
Report on the European Wet Cleaning Committee

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Mr. den Otter is Manager of the Dry Cleaning Department at the Cleaning Techniques Institute. He is developing alternative cleaning methods for dry cleaning, as well as cleanup methods for soil and ground-water pollution. In addition, he serves in a workgroup of the Dutch Ministry formulating the update of the General Administrative Order (Dutch Environmental Act) involving safe working conditions for the Dutch dry cleaning industry. Mr. den Otter holds Engineering and Physical Chemistry degrees from a technical college in Amsterdam.

I have been a research manager and senior adviser at the TNO Cleaning Techniques Research Institute in Delft, The Netherlands for 26 years. Wet cleaning has been one of the major areas of our activities, and will continue to be so in the near future.

Throughout Europe, discussions have been taking place about wet cleaning. IDRC (a collaborative bond of European institutes for dry cleaning) and CINET (an international committee on textile care), has discussed this subject extensively. The heart of the matter is how to show consumers that garments have to be treated by a professional wet cleaner; it is absolutely necessary to distinguish between washing and wet cleaning.

The members of IDRC and CINET unanimously agree an adequate care label must therefore be developed. Efforts to produce a wet cleaning label, and a test method which satisfies the demands of wet cleaning, have to be discussed at a national and international level.

In order to create a professional platform for European discussions and decisions, British, Dutch, German, and Swedish research institutes organized a summit held in Delft on October 23, 1995. At this summit, after intensive discussions of all technical possibilities and operational requirements, the European Wet Cleaning Committee (EWCC) was founded. In addition to providing a professional platform, EWCC's aim is to establish wet cleaning as an adequate cleaning method in the field of dry cleaning, without the risk of textile damage. The founding members of the EWCC are the European members of the IDRC, members of CINET, and the European Manufacturers Council (a group of manufacturers of special innovative textiles and garments). EWCC associated members include

manufacturers of wet cleaning machines/systems, supplier of detergents, and companies which can contribute technical and organizational expertise. The founding of EWCC created a professional platform on which factual and objective discussions and preparations for the wet cleaning care label can take place.

One of the aims of EWCC is the development of an official, accepted care label symbol indicating that a garment can be wet cleaned. In order to create this care label symbol, a test method must be defined. This test method would be used to test garments to see if they can be wet cleaned safely. If the garments pass this test, they can obtain the wet cleaning care symbol.

At the moment, a label for wet cleaning has been determined by GINETEX for three categories: normal, gentle, and very gentle processes. For the label to be used, a test method is required. For this test method to be established, a round robin trial (RRT) is necessary.

An RRT is a test in which different laboratories participate in order to discover the reliability and reproducibility of the specific test method. Most RRT's are performed more than once, since during the process of a trial, improvements in the test method will emerge. In the case of EWCC's RRT, the draft test method had already gone through a first trial to optimize the method.

The 11 participants of EWCC's RRT are:

- *Research institutes:* FCRA (United Kingdom), Forschungstitut Hohenstein (Germany), IFP-TEFO (Sweden), TNO Cleaning Research Techniques Institute (The Netherlands), WFK Forschungsinstitut für Reinigungstechnologie (Germany).

- *Machine/system manufacturers:* Electrolux (Sweden), John Laithwaite Association (United Kingdom), Miele & Cie. Professional (Germany).
- *Detergent and agent suppliers:* Busing & Fasch (Germany), Kreussler (Germany), Chemische Fabrik Seitz (Germany).

In the first EWCC RRT, two processes were tested: a gentle process for sensitive materials and a very gentle process for very sensitive materials. The RRT tested the dimensional change that occurs with wet cleaning. The 11 participants of the RRT used five different types of machine systems (Miele, Electrolux, Boewe, Aquatex, and Ipso). Each type of machine has different processes and mechanical actions. In the RRT, it must be proved that the same results can be obtained with different machines and program designs. To limit the number of variables in the RRT, process parameters were fixed: washing and drying times and temperatures, liquid ratio, loading ratio, ballast and detergent.

