La jícara

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Reliable tests

An industrial scale comparison

One of the largest worsted mills in the world compared their chrome process with Huntsman's LANASOL® dyeing process.
2 tons of wool were split, one half was dyed with Chrome Black and the other half was dyed with LANASOL® Black. Both batches were spun with the same parameters:

- 19.5 micron wool
- Yarn count 1/71Nm
- Fibers in cross section: 33
- Spinning speed: 7'800 rpm
- Single twist 719 turns per metre (85.4 α)
- Folding twist 799 turns per metre (135 α)

During all processing steps data were collected and compared inhouse as well as in an independent institute.

Dyeing Recipes: A real life comparison

Chrome dyeing recipe

5 dye-batches of 200 kg wool were dyed with chrome dyes according to the customer's well established day-to-day procedure without any modifications:

4.2	%	Chrome Black PVW
0.4	%	Chrome Yellow 2G
0.4	%	Chrome Red S80

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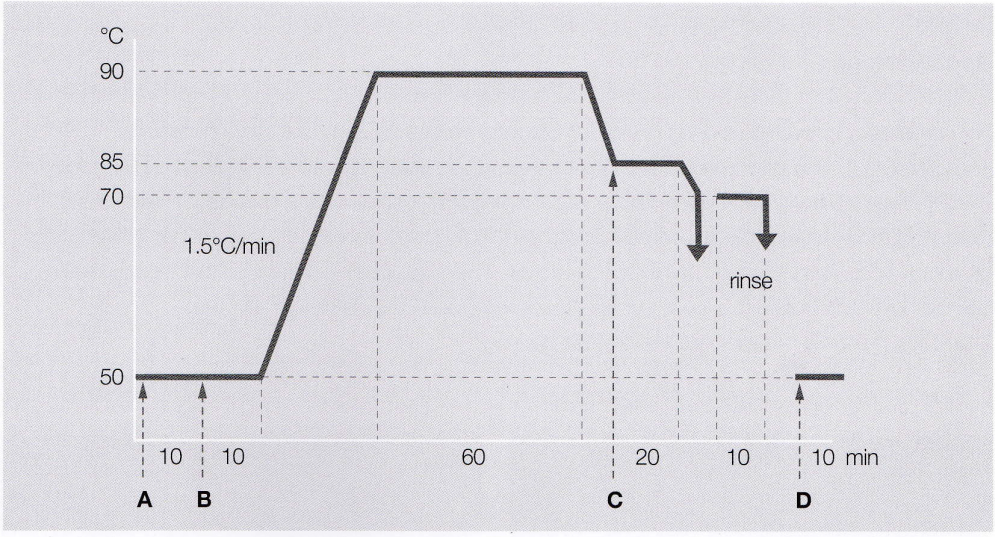
LANASOL® recipe

5 dye-batches of 200 kg wool were dyed according to the following procedure:



A	0.5	g/l	ALBEGAL® FFA	**B**	4.55	%	LANASOL® Deep Black CE-2B
	2.0	%	MIRALAN® LTD		0.50	%	LANASOL® Golden Yellow CE-01
	1.6	%	formic acid 85%		0.40	%	LANASOL® Red CE
C	5.25	g/l	soda ash	**D**	1.0	%	formic acid (85%)

Shade and depth were accepted by the mill as being equal to the chrome dyed wool.
The degree of dye fixation was determined to be 94% (the absorbance of the residual dye liquor was compared to diluted original dye liquor).

Dyeing parameters					
Batch No.	1	2	3	4	5
Batch weight (kg)	200	200	200	200	183
Liquor/wool ratio	1:10	1:10	1:10	1:10	1:12
pH dyeing start (with dyestuff)	4.05	3.96	3.95	3.94	3.96
pH dyeing end (before adding soda)	4.50	4.35	4.36	4.33	4.35
pH after washing with soda ash	8.77	8.66	8.64	8.65	8.63
final pH (after neutralisation)	5.30	5.32	5.31	5.28	5.30

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Average fibre length after dyeing, backwashing, re-combing/finishing and drawing

