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LANADOL

Wetcleaning in practice



Information No. 25

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When, in December 1991, Kreussler jointly with Miele introduced the LANADOL procedure (Miele System Kreussler) to the German public, a clear-cut objective was to be achieved:

- Textile cleaning without perc;
- Improvement of the customer acceptance of professional textile cleaning;
- Improvement of the competitiveness of textile cleaners as compared to domestic cleaning;
- Expansion of the services of textile cleaners;
- Preservation of textile cleaner locations near customers.

For this reason, the LANADOL procedure has been designed in a way that ensures that basically all outerwear textiles, from shirts to evening dresses, can be cleaned.

Because of the almost simultaneous market introduction of textile cleaning with hydrocarbon solvents, wetcleaning was not the only alternative to dry cleaning in perc. In practice, this means that textile cleaners see wetcleaning more as a complement rather than an alternative to dry cleaning in perc. In the market, the certainly convenient practice of substituting the cleaning with perc with a combination of hydrocarbon solvents and wetcleaning was established.

Due to the lack of care labeling for wetcleaning, textiles with care labels (P), (F) were usually treated in hydrocarbon solvents and textiles that can be cleaned domestically were wetcleaned. Therefore, the public image of wetcleaning drifted gradually toward an alternative to domestic fine-fabric cleaning, but not to cleaning with solvent.

This trend is confirmed by the definition of care labeling for wetcleaning that has meanwhile been approached. The indexes for classifying textiles to the care label (W) are used as an orientation for the conditions required for defining care labels for fine-fabric cleaning or domestic cleaning by hand.

This has never been the objective of LANADOL. The aim has always been full service, the hygienic, gentle, and environmentally compatible cleaning of textiles in water.



1. Potentialities and limits

Textiles that have a care label which allows domestic cleaning can be treated with water by textile cleaning companies; wetcleaning is not required. Wetcleaning with the LANADOL procedure goes beyond that: Even textiles with care labels (P) and (F) can be treated.

The meanwhile long-standing experience and advancement of the LANADOL cleaning technology together with the advancements in washing machines, driers, and finishing devices allow the following statements:

- Textiles cleaned with the LANADOL procedure are cleaner, fresher, and more hygienic than textiles treated with any other cleaning procedure using solvents.
- For treating textiles made of pure silk, for modern proofing ware and for textiles made of synthetic fibres and blends, cleaning with the LANADOL procedure is more effective, more gentle, and usually also safer than cleaning with solvents.
- If the LANADOL procedure is performed properly, treating delicate knitwear made of wool, cashmere or lambswool is better and safer than cleaning with perc.
- For sorting suit jackets, textiles made of viscose and linen, delicate knitwear and intensively coloured silkwear to be cleaned with the LANADOL procedure, more meticulousness and more expertise are required than for sorting textiles that are to be wetcleaned.
- For textiles made of cotton and for blends to be cleaned with the LANADOL procedure, the finishing expenditure is lower than for wetcleaning. For trousers, skirts, dresses, and sweaters, it is similar to that of wetcleaning. For suit jackets and woolen coats, the finishing expenditure of the LANADOL procedure exceeds that of wetcleaning.

- Successful implementation of the LANADOL procedure requires specific expertise and careful proceedings. The failure rate with regard to the textiles is lower than in wetcleaning. However, the risks with regard to environmental pollution and operational safety are much lower than for applications with solvents.

2. Instrumental requirements

If wetcleaning is regarded merely as the treatment of textiles that can be cleaned domestically using fine-fabric cleaners or cleaning by hand according to their care labels, all modern washing machines/tumblers can be used provided that they have a fine-fabric or wool program.

The rotatory driers to be used must be equipped with a temperature control that ensures that the exhaust temperature does not exceed 60 °C. The drying programs must be laid out in a way that prevents over-drying (less than 8% residual moisture).





If, however, textiles whose care label does not allow fine-fabric cleaning or cleaning by hand, are to be wetcleaned, the following conditions must be met:

Washing machine/tumbler

Cage radius: > 35 cm
 Cage perforation: Fine mesh with negative profile
 Lifter ribs: shaped as dip ribs
 Level control: liquor ratio 1 : 3 must be possible
 Reversion: programmable control drive required
 Spinning: G-factor > 350; the higher the better

Rotatory drier

Cage radius: > 50 cm
 Cage layout: plain circumference with rounded lifter ribs
 Airflow: horizontal airflow with high flow rate at low air-flow velocity
 Temperature control: Temperature program with control for downflow and exhaust air temperature
 Residual moisture: exact, self-calibrating electronic determination of the residual moisture is required.