The gentle process was:

wash	pre wash	30°C	5 min.
	pump off		
	main wash	30°C	10 min.
	spin		
	rinse	cold	5 min.
	pump off		
	spin		
drying	inlet temperature	60°C	
	drying to 12-15 percent residual moisture		

The liquid ratio had to be 5 liters-per-kilogram (kg) load and the loading ratio 1 kg load in 25 liters volume.

The very gentle process was:

wash	main wash	30°C	10 min.
	spin		
	rinse	cold	5 min.
	pump off		
	spin		
drying	inlet temperature	40°C	2 min.

The liquid and loading ratios of the very gentle process were the same as in the gentle process.

To determine shrinkage, the processes were performed on an untreated woven wool fabric of the International Wool Secretariat (IWS) called A1 wool. This wool is especially prone to shrinkage, therefore differences between processes can be seen easily. Of course, such wool will not be used for garment manufacturing. The shrinkage in the test method is measured relative to a household washing process. The aim of the first RRT was for the gentle wet cleaning process

to have a 60 percent shrinkage rate as compared to home laundering, and for the very gentle process to have shrinkage rates of 30 percent. The shrinkage rate is determined after one to five complete (washing and drying) wet cleaning cycles.

Slide 6 shows the results of the RRT for the gentle process. In this figure, the results of the participants with similar machines are grouped together. The results are given for each of five (and in some cases six) complete wet cleaning cycles. The shrinkage listed in Slide 6 is the area felting shrinkage of the IWS wool test pieces. The x-axis represents the different laboratories and the y-axis the percent of area felting shrinkage.

One laboratory had very high shrinkage values. In evaluating the process parameters, it became clear that the cause for this high level of shrinkage was that the rinsing part of the process was carried out without detergent and the mechanical action in this particular process (pumping off) was very high. These results show two important parameters for wet cleaning which negatively influence shrinkage. Slide 7 shows the same type of figure for the very gentle process.

These results show us that in order to receive low shrinkage levels, special attention must be given to the performance of the wet cleaning process; washing without special settings and additives results in a much higher shrinkage level.

An inventory of the process conditions of the different participants revealed a number of differences in the process conditions. These differences may be the reason for the variations in results. The first difference is the type of machines used. However, there are still differences in the results from the same type of machine.

Causes for these differences might be:

- The mechanical action during washing.
- Rinsing with or without detergent.
- The centrifugation speed.
- To reach the goal of 12-15 percent residual moisture, drying time for different participants ranged from 4.5 to 11 minutes.
- The hardness of the water at different sites varied from 1 to 20 degrees DH (A German method for measuring hardness).

As this was the first RRT and there were many possible causes for differences in results, the participants were all satisfied with the results. They laid the groundwork for a second RRT which is more defined than the first. For example, in the gentle process in the second RRT, drying time is restricted to a maximum of

7 minutes (in case a 12 to 15 percent residual moisture has not been reached), with 5 minutes being the preferred amount of time. The pH and the hardness of the water will be measured, and the amount of detergent is specified more precisely. The detergent used in the RRT is a solid and becomes a liquid by warming it to 25-30°C. In the first RRT, we noticed variations in the way detergent was used. One participant dissolved the detergent in water. Others heated the detergent and poured it into the detergent hopper. For the second RRT, detergent will be dissolved in 25-30°C water and the detergent hopper will be rinsed with warm water.

During the wet cleaning process, shrinkage occurs during the washing cycle as well as the drying cycle. In the first RRT, a few of the participants measured shrinkage after the washing and drying parts of the process separately. Approximately 75-95 percent of the total shrinkage occurs in the washing part of the wet cleaning process, if the settings for drying are installed well.

Another result of the first EWCC RRT was the shrinkage of a gentle wet cleaning process was only approximately 50 percent of the shrinkage resulting from household washing machines. For a very gentle wet cleaning process, it was only about 25 percent. That's why there's an urgent need to distinguish between washing and wet cleaning.

