For restricting the permanent setting of wool during dyeing

Dyeing wool at the boil leads to permanent setting of the fibre, and this has a detrimental effect on processing and product performance.

The addition of Basolan AS-A and hydrogen peroxide to the dyebath inhibits this chemical setting process and reduces its adverse effects.

The Antisetting process is a development of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Woolmark; Basolan AS-A is a development of BASF.
Basolan AS-A

Nature
Solution of organic activators

Physical form
Thin, almost colourless liquid

Shelf life
Basolan AS-A can be kept in the original sealed containers at temperatures between –10 and 30 °C for at least 2 years. Once containers have been opened, the contents should be used up quickly. Containers should be closed tightly after use.

Properties

Physical data
- Viscosity: approx. 30 – 40 mPa·s
- Setting point: approx. –10 °C
- Boiling point: approx. 100 – 102 °C
- Density: approx. 1.2 – 1.3 g/cm³

The above data are approximate. Tolerances are given in the product specification.

pH
Slightly acidic

Solubility
Miscible in all proportions with cold or warm water

Stability of the solution
Stable to acids, alkalis, electrolytes and water-hardening substances

Action

Chemical action
During the dyeing of wool, the Basolan AS (Anti-Setting) process inhibits the rearrangement of disulfide bonds between the keratin molecular chains. It therefore restricts chemical setting of the wool fibres in the strained conformations imposed on them by processing and packing prior to dyeing. For example, stretched fibres and kinks are no longer permanently set. Thus, compared with conventionally dyed wool, wool dyed by the Basolan AS process shows practical benefits in subsequent processing steps and in the performance and appearance of woollen garments.

Technical improvements
The following improvements to wool dyed by the Antisetting process have been noted:

- AS dyeing of loose wool or tops:
  Improved performance in carding and spinning
  Increased yarn elongation at break, leading to greater knitting and weaving efficiency
  Improved fabric tensile properties
  Improved handle of knitgoods

- AS dyeing of yarn (package or hank):
  Increased yarn elasticity, leading to greater knitting and weaving efficiency
  Increased bulk of knitting yarn
  Less flattening of yarn at intersection points in a package, leading to a more uniform mesh structure in the knitted fabric

- AS dyeing of piece goods:
  Reduced hygral expansion and hence no puckering along the seams of ready-made garments as a result of changes in humidity
  Less or no running marks and wrinkles
  Increased tensile strength and abrasion resistance

- All forms of AS-dyed wool:
  Clear shades and somewhat better initial light fastness due to a greater basic lightness of the wool
  More level, less skittery dyeings
  Faster drying
Testing the AS effect

The antisetting effect is usually demonstrated indirectly by testing the specific benefits, for example improved weaving efficiency, reduced occurrence of creases and wrinkles, or smaller dimensional differences between the wet and dry fabric. The success of the method is most evident near the limits of processability, i.e. spinnability, weavability or fabric tailorability.

The setting of wool and hence the effectiveness of the Basolan AS process can also be assessed directly by the crease-angle method described in the reference below. This method provides numerical values for the level of permanent set. Typical values are 70 – 80% for conventionally dyed wool and 30 – 40% for AS-dyed. According to data given in the literature, detrimental effects on the properties of dyed wool are already minimized if the level of permanent set is reduced to 40 – 50%.

Application

Basic recipe

Add to the dyeing recipe at the normal application temperature:

0.5 g/l Basolan AS-A (at least 1% on the weight of the goods)
Treat for 5 min, then add

1.0 ml/l hydrogen peroxide 35% (at least 2%)
Treat for 5 – 10 min, then add

0.5 – 2% Uniperol® grades
Depending on the range of dyes, Uniperol SE, Uniperol KW, Uniperol W or Uniperol AC is recommended.
Adjust the pH, if necessary make further additions, treat for 5 – 10 min, add the dye, and dye as usual.

When light shades are being applied at slightly acid pH, it is necessary to compensate for the acid reaction of the peroxide.

Replenishments

Whenever the dye is replenished without changing the liquor, add

0.25 g/l hydrogen peroxide 35% (at least 0.5%)

If the liquor is partly or completely replaced, the new water must contain

0.5 g/l Basolan AS-A (at least 1%)
1.0 ml/l hydrogen peroxide 35% (at least 2%)

Dyeing processes, dye stability

The Basolan AS process can be used with most 1:2 metal-complex, acid and reactive dyes for wool, as well as with disperse and basic dyes applied to fibre blends. It is unsuitable for the majority of 1:1 metal-complex and chrome dyes, though it can be used with C.I. Mordant Black 9.

Woolmark and BASF have carried out parallel tests on the wool dyes of western European manufacturers under agreed standard conditions and can provide information about the suitability of the process for particular dyes. It should be noted, however, that the results only apply to the selected test conditions and to the dye samples tested. Dyers should carry out control tests with their own dyeing recipes.

The Basolan AS process inhibits the normal yellowing or greying of wool under dyeing conditions, so that pale or medium shades appear much brighter. For this reason, too, existing dyeing recipes should be tested.

Wool treated with Basolan AS-A can be bleached in the dyebath as usual with Prestogen® W Liquid and hydrogen peroxide. The Antisetting process should not be used in conjunction with reductive bleaching agents such as Lufibr0l® FW.

Further processing

The improved wearability of piece-dyed fabric due to the reduced hygral expansion becomes particularly apparent if the fabric is less intensively decatized. Intensive decatizing increases hygral expansion (the dimensional difference between the wet and dry fabric).
Reference

Additional information may be found in the following publication:


Stability of dyes
illustrated using Isolan® 1 2S dyes

Test conditions:

Pure woollen serge, liquor ratio 40:1

0.5 g/l Basolan AS-A
1.0 g/l hydrogen peroxide 35%

Treat for 10 min, add dyes in 1/3 RSD (except black and navy blue) and auxiliaries as normal, heat up from 30 to 98 °C at 1 °C/min, dye for 60 min at 98 °C, rinse.

The following dyes are stable under the test conditions:

Isolan Bordeaux 2S-B
Isolan Olive 2S-BGL
Isolan Brown 2S-BL
Supranol Yellow 5GL
Isolan Yellow 2S-GLN
Isolan Yellow 2S-5RL
Isolan Scarlet 2S-L
Isolan Red 2S-BR
Isolan Dark Blue 2S-GL (as navy blue)
Supranol Turquoise 5G
Isolan Black 2S-LD

Lightening of the wool with Basolan AS-A and hydrogen peroxide usually makes the colours brighter. The final shade should therefore be checked under local conditions.

For dyes that are not stable, e.g. Palatin® Fast dyes,
a non-oxidizing antisetting agent is recommended.

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Safety

When using this product, the information and advice given in our Safety Data Sheet should be observed. Due attention should also be given to the precautions necessary for handling chemicals.

Note

The information submitted in this publication is based on our current knowledge and experience. In view of the many factors that may affect processing and application, these data do not relieve processors from the responsibility of carrying out their own tests and experiments; neither do they imply any legally binding assurance of certain properties or of suitability for a specific purpose. It is the responsibility of those to whom we supply our products to ensure that any proprietary rights and existing laws and legislation are observed.

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