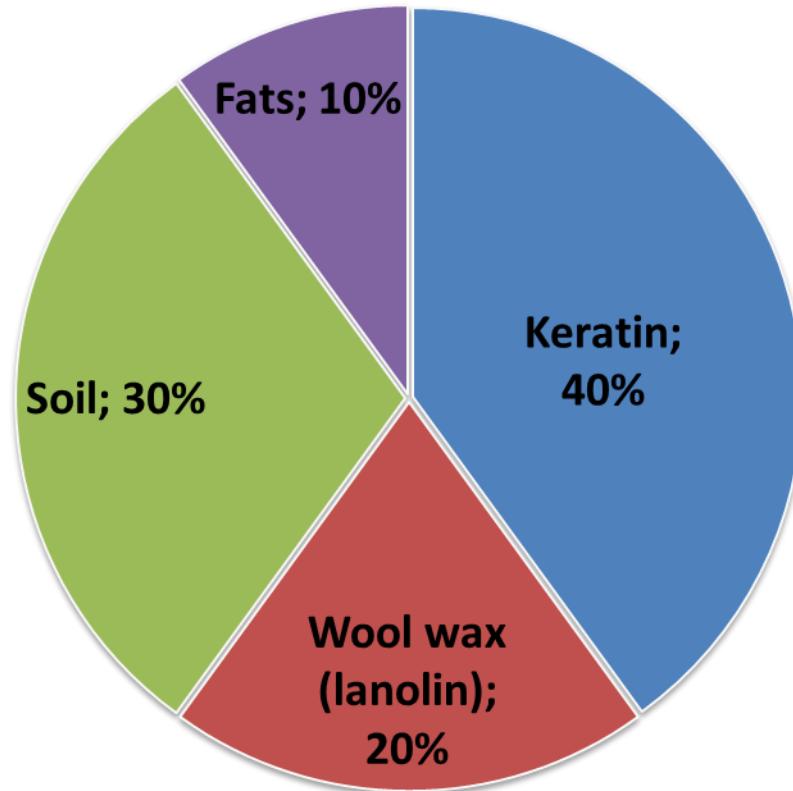
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- first step in wool finishing
- remove impurities, fat, sweat, wool wax from the fibre
- raw wool is scoured and rinsed on continuous ranges, such as Leviathan or perforated drum washing machines

# Composition of raw wool



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simplified – depends on origin and quality of wool

## Guiding recipe (3 scouring & 3 rinsing compartments)

2 g/l PERLAVIN NIC

2 g/l PERIQUEST APG

pH 9 with soda ash

Scouring: 50 / 50 / 45 °C

Rinsing: 40 / 30 / 20 °C  
(water, only)

Universal wetting and scouring agent

## Chemical character

- fatty alcohol ethoxylates
- nonionic

## Properties

- very good wetting
- excellent emulsifying properties (fats, oil)
- low foaming properties

Usage amount            1 – 3 g/l



## Sequestering and dispersing agent

### Chemical character

- blend of organic and inorganic salts
- anionic

### Properties

- excellent dispersion of soil
- very good complexing of calcium and iron ions
- improves the performance of detergents

Usage amount            1 – 2 g/l



# Auxiliaries for the pretreatment



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**Wetting/scouring**

**PERIWET WLN  
PERIWET ANW**

**Bleaching**

**PERISTAL BWO  
PERISTAL IN**

**Chemical Setting**

**PERFIXAN WMA**

**Milling**

**PERLAVIN WAN**



## Wetting and washing agent

### Chemical character

synergistic mixture of alkane sulphonates and fatty alcohol ethoxylates

### Properties

- good wetting and washing effects
- high fat and oil emulsifying properties
- very high soil suspending properties

Application amount 1 – 2 g/l

Wetting and washing agent for very low residual fat content

## Chemical character

synergistic mixture of anionic, nonionic surfactants and natural citrus terpenes

## Properties

- excellent wetting and washing effects (surfactants)
- outstanding fat and oil dissolving properties (citrus terpenes)
- very good soil suspending properties

Application amount 1 – 2 g/l

Activator for the  $\text{H}_2\text{O}_2$  rapid bleaching at neutral to acid pH values

## Chemical base

polycarboxylic acids, phosphonates

## Properties

- activation of peroxide leads to good bleaching results
- low damage of wool compared to alkaline bleaching
- versatile use in continuous, semi- and discontinuous bleaching processes
- lower felting of wool in piece dyeing machines
- whole temperature range (cold to hot)
- loose fibre, top, yarn, woven and knitted pieces

## Guiding recipe rapid bleach



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1 – 2 g/l PERIWET WLN

2 – 6 g/l PERISTAL BWO (20 % of peroxide 35 %)

10 – 30 ml/l hydrogen peroxide 35 %

start at 50 °C, heat up to 80 °C, within 15 min

bleach for 45 – 60 min at 80 °C

rinse warm and cold, continue with reductive bleaching if necessary

For full white bleach it is recommended to do a subsequent reductive bleach in combination with optical brightener.