The results of the first RRT allowed the EWCC to optimize the test method for wet cleaning for the second RRT, which will lead to the development of a care label symbol for wet cleaning.

The manual of the second RRT specifies

Composition of the ballast:	50 percent PES/50 percent CO
Reference material:	A1/SM 12
Number of Reference Pieces:	3 x 8 gentle process; 3 x 4 very gentle process
Preparation of Reference Pieces:	IEC 456, sections 5.6.1.1. and 5.6.4.2

Water:	softened water (hardness and pH to be measured)
Detergent:	2.0 g/l of C13 oxoalcohol 7EO (Lutensol A07/BASF)/ one in each bath
Measurement:	<ul style="list-style-type: none"> • IEC 456, section 5.6.5.1.3.5 (under water) • after each washing and drying cycle • eight washing and drying cycles <ul style="list-style-type: none"> gentle process—four pieces after washing and four after washing and drying very gentle process—four pieces after washing and drying
Aim:	shrinkage values set at (50 + 5) percent gentle and (25 + 2.5) percent very gentle
Calibration Procedure:	after five working cycles ISO 6330 program 7A in reference machine WASCATOR FOM 71
Deviation:	each deviation from test conditions must be registered

This second RRT is planned to be carried out in the fall of 1996 in order to gather enough data for the International Organization for Standards meeting in early 1998. EWCC wants to cooperate with the North American Institutes in the United States and Canada in order to get an international test method and labeling as soon as possible. EWCC welcomed North American delegates to the June meeting at Hohenstein this year and is looking forward to cooperation which benefits all parties.

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EWCC **European Wet Cleaning Committee**

- **IDRC Research Institute**
France, Germany, The Netherlands, Sweden,
United Kingdom
- **CINET**
International Committee of Textile Care
- **DTB**
European Textile Manufacturers Council
- **Associated Members**
 - Machine/system manufacturers
 - Suppliers detergents, agents etc.
 - Technical and organizing contributions
attributing companies

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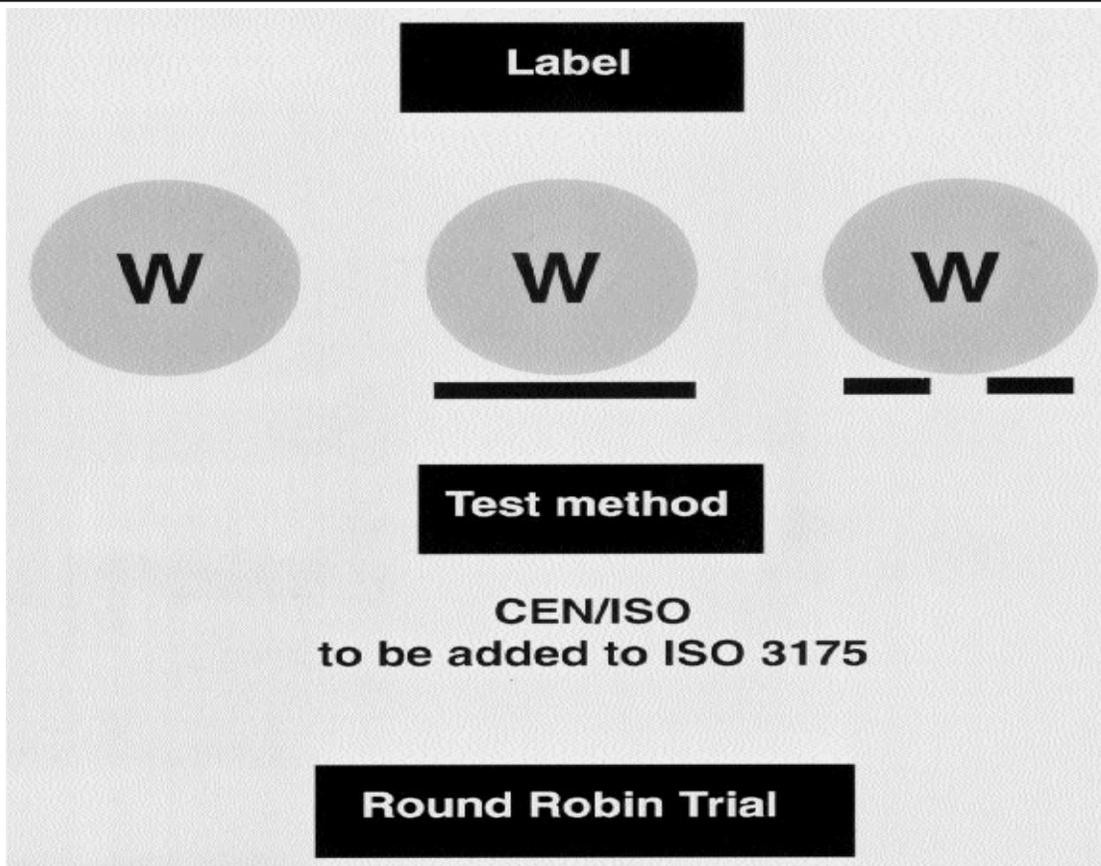
Aims of EWCC