Finishing devices

Trouser toppler: with fixture for generating controlled vertical tension. The ends of the trouser-legs must not be capped. Steaming is not required; however, high airflow volume with good heat transfer is required

Clothes shaper: with controlled hem and height tension, controllable air volume and air temperature, concentration of airflow for multi-layer areas on jackets and coats. Steaming is not required; however, high airflow volume is required
 Ironing table: with vacuum and blower system, swivel arm for sleeves
 Laundry press: not necessarily required, but very convenient for ironing trousers and for finishing jackets and coats.

3. LANADOL products

The use of LANADOL products that are the basis for the gentle cleaning of the textiles due to their special formulation is essential for successful wetcleaning with the LANADOL procedure.

The LANADOL product range consists of a finely-balanced prespotting agent (LANADOL AVANT), a special cleaning agent (LANADOL AKTIV), and a postspotting agent (LANADOL APRET). LANADOL LICKER is the specialist for cleaning leatherwear.

LANADOL AVANT is a prespotting agent with particular activity for removing grease and pigments. It is based on perfectly biodegradable surfactants that are particularly gentle on the textiles and on colours.

LANADOL AKTIV is the product for cleaning, colour stabilization, and protection from shrinkage or pilling. LANADOL AKTIV provides textiles with a temporary colloidal fibre protection that prevents pilling of wool and other textiles during the washing process. To achieve this, the polar groups in

the wool matrix responsible for water absorption are blocked by constituents of LANADOL AKTIV so that the water absorption of natural fibres and therefore the swelling effect is reduced. To improve the removal of dirt and stains, the washing effect and the anti-redeposition power were designed to be largely independent of washing mechanical action and temperature.

LANADOL AKTIV is protected by the German patent no. 41 29993, by the British patent no. 22 59520, and by the French application for a patent no. 92 10716.

LANADOL APRET is retexturing agent, anti-static agent, and fibre protection during the drying process. It gives wetcleaned textiles a pleasant feel, improves the wrinkle recovering properties of tissues, fixes ironing effects, and ensures a slightly hydrophobic finishing so that moisture and stains are stopped from penetrating the tissue. During the drying process, LANADOL APRET prevents pilling of wool and makes textiles smoother which aids in the ironing and finishing processes.

LANADOL APRET is protected by the German patent no. 41 27944, by the British patent no. 22 59094, and by the French patent no. 92 10085.

LANADOL LICKER is a self-emulsifying leather grease that regulates the greasing and colouring of leatherwear, keeps leathers and furs supple and has a slight hydrophobing effect.

4. LANADOL procedure

The LANADOL procedures are based on extensive research by Kreussler that has resulted in new findings about the cleaning dynamics. The transference of these findings to the cleaning technology and the procedures resulting thereof have been protected by Kreussler with the European patent specification no. 0468 242. Licences for the use of this patent have been granted to Miele and Electrolux.

The process engineering for LANADOL procedures is laid out clearly and comprises the entire area of requirements for textile cleaning with water in no more than three procedures:

LANADOL SENSITIV: Special procedure for textiles with care label (P) or (F) and all care labels that allow domestic cleaning.

LANADOL EXTRA: Special procedure for textiles with care label "wash by hand" and all other care labels that allow domestic cleaning.

LANADOL NORMAL: Special procedure for textiles with care label "wash by hand" at 30 °C and at higher temperatures.

LANADOL SENSITIV

Cleaning ware classification:

Textiles with care label (P), (F), "wash by hand", and "gentle wash" and all other textiles that can be wetcleaned according to their care label.

When treating textiles with care label (P) and (F) that may not be cleaned domestically, please keep in mind that a treatment of these articles may present a risk (shrinkage, deformation). Therefore, they should only be treated if the knowledge and the capabilities of the operating personnel ensure proper treatment.

Cleaning ware sorting:

Sort the textiles by bright/dark colour and compose batches of textiles with nearly identical substance weight.