# PERISTAL IN



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Agent for the reductive bleach of wool in all form such as loose fibre, top, yarn, woven and knitted goods

## Chemical character

stabilized sodium dithionite, including sequestering agent and pH buffer

## Properties

- very good bleaching effect
- damage of wool is comparatively low because of slightly alkaline conditions
- recommended for discontinuous processes in closed machines (sensitive against oxygen)

**Application amount** 2 – 6 g/l

## Guiding recipe reductive bleaching



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1 – 2 g/l PERILAN VF (reduces felting)  
x % optical brightner (optional)  
x g/l Glauber's salt (to increase bath exhaustion of OBA)

heat up the bath to 45 – 70 °C, then add

2 – 6 g/l PERISTAL IN

treat 30 – 90 min

rinse warm (50 °C) and cold with 1 ml/l peroxide 35 %  
in the last bath

Gentle setting agent for stabilizing the dimension of

- twisted wool yarns
- woven fabrics
- knitted goods
- felts

**Chemical character**

organically stabilized sulphite compound

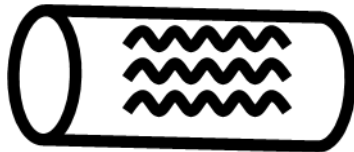


## Versatile in use

- for pressing and decatizing on continuous fixing machines (Contipress, Minicrab)
- for pressing and decatizing on semi continuous fixing process (crabbing jack)
- prewashing and setting on continuous open width washing ranges
- for setting of wool in yarn dyeing machines

## How it works

- disulphite bonds of the fibre are splitted
- inner fibre stress relaxes, the fibre can be brought into a new shape
- with the recovery of the splitted disulphite bonds the new shape of the fibre is fixed permanently



wool fibre in its natural shape, relaxed



same wool fibre, spun, stressed



same wool fibre, setted, relaxed again

# Chemical setting of twisted wool yarn



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without PERFIXAN WMA

5 g/l PERFIXAN WMA

A

B

A

B



A = prior boiling test

B = after boiling test (15 min at 98 °C, pH 5, LR 1:50)

## Prewashing and setting of wool fabric on a continuous open width washing range

2 g/l PERIWET ANW  
20 g/l PERFIXAN WMA

Temperature of  
padding liquor:

80 – 90 °C

Pick up:

100 – 110 % (dry in wet)

Fixation:

3 compartments at 90 / 90 / 60 °C  
dwelling time approx. 4 min

Rinsing:

40 °C, last compartment 20 °C or colder

# Chemical setting of wool fabric



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**mouselin, raw fabric**

**mouselin, washed and fixed  
(PERIWET ANW + PERFIXAN WMA)**

**prewashed without WMA, dyed,  
with pseudo crepe effect**

**prewashed with ANW + WMA,  
dyed, no pseudo crepe effect,  
little felting**

**prewashed with ANW + WMA,  
treatment with PERISTAL WAF,  
dyed, no pseudo crepe effect, no  
felting**

Fibre protecting, washing and milling agent with softening properties

## Chemical character

fatty acid alkanol amides and fatty alcohol ether sulfates (a)

## Properties

- very well suitable for all milling processes in alkaline, neutral or acid medium
- increases the swelling of the fibre, thus milling process is speeded up and process time can be shortened
- due to its softening and advanced gliding properties crease and mill marks are avoided

Application amount 1 – 2 % w.o.g.