- **To assist and support the cleaner to do a good job**
- **To develop test methods for wet cleaning**
cleaning efficiency, dimensional stability, colour
fastness
- **To propose a care label system for wet cleaning**

In general:

**Establishing the wet cleaning processes to an
adequate cleaning method in the field of dry
cleaning with no risks of textile damages for the
cleaner**

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Round Robin Trial

- 11 Laboratories
FCRA, Hollenstein, IFP-TEPO, IR-TNO, WFK,
Electrolux, JLA, Miele, BuFA, Kreussler, Seitz
- 5 different types of machines
(different processes)
- Process parameters
washing times, temperatures, drying
temperature, drying time, liquid ratio, loading
ratio, detergent

Objective:

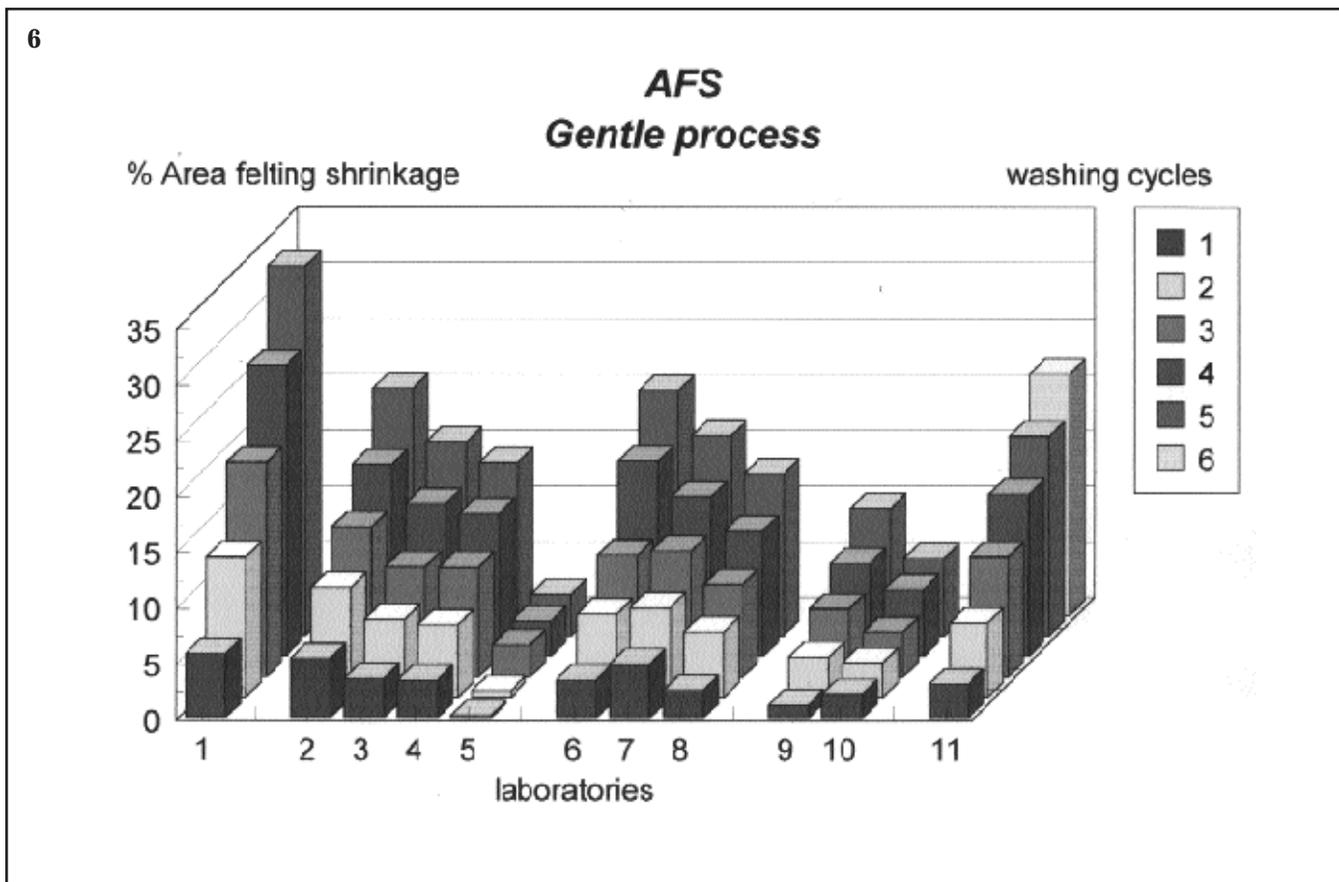
**Development of a test method for wet cleaning
to become a correlabel symbol for wet cleaning**