Pretest:

Check colourfastness. Particularly for colourations on silk and viscose, perform a rub test with a white cotton cloth that has been moistened with a 10% solution of LANADOL AKTIV in water. If the cloth is dyed, treat the textiles separately or together with dark textiles.

LANADOL SENSITIV procedure:

Machine load:	up to 4 kg of textiles per 100 litres of cage volume
Water inlet:	low level (cage immersion height approx. 12 cm)
Dosage:	5 ml LANADOL AKTIV per litre of liquor
Dipping speed:	1 minute (during dosage)
Gentle reversion:	run time 3 sec., holding time 57 sec.
Temperature:	20 °C
Run time:	8 minutes
Short spin	
Drainage	
Water inlet:	low level
Dosage:	5 ml LANADOL APRET per litre of liquor
Dipping speed:	1 minute (during dosage)
Gentle reversion:	run time 3 sec., holding time 57 sec.
Temperature:	20 °C
Run time:	4 minutes
Drainage	
Short spin	
Final spin:	3 minutes (G-factor > 350)
Drying	

Drying:

Drying in the rotatory drier with air inlet temperature of up to 80 °C, air outlet tem-

perature up to 60 °C and drying interruption at a residual moisture of 12 – 15 %. Loosen up meshware and loose fabrics – including delicate jackets – in the drier for approximately 3 minutes, then allow to air-dry.

LANADOL EXTRA

Cleaning ware classification:

Very dirty textiles with care label "wash by hand" and "gentle washing" and all other textiles with care label "domestic washing".

Cleaning ware sorting:

Sort the textiles by bright/dark colour and compose batches of textiles with nearly identical drying characteristics.

Pretest:

As described for the LANADOL SENSITIV procedure.

LANADOL EXTRA procedure

Machine load:	up to 6 kg of textiles per 100 litres of cage volume
Water inlet:	low level
Dosage:	3 ml LANADOL AKTIV per litre of liquor
Gentle reversion:	run time 3 sec., holding time 27 sec.
Temperature:	30 °C
Run time:	5 minutes
Drainage	
Water inlet:	low level
Dosage:	2 ml LANADOL AKTIV per litre of liquor
Temperature:	30 °C
Gentle reversion:	run time 3 sec., holding time 57 sec.
Run time:	10 minutes
Drainage	
Short spin	
Water inlet:	low level
Dosage:	3-5 ml LANADOL APRET per litre of liquor
Gentle reversion:	run time 3 sec., holding time 27 sec.
Temperature:	20 °C
Run time:	5 minutes
Drainage	
Short spin	
Final spin:	3 minutes (G-factor > 350)

Drying:

Drying in the rotatory drier with air outlet temperature of up to 60 °C and drying interruption at a residual moisture of 8 – 10%. Loosen up meshware and loose fabrics in the drier for approximately 3 minutes, then allow to air-dry.

LANADOL NORMAL

Cleaning ware classification:

All textiles with care label "domestic washing".

Cleaning ware sorting:

Sort the textiles by bright/dark colour and compose batches of textiles with nearly identical drying characteristics.

LANADOL NORMAL procedure

Machine load:	up to 8 kg of textiles per 100 litres of cage volume
Water inlet:	low level
Dosage:	3 ml LANADOL AKTIV per litre of liquor
Temperature:	30 – 40 °C
Reversion:	normal (run time 8 sec., holding time 2 sec.)
Run time:	5 minutes
Drainage	
Water inlet:	low level
Dosage:	2 ml LANADOL AKTIV per litre of liquor
Temperature:	30 – 40 °C
Reversion:	normal
Run time:	10 minutes
Drainage	
Short spin	
Water inlet:	low level
Dosage:	3 – 5 ml LANADOL APRET per litre of liquor
Reversion:	normal
Temperature:	20 °C
Run time:	5 minutes
Drainage	
Short spin	
Final spin:	3 minutes (G-factor > 350)

Drying:

Drying in the rotatory drier with air outlet temperature of up to 80 °C and drying interruption at a residual moisture of approximately 5 %.

LANADOL NORMAL + Proofing

The procedure corresponds with that of LANADOL NORMAL. For extremely dirty cleaning ware, dose 5 g TREBON COLOR or TREBON EXTRA per kg of machine load through the detergent feed chamber to the first bath. The third bath is set to a high level and used as a rinsing bath (i.e. no dosage of LANADOL APRET).