# Dyeing wool



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Depends on several factors, such as

- form of fabric
- dyeing device
- qualities of wool
- dyestuff selection
- selection of auxiliaries

Wool can be dyed in all kind of forms on various dyeing devices

loose fibres	pack dyeing apparatus
tops	pack dyeing apparatus, backwashers
felts	beam dyeing apparatus
yarns	cheese and hank dyeing apparatus
woven fabric	beam dyeing, winch beck, soft flow
knitted goods	soft flow
garments	pack dyeing, paddle, drum dyeing machines



- pure wool
- superwash wool (felt free)
- blends with synthetic fibres
  - WO/PES
  - WO/PAN
  - WO/PA
- blends with natural fibres
  - WO/CO
  - WO/SE



- |               |  |
|---------------|--|
| Acid dyes     | <ul style="list-style-type: none"><li>- for all color shades</li><li>- very good levelness</li><li>- low to high wet fastness level</li></ul>  |
| 1:1 MC dyes   | like acid dyes   |
| 1:2 MC dyes   | <ul style="list-style-type: none"><li>- for all colour shades</li><li>- limited in brilliance</li><li>- high wet fastness levels</li><li>- difficult to achieve even dyeing results</li></ul>          |
| Reactive dyes | <ul style="list-style-type: none"><li>- for all color shades</li><li>- very bright shades possible</li><li>- very high wet fastness level</li><li>- difficult to achieve even dyeing results</li></ul> |

Acid and 1:2 metal complex dyes are dyed at pH 4 – 7  
1:1 MC dyes used to be dyed at pH 2

Further criteria of dyestuff selection:

- colour fastness
- light fastness
- wet fastness
- rubbing fastness
- economical
- ecological

- The dyestuff uptake of untreated wool happens at higher temperatures ( $> 80\text{ }^{\circ}\text{C}$ ), because of its hydrophobic nature, caused by the scales.
- The dyestuff uptake of modified wool (hercosett wool, or treated with PERISTAL WAF or PERIZYM AFW) is faster and happens at lower temperatures, due to its hydrophilic surface.
- A simple but effective levelling agent is **Glauber's salt**. The sulfate anions are attached at the positive amino groups of the wool and are slowly substituted by the dyes. Thus the dye absorption is slowed down and the levelness of the dyeing is increased.



## Levelling agents

### **PERIGEN SMV**

acid and 1:1 metal complex dyes

### **PERIGEN MKL**

1:2 metal complex dyes

### **PERIGEN TAM**

reactive dyes

### **PERLAVIN IMU/WO**

low temperature dyeing at  
80 – 85 °C with selected acid dyes

### **PERFIXAN NAB**

tone-in-tone dyeing of WO/PA blends

Levelling agent for dyeing wool with **acid dyes** and **1:1 metal complex dyes**

## Chemical character

alkylamine ethoxylates, aromatic sulphonates  
(slightly anionic)

## Properties

- excellent levelling effect due to its components having affinity to fibre and dyestuff
- good wetting effects

**Application amount** 1.0 – 2.0 % w.o.g.

Levelling agent for dyeing wool with **1:2 metal complex dyes**

## Chemical character

alkylamine polyglycole ether sulfate (amphoteric)

## Properties

- highly effective levelling and migration properties
- excellent dispersing power to 1:2 MC dyes
- good wetting effects

**Application amount** 1.0 – 2.5 % w.o.g.

Levelling agent for dyeing wool with **reactive dyes**

## Chemical character

fatty amin ethoxylates (nonionic)

## Properties

- very good levelness due to its retarding effects (affinity to dyes)
- increases intake and deeper penetration of dyes into the fibre
- good wetting effects
- can be used for aftersoaping and stripping

**Application amount** 1.0 – 2.0 % w.o.g.



# Levelling properties of PERIGEN TAM



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Sheep skin dyed with reactive dye

Recipe:

0.5 g/l PERIWET ELR

x g/l PERIGEN TAM

4.0 % ammonium sulfate

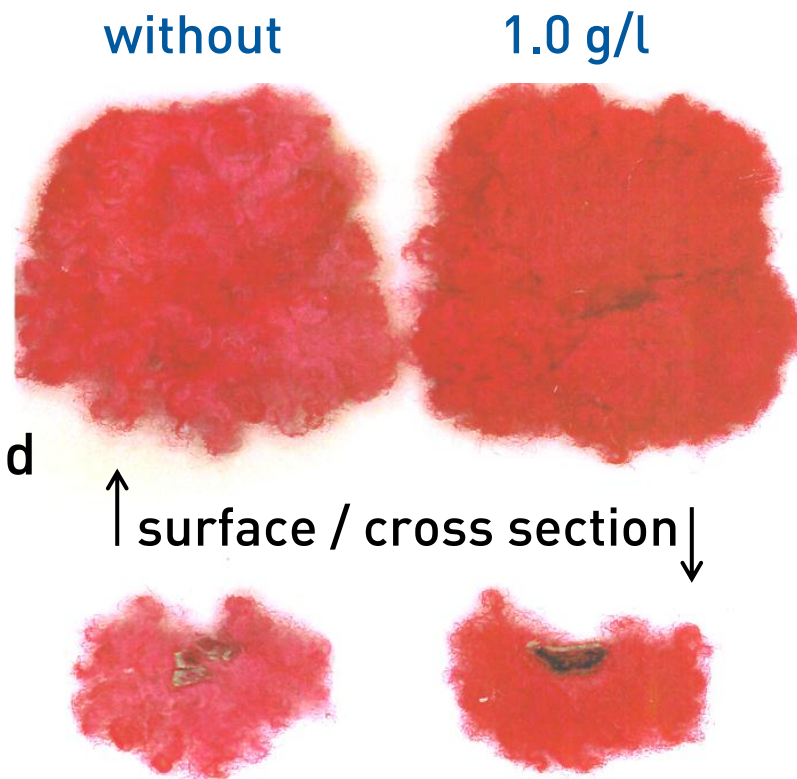
1.0 % Lanazol Red B

pH 5 with acetic acid

Liquor ratio 1:25

30 min at 95 °C

rinsed warm and cold



Dyeing accelerator for dyeing wool with acid, 1:1 and 1:2 metal complex dyes

## Chemical character

fatty alcohol ethoxylates (nonionic)

## Properties

- enables dyeing at 80 – 85 °C with selected dyes
- shortens dyeing time at the boil
- increases penetration of liquor into the good
- improves the reproducibility of dyeings
- can be combined with other levelling agents

Application amount 0.5 – 1.0 % w.o.g.

Fixing agent with special properties to dye WO/PA blends (80/20) with **acid** and **1:2 metal complex dyes**

## Chemical character

polycondensation product of aromatic sulphonic acids

## Properties

- cover the surface of the PA fibre and prevent an early dyestuff uptake at lower temperatures (60 – 80 °C)
- thus an even tone-in-tone dyeing of WO/PA blends can be achieved (light and medium shades)
- resisting of wool against direct dyes if WO/CEL blends are dyed

**Application amount** 2 – 4 % w.o.g.

## Important!

Due to its **anionic** character it is **not** possible to use PERFIXAN NAB together with levelling agents which contain **pseudocationic** components (fatty amin ethoxylates) in one bath.

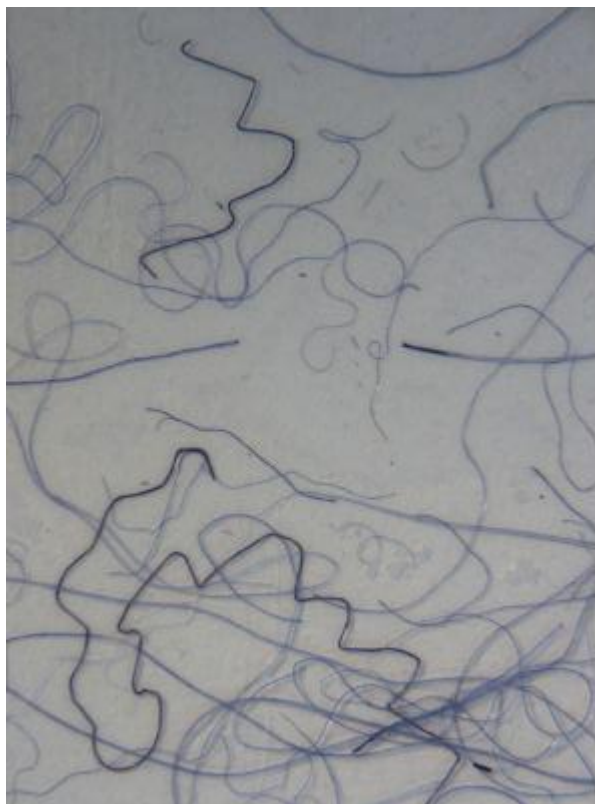
**Strong precipitation will occur!**

Pure anionic levelling agents, such as **PERIGEN DUS conc.** can be used without any problem.