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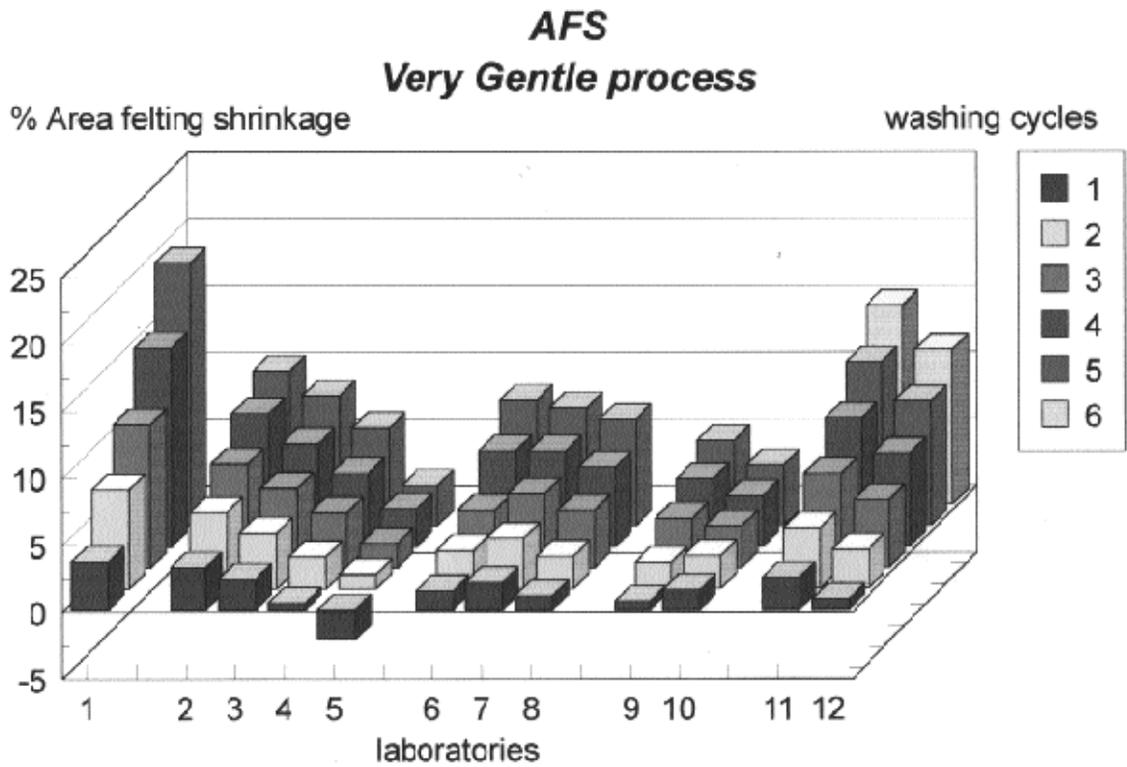
2 processes: Gentle Very Gentle