After the final spin, a proofing bath with low liquor level is heated to 30 °C; dosage of

20 – 25 ml HYDROB FC or HYDROB TX per litre of liquor with a treatment time of 10 minutes. Then liquor drainage and spinning at medium speed (G-factor approximately 150) for 3 minutes. If membrane textiles were proofed, interval spinning is required, followed by two successive short spins with an interval of one minute and then by the final spin for two minutes with a G-factor of approximately 150.

Drying is performed at an air outlet temperature of 80 °C to a residual moisture of 2 %, followed by redrying for 5 minutes without temperature limitation.

5. Practical execution

Textile cleaning with the LANADOL procedure is easily learned by persons with experience in textile cleaning. The proper cleaning ware classification and sorting is an essential step in this process.

Cleaning ware classification:

The first criterion is the care label that indicates which LANADOL procedure the textiles must be assigned to.

For textiles with care label (P) or (F) that may not be wetcleaned, there are treatment risks that are not obvious during a quick examination. Particularly jackets may contain interior materials whose dimensional stability is insufficient. In such cases, the textiles may be damaged or require a considerable finishing expenditure. These articles should only be cleaned with the LANADOL procedure if all instrumental conditions are met and if the operating personnel has the necessary experience.

Cleaning ware sorting:

During the cleaning ware classification for the individual LANADOL procedures, the textiles are sorted by bright/dark colours and by their substance weight. Rugged textiles allow a more flexible sorting. However, it must be ensured that delicate silk or viscose textiles (e.g. blouses and dresses) are not treated in the same batch as heavy woolware or cottonware (e.g. winter coats or jeans).

If the cleaning ware quantity is not high enough for fully exploiting the load capacity of the washing machines, the cleaning ware can be classified during the bright/dark and light/heavy classification for the more gentle LANADOL procedure.

Prespotting:

Prespotting should be combined with a thorough examination of the textiles to be cleaned. Check for holes, tears, wear or colour defects and note all defects. Then check the pockets to make sure that they are empty.

For garments with intensive colouration, the colour fastness should be tested. Perform a



rub test with a white cotton cloth that has been moistened with a 10% solution of LANADOL AKTIV. If the cloth is dyed, treat the textiles separately or together with dark textiles.

Recognized stains are prespotted: Brush off large-surface dirt areas (e.g. the inner sides of collars, sleeve ends, trouser-leg ends) with a small quantity of LANADOL AVANT.

Pretreat stains depending on their origin with PRENETT C (oil, grease, paint), PRENETT B (food residues, blood) or PRENETT A (red wine, coffee, tea).

Wetcleaning:

After the cleaning ware has been classified and sorted, it is fed into the washing machine, and the appropriate LANADOL procedure is preselected.

LANADOL AKTIV and LANADOL APRET should preferably be dosed with automatic dosing equipment. Calibrate the equipment according to the type and size of washing machine to ensure that the correct quantity of the LANADOL product is dosed at the right time.

Drying:

After the spinning, the textiles are removed from the washing machine and inserted into the drier. For automatic driers with electronic program control, select the drying procedure that corresponds with the sensitivity of the textiles. For driers without automatic control, the maximum permissible drying temperature and the residual moisture must be monitored to prevent unnecessary finishing expenditure and textile damage resulting from overdrying. After the drying process, hang the textiles using coat hangers before they are checked further and finished.

Spotting:

Stains that are observed in the textiles after wetcleaning can be removed by postspotting.

Spotting is achieved with the DEPRIT product range. DEPRIT GES is the specialist for removing grease stains.

Stains originating from albumin or starch are treated with DEPRIT 1.

Stains originating from paint or wax are treated with DEPRIT 2.

Stains originating from tannin are treated with DEPRIT 3.

Stains of unknown origin are treated with DEPRIT 1. If DEPRIT 1 does not remove the stain, use DEPRIT 2; if the stain is not removed, treat it with DEPRIT 3.

Use DEPRIT FER to remove rust stains.

For detailed information on spotting, please refer to Kreussler Information No. 18.

Finishing:

Basically, the same finishing techniques are used as in dry cleaning.

Particularities are encountered in wetcleaning if textiles can not be dried completely due to their sensitivity in the LANADOL SENSITIV procedure, i.e. if their residual moisture exceeds 10%.