# Levelling effect on WO/PA (80/20)



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without



3 % PERFIXAN NAB

## Other auxiliaries for dyeing



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<b>Wetting agent</b>	<b>PERIWET ELR</b>
<b>Anti crease</b>	<b>PERLAVIN VF</b> with low anti felting properties
<b>Acid donor</b>	<b>PERISTAL GAE conc.</b>
<b>Acid buffer</b>	<b>PERISTAL CSL</b>
<b>Fixing agent</b>	<b>PERFIXAN RD</b>
<b>Fibre protecting agent</b>	<b>PERILAN EW</b> dyeing of WO and its blends at the boil and HT dyeing process with PES

## Chemical character

hydrolized proteins, nonionic – slightly anionic

## Scope

protection of wool at all dyeing processes, e.g. WO/PES blends at HT conditons

## How it protects

Especially under HT dyeing conditions the proteins of the wool will be decomposed (hydrolized) to certain extend. By increasing the concentration of hydrolized proteins (PERILAN EW) in the dye bath, according to law of mass action, lower quantities of hydrolized proteins will be released by the wool.



## Properties

- minimizes the loss of proteins from wool
- protect the quality of wool (elasticity, softness, lustre)
- keep its physical properties (tear strength, elongation)
- no retarding effect to dyestuff
- very well biodegradable

**Application amount** 2 – 3 % w.o.g.





Lubricant	PERIFIL 207/R (yarn) PERFILAN WO/R (spinning) PERIXEN KSP (weaving)
Softeners	PERISOFT GB/CS PERISOFT NANO PERISOFT BWF/R
Antifelt finish	PERIZYM AFW PERISTAL WAF
Fluorocarbon finish	PERIGUARD CSF
Flame retardant finish	PERIGUARD FR/WO PERIGUARD FR/WT



Bath exhaustion lubricant for yarns made of wool and its blends with other fibres

## Chemical character

emulsion of carefully selected paraffins

## Properties

- provide the yarns with optimal gliding properties
- water clear exhaustion, no residues in apparatus left
- can be used on bleached or dyed yarns

**Application amount** 1.5 – 3.0 % w.o.g.



## PERFILAN WO/R

- spinning lubricant
- provides the fibre with good antistatic and balanced fibre/fibre friction for optimal spinning properties

## PERIXEN KSP

- liquid warp wax with smoothening and antistatic properties
- improves the surface smoothness and flexibility of warp yarns



Spinning lubricant for wool

## Chemical character

fatty acid amides and phosphoric acid esters

## Properties

- application by spraying, dipping or on backwasher
- suitable for raw white and dyed wool and blends with synthetic fibres

## Quantity used for spinning

4 – 12 % related to the w.o.g.

Liquid warp wax with smoothing and antistatic properties

**Chemical character**  
polyethylene glycole

## **Properties**

- provides the warp threads with high surface smoothness and excellent antistatic properties
- usable in all common wax devices in the spraying and immersion process
- easy to wash off

## **Recommended quantity**

0.5 – 3.0 % related to the w.o.g.

## Silicone micro emulsion

### Chemical character

modified polysiloxanes (slightly cationic)

### Properties

- provides woolen knits with pleasant handle effects
- increases the resilience and dimension stability of knits
- part of the antifelt finish with PERIZYM AFW or PERISTAL WAF

**Application amount** 2 – 4 % w.o.g.

Hydrophilic silicone nano emulsion

**Chemical character**

quaternary polysiloxan polyalkylene oxide copolymer

**Properties**

- very soft and voluminous handle on woolen goods
- increases the resilience and dimension stability of knits

**Application amount** 1 – 2 % w.o.g.



Excellent softener for wool, polyacrylics and their blends

## Chemical character

fatty acid condensation product, containing lanolin

## Properties

- provides the goods with soft and fluffy handle
- supports the natural soft grip of wool
- lanolin provides the fibre with supple effects
- can be used to improve the raising properties