		Gentle	Very gentle
washing	pre-wash	30° C, 5 min.	-
	pump off		-
	main wash	30°C, 10 min.	30°C, 10 min.
	spin		
	rinse	cold, 5 min.	cold, 5 min.
	pump off		
	spin		
	drying	inlet temp.	60°C
drying time		to 12-15 % residual moisture	2 min.

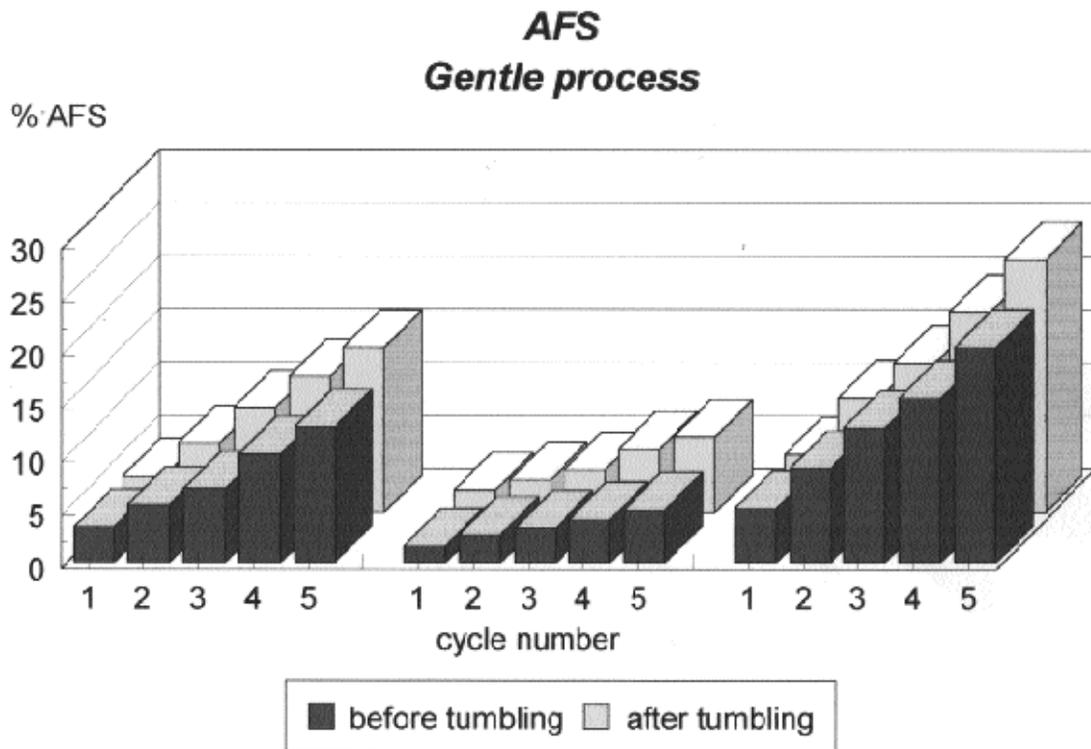
Liquid ratio 1 : 5
Loading ratio 1 : 25



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Manual 2nd RRT

- **Composition of the ballast**
- **Reference material**
- **Number of reference pieces**
- **Preparation of reference pieces**
- **Processes**
- **Water**
- **Detergent**
- **Measurement**
- **Aim**
- **Calibration procedures**
- **Deviation**