Single-layer textiles (e.g. trousers, skirts, blouses, dresses) can be finished immediately if the drying capacity of the finishing equipment is sufficient. Shaped articles are finished on a clothes shaper without steam or with little steam but intensive hot air and then ironed.

Trousers are blown dry on the topper and then ironed using a laundry press or a vacuum/blow table. Make sure that the creases are positioned exactly.

Multi-layer textiles such as jackets and coats are pretreated immediately after drying using the clothes shaper (treatment with hot air at high pressure) and then allowed to dry on coat hangers at room temperature (e.g. overnight drying). When they are dry, they



are shaped with hot air on the clothes shaper (the usual procedure in dry cleaning) and then ironed on the vacuum/blow table.

For jackets, make sure that the pocket flaps and the seams at the sleeve inserts are finished thoroughly.

6. Kreussler Service

Kreussler offer their application engineering service to all those interested in wetcleaning. This service comprises counselling for plant installations, imparting of experience, machine programming, correct setting of dosing equipment for LANADOL products and personnel training. In addition, the knowledge required to classify and sort cleaning ware and to perform prespotting, postspotting, and finishing is imparted.

7. Consumption and costs

Due to the low consumption rates for water, energy, and chemicals and as a result of the enormous efficiency of the LANADOL procedures, wetcleaning with the LANADOL procedure is particularly economical.

The LANADOL SENSITIV procedure consumes only 6 litres of water per kg of textiles which is less than the cooling water consumption in dry cleaning. The energy demand is approximately 0.2 kW/h per kg of cleaning ware and approximately 1 kg steam per kg of cleaning ware. The energy consumption is so low in comparison to dry cleaning because solvents must not be distilled and because only a small quantity of water must be evaporated during drying as a result of the high G-factors of the spinning cycle.

The consumption of 15 g LANADOL AKTIV and LANADOL APRET per kg of cleaning ware is also very low.

Per 100 kg of cleaning ware, only approximately € 15,- are required for materials, water, and energy.

Because of the short batch cycles of only 20 minutes in washing machines and driers, three batches per hour can be completed which ensures a high rate of capacity utilization.

8. Environmental safety

Wetcleaning with the LANADOL procedure

Procedural comparison with dry cleaning in perc and hydrocarbon solvents in respect of environmental and health hazards.

Basis

The wetcleaning procedure developed by Kreussler, characterized by the European patent 0 468 242 B1, the British patents GB 2 259 520 B and GB 2 259 094 B, the French patent 92 100 85, the French application for a patent 92 10716 and the German patents DE 41 29 993 A1 and DE 41 27 944 A1 (holder of all patents: Chemische Fabrik Kreussler, Wiesbaden) was introduced to commercial textile cleaning in 1991 and therefore established the new operational procedure known as "wetcleaning". Until today, wetcleaning procedures are subject to restrictions in applications for textiles that are very sensitive to the influence of water and are susceptible to dimensional changes.

When comparing the environmental safety and the potential health hazards of the LANADOL

DOL procedure with conventional dry cleaning procedures as described below, it must be considered that a complete substitution of dry cleaning with wetcleaning procedures is not possible at present due to partially existing textile-related application restrictions.

A. Potential hazards

Dry cleaning machines for perc and hydrocarbon solvents are characterized by the fact that they contain, in addition to the installation for textile cleaning (moving perforated cage for washing and drying), installations for the use of solvents, such as reservoirs, pressurized pipes for transporting the solvent from the reservoirs to the cage, filter systems with solvent pressures of up to 3.5 bar and distillation systems where solvent is recovered by distillation and condensation. On an average, the amount of solvent stored in the dry cleaning machines is ten times the mass of the machine's maximum load capacity. For a cleaning machine with a load capacity of 25 kg of textiles, usually 250 litres of solvent are stored.

During the permanent operation of the cleaning machines, approximately 5 litres of solvent per kg of cleaned textiles are distilled. In perc cleaning machines, distillation is performed at 125 – 135 °C under ambient pressure. Due to the high boiling temperature of hydrocarbon solvent (180 – 200 °C), vacuum distillation is required for these machines.

The dirt removed by textile cleaning accumulates together with the auxiliary chemicals (dry cleaning detergent, retexturing agent, proofing agent, stain removing agent) and solvent residues (approximately 50 – 70 % of the overall quantity) in form of distillation residue. This residue is removed from the distillation container by pressure pumps and



fed into separate metal barrels where it is stored and then collected at regular intervals (usually once a month) by a disposal company.