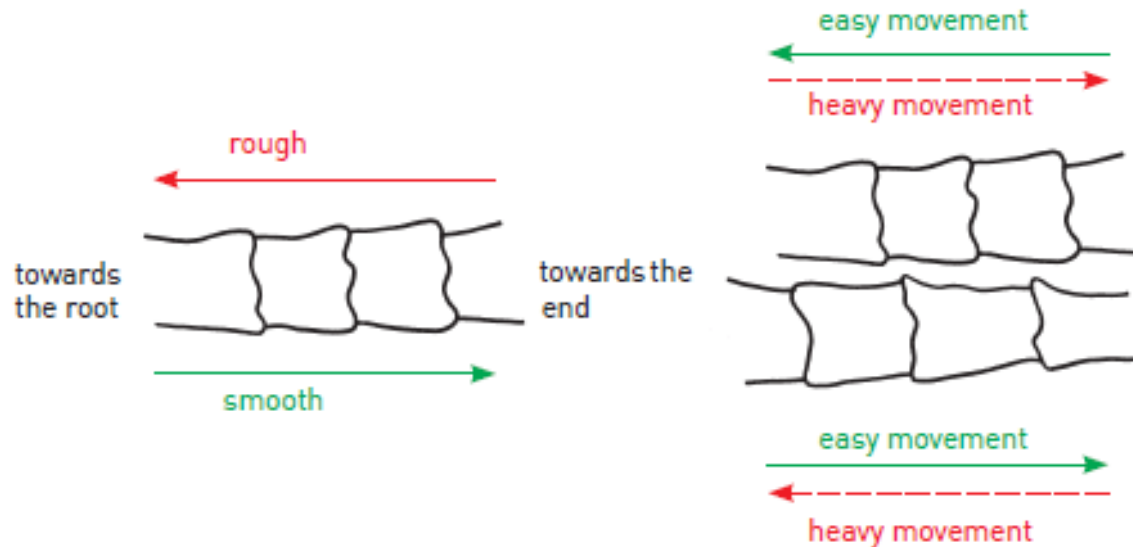
**Application amount** 1 – 2 % w.o.g.



# Antifelting - Why wool felts



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Under the influence of warm, alkaline water, the scales surrounding the fibres rise. Through mechanical action the fibres starts moving. They always move towards the root, because of lower friction. In consequence the textiles made of wool shrink / felt during wet processing or washing.



**Pullover made of untreated wool, prior and after washing in normal household washing machine.**

## Methods for antifelt finish



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To prevent felting of wool and improve its washability in household washing machines, the scales have to be removed and covered.

We recommend **PERIZYM AFW**  
**PERISTAL WAF**

for removing/degrading the scale structure.

To improve the antifelt properties it is recommended to finish the goods with **PERISOFT GB/CS** or **PERISOFT SIV** for maximum surface smoothness.

Highly specific combination of proteases for the enzymatic treatment of wool

## Chemical character

enzyme proteins

## Properties

- reduces the felting behavior of woolen goods significantly (very low felting, but not felt free finish like hercosette wool)
- woolen goods can be washed in household washing machines at 40 °C
- pilling behavior is reduced significantly
- dyestuff uptake and dyeing speed is increased
- wool is provided with hydrophilic effects

## Application example:

Start at cold and adjust the pH of the bath to 8.5 – 9.0 with

0.5 g/l **PERLAVIN NIC** (nonionic, enzyme compatible)

3.0 g/l **PERISTAL WEB** (special buffer system)

Heat up to 70 °C, check pH, adjust with ammonia if necessary, add

0.2 – 2.0 g/l **PERIZYM AFW** \*

Treat 30 – 60 min at 70 °C \*

Drop the bath immediately and rinse with water (40 °C, pH 4 adjusted with formic acid)

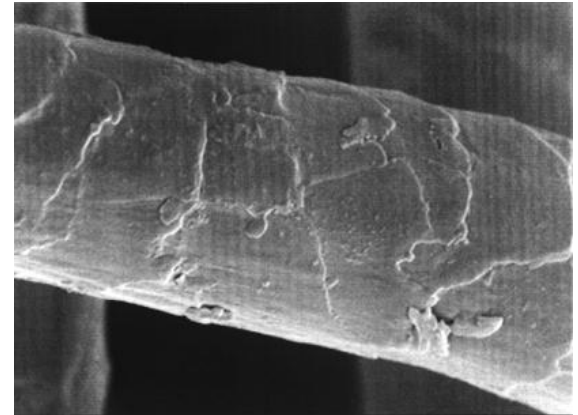
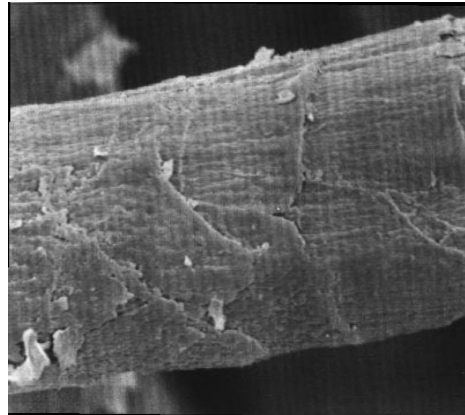
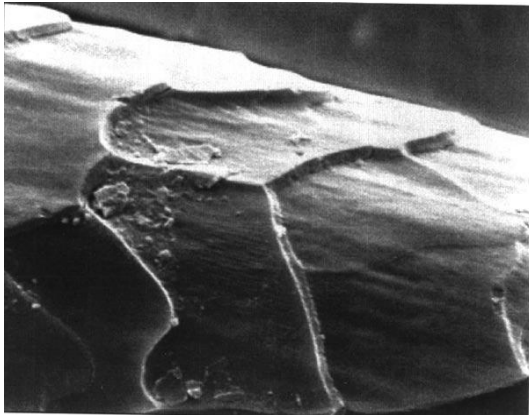
**This enzyme stop is very important to avoid damage of the fibre!**