Lot	As delivered	Backwashing	Blending	Re-combing Finishing	Drawing
Ecru Hauteur mm	72.4	Not applicable	No data	**73.6**	**69.6**
Chrome Hauteur mm	72.4	73.3	66.9	**68.2**	**64.2**
Lanasol Hauteur mm	72.4	72.6	69.0	**72.3**	**69.9**
Ecru % < 30mm	10.0	Not applicable	No data	**8.3**	**10.6**
Chrome % < 30mm	10.0	8.6	11.3	**9.0**	**10.9**
Lanasol % < 30mm	10.0	9.0	11.1	**9.0**	**10.5**

The length characteristics of the LANASOL® dyed lot is significantly better than the chrome dyed lot and even longer than the original Ecru lot.
The Almeter average fiber length results after processing are a very good predictor of fiber strength and highlight the differences between dyestuffs. The LANASOL® dyed lot performed better than the ecru lot in terms of maintaining average fiber length and was far superior to the chrome dyed lot. Therefore, it is safe to conclude that the LANASOL® dyeing procedure is less severe on the fiber than the chrome process.
As a consequence finer high quality yarns can be produced with LANASOL® dyed wool.

Single yarn test results

	Ecru	Chrome	LANASOL®
Yarn count Nm	1/71	1/71	1/71
Irregularity CV%	20.9	23.0	22.1
Thin places/km	573	1066	842
Thick places/km	149	341	248
Nep/km	116	101	81
Yarn strength g/tex	6.0	5.0	5.2
Yarn extension %	5.9	4.3	6.3
End breaks/1000 spindle hrs	89	231	85

All the yarn quality parameters of the LANASOL® dyed yarn are far superior to the chrome dyed yarn and for the most part comparable to the ecru yarn.
On average yarns spun from the LANASOL® lot have 21% fewer thin places, 27% fewer thick places, 11% fewer neps and are 17% more extensible.
Most impressive is the figure of 63% fewer end breaks. The very high number of end breaks for the chrome dyed wool is related to the serious spinning conditions (71Nm yarn with only 33 fibers in the cross section, produced with a spinning speed of 7'800 rpm). This highlights even more the excellent performance of the LANASOL® dyed wool—even under extremely severe conditions a perfect yarn is spun. Differences of such magnitude lead to measurably better productivity in spinning, fewer clearer cuts during winding, better twisting and weaving efficiency and ultimately better fabric quality.

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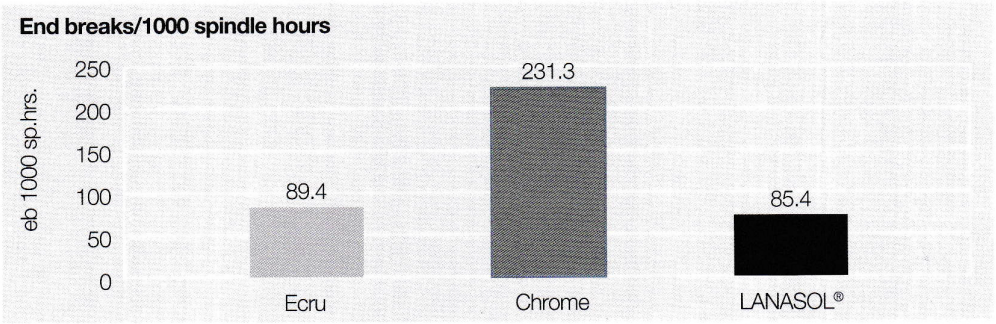
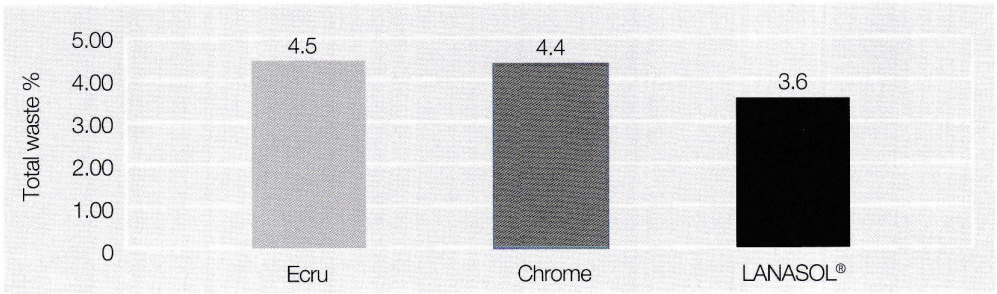
Significant savings/benefits

Savings during spinning



With LANASOL® an end breakage range of approx 85 will require only one operator on one spinning frame. 230 end breaks with chrome dyed wool are impossible to handle for one operator; therefore two operators on one spinning frame with 430 spindles would be required to cope with such a poor spinning batch.
To spin 1'000 kgs of 71Nm yarn on 430 spindles takes approx. 11 days (264 hrs).

Savings due to less waste



Assumptions	*Top dyehouse*	16 tons/day
		220 working days/year
		3'520 tons/year
	Spinning	Yarn: Nm 1/71
		Price: EUR 20.00/kg dyed yarn
	Spinning yield	95.6% Chrome dyes
		96.4 % LANASOL® CE dyes

Result Dyeing with LANASOL® CE produces 28 tons of additional yarn per year which at the going price of 28 USD/kg, **means annual savings of 784.000 USD!**

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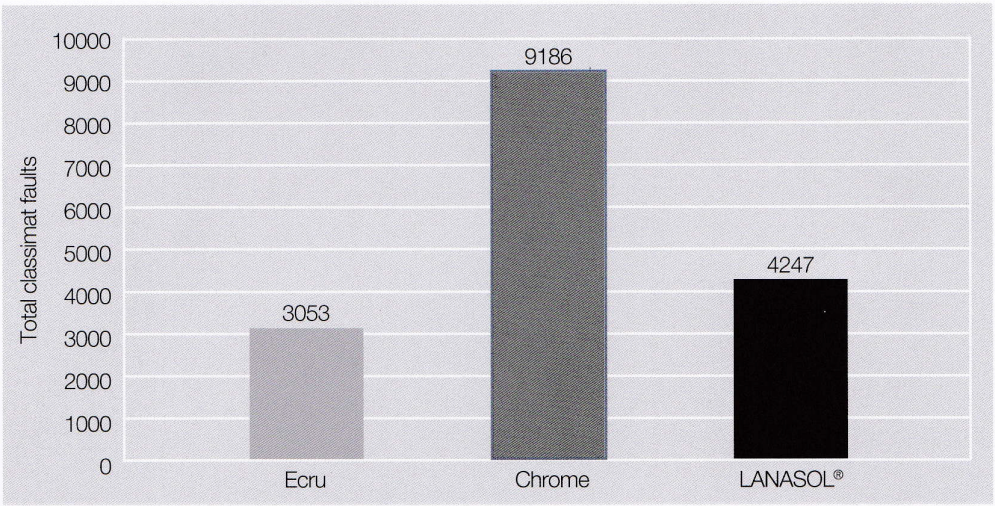
Auto coner classimat results

Test	Fault class	Ecru	Chrome	LANASOL®
Classimat	A	61	82	17
Classimat	B	11	35	17
Classimat	C	1	7	5
Classimat	D	0	1	0
Classimat	E	0	0	0
Classimat	F	92	500	129
Classimat	G	0	0	0
Classimat	H	2880	8540	4010
Classimat	I	8	21	5

Following on from spinning the classimat results correlate with the single yarn faults as the seriously occurring thick LANASOL® yarn faults (Fault class B) are significantly lower than the chrome dyed yarn.
The serious thin LANASOL® yarn faults (Fault class H) are significantly lower than the chrome dyed yarn.



Overall the LANASOL®-dyed lot had 54% fewer faults compared to chrome-dyed lot. With fewer yarn faults to be cleared on the autoconer, machine efficiency and production will be better. Yarns requiring a lot of clearing lead to expensive hold-ups in the production pipeline. Better yarn quality results in better machine efficiency and no bottle necks in production.