To compensate solvent losses in the cleaning machines, solvent must be refilled every two to four weeks. For this purpose, perc from double-walled metal barrels is fed into the machine through completely closed coupling systems. Hydrocarbon solvent is supplied in PE canisters and fed directly into the machine from these containers.

Storage, use, and regeneration of the solvent in the cleaning machines as well as handling, intermediate storage, and transport of the distillation residues present potential hazards that may result e.g. from accidents in the plant.

In wetcleaning, the conditions are quite different. As with domestic washing machines, the water is withdrawn directly from the existing water supply line and then drained immediately after use into the local sewage water system. This means that the "solvent" water used in wetcleaning does not present a hazard to the environment or to health.

B. Consumption

In dry cleaning, 20 – 30 g perc or 15 – 30 g hydrocarbon solvent per kg of textiles are consumed. The major amount is released into the atmosphere where perc may contaminate the ground due to condensation and rain.

For the condensation during distillation and for the recovery (drying), perc cleaning machines require approximately 10 litres of cooling water per kg of cleaning ware, hydrocarbon solvent cleaning machines require approximately 12 litres of cooling water per kg of cleaning ware. When re-

cycled, the cooling water can be reused several times.

Wetcleaning machines require 6 – 8 litres of "washwater" per kg of cleaning ware. This means that the quantity of water consumed for cooling in dry cleaning machines is approximately the same as in wetcleaning.

In dry cleaning, 10 – 15 g dry cleaning detergent per kg of cleaning ware are used; the dry cleaning detergent usually consists of surfactant preparations in combination with solubilizers. In wetcleaning, approximately 12 g special detergents per kg of cleaning ware are used. These detergents must comply with the biodegradability requirements of the detergent and cleaning agent act, and they must be biodegradable by more than 90% according to the OECD screening test.

Wastewater from a wetcleaning machine has the following average values:

pH:	6,6 – 6,8
CSB:	approximately 1,500 – 2,500 mg per litre
AOX:	0.00 – 0.02 mg per litre
hydrocarbons (H 18):	2 – 10 mg per litre
saponifiable oils and greases:	100 – 250 mg per litre.

With these values, wastewater from wetcleaning is in accordance with the requirements for discharging household wastewater into local sewage water systems.

In addition to these consumptions, the expenditure for raw materials, energy, production risk, storage, and transport required

for the production, distribution, storage, disposal, and recycling of the solvents used in dry cleaning must be considered. In wetcleaning, this expenditure can be omitted completely.

C. Evaluation

For wetcleaning, the water consumption is approximately one fourth of the water consumption in domestic fine-fabric cleaning. This consumption corresponds approximately with the consumption in dry cleaning.

Sewage water from wetcleaning contains in addition to the approximately 10 – 15 g dissolved dirt (pigments, food residues, body secretions, etc.) per kg of textiles approximately 5 – 8 g residues from cleaning and finishing agents per kg of textiles which is in accordance with the requirements of the German detergent and cleaning agent act.

For dry cleaning with perc and hydrocarbon solvents, additional expenditure arises for the solvents and for the energy required for the solvent regeneration.

To evaluate the humanotoxicological and ecotoxicological data of perc and of hydrocarbon solvents, please refer to the extensive documentation of the senate commission for setting up TLV and BAT as well as to the R and S clauses of the dangerous substances regulation.

9. Textile care marketing

Wetcleaning with the LANADOL procedure offers commercial textile cleaners the chance of expanding their service range: No longer

merely specialists for formal clothing, but also specialists for easy-care clothing and for all other services around textiles.

Furthermore, the LANADOL procedure is the chance for offering cost-efficient services and for attractive prices for modern, easy-care textiles. On this basis, business can be

extended to cleaning shirts, sportswear, bedware, outdoor articles (sleeping bags) and, of course, cuddly toys.

The LANADOL procedure is the key to services all around textiles. It ensures hygienic, safe, and healthy cleaning and is perfectly accepted by critical consumers. The LANA-

DOL procedure is more energy-saving and ecological than domestic care. It can be installed easily and without restrictions and is cost-efficient to operate.

Wetcleaning with the LANADOL is the ideal way for business expansion and for securing the future of textile cleaners.



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