\* Optimal quantity and treatment time have to be carried out by pretrials

# REM pictures



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- left REM photo of wool fibre
- middle REM photo of wool fibre treated with PERIZYM AFW
- right REM photo of chlorinated wool fibre (Hercosette)

Oxidizing agent for wool as a basic treatment for antifelt finish with polymers, softeners

## Chemical character

inorganic oxidizing agent

## Properties

- good degradation of the scales
- easy process, done at the cold
- good reproducibility
- no risk of fibre damage (if compared with PERIZYM AFW)
- dyestuff uptake and dyeing speed is increased

**Application amount** 5 – 7 %

# PERISTAL WAF



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Application example:

Prewetting the goods with

1 g/l PERIWET ELR

1 g/l soda ash

After 10 min add 5 – 7 % PERISTAL WAF (prediluted in cold water)

Run 20 min at the cold, then add

3 – 4 % sodium sulfite (dyed goods) or

3 – 8 % PERISTAL IN (if not dyed)

Adjust pH to 8 with soda ash and treat 20 min at 30 °C

Rinse warm and cold, continue with dyeing and/or finishing (e. g. with PERISOFT GB/CS or PERISOFT SIV)



## Fluorocarbon finish



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- To provide the goods with water and oil repellent properties fabrics we recommend **PERIGUARD CSF**.
- PERIGUARD CSF can be used by padding or exhaustion as well as lick-roll (yarns).
- Yarns should be finished with PERIGUARD CSF **prior** lubricating with PERIFIL 207/R or together in one bath. This ensures, that after rewinding the water-repellent properties are not affected that much.

Fluorocarbon based on C6-chemistry for the water and oil repellent finish

## Chemical character

fluoroacrylate copolymer (slightly cationic)

## Properties

- provides the goods with very good water repellent and good oil repellent effects
- good wash permanence
- low influence in handle

**Application amount**    3 – 6 % w.o.g.  
10 – 60 g/l in padding liquors  
pure if used in lick-roller devices

## Flame retardant finish



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If a woolen fabric, felt or carpet pile has to be finished with permanent flame retardant properties, e.g. for home textiles, upholstery fabrics, fire protection blankets, we recommend two products:

**PERIGUARD FR/WO**

**PERIGUARD FR/WT**

Both of them have to be applied in strong acid medium using hydrochloric acid. See TDS and MSDS!



## Chemical character

potassium hexafluorozirconate

## Properties

- excellent permanent flame retardant properties, can meet the highest fire safety standards
- low influence of colour shade, therefore suitable for light and bright dyeings
- has to be applied after dyeing in a separate exhaustion process

**Used quantity:** 6 – 12 % related to the w.o.g.

PERIGUARD FR/WO is **toxic**. Follow the safety instructions in the TDS and MSDS.

# PERIGUARD FR/WT



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## Chemical character

potassium fluorotitanate

## Properties

- excellent permanent flame retardant properties, can meet the highest fire safety standards
- influence of colour shade is possible (yellowish), therefore suitable for medium to dark dyeings
- has to be applied after dyeing in a separate exhaustion process

**Used quantity:** 4 – 6 % related to the w.o.g.

PERIGUARD FR/WT is **harmful**. Follow the safety instructions in the TDS and MSDS.



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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.

05